Foot Structure in Germanic

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Summary

A foot is an organising unit of prosodic structure built on moras and syllables. Prominence falls on the heads of feet, and feet can be right or left-headed (an iamb or a trochee, respectively). Feet can be constructed from the right or the left edge and lexical stress falls on the head of the leftmost or rightmost foot. The metrical system of a language can thus be defined by (i) the nature of the foot (trochee/iamb), (ii) the direction of parsing and (iii) the foot that carries main stress. Each prosodic word minimally comprises a stressed foot. Germanic languages are traditionally divided into three branches, East Germanic (Gothic), West Germanic and North Germanic. East Germanic has no modern descendants, unlike the latter two branches, which include, for example, English, German and Dutch (West Germanic) and Danish, Norwegian and Swedish (North Germanic). The status of the foot has remained remarkably consistent across the history of Germanic, remaining trochaic and quantity sensitive (although details differ across the relevant languages). This is despite significant changes to the quantity systems of Germanic languages, which have almost exclusively lost the distinction in either vowel or consonant quantity (whereas Proto-Germanic had both). The extensive borrowing from Romance languages across Germanic has also had a substantial impact. Germanic words rarely contain more than one foot, whereas Romance loans are largely longer than native Germanic vocabulary and therefore frequently comprise two or more feet. Due to the fact that native vocabulary was broadly stressed on the initial foot, whereas Romance loans often retained right-edge stress, a choice had to be made as to which foot to stress and the modern languages demonstrate that the right edge was selected in every case. Thus, whilst feet remain quantity sensitive and trochaic, the modern languages construct them from right to left and place main stress on the rightmost foot. This is in contrast to the early stages of the languages, when the opposite was the case.

Key Words: Phonology, Germanic, metrical foot, quantity, Historical Linguistics

1. Germanic metrical structure

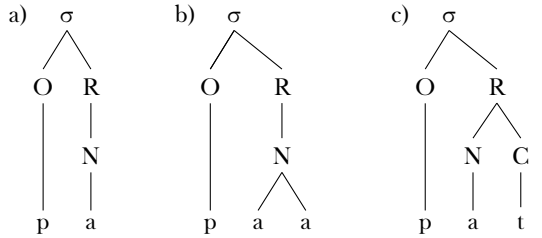
Germanic languages are traditionally divided into three branches, East Germanic (Gothic), West Germanic (WGmc) and North Germanic (NGmc). Gothic is no longer extant and we will review the following languages from the other two branches: Dutch (Du), English (E) and German (G) (WGmc); and Danish (Da), Norwegian (N)[1] and Swedish (S) (NGmc). Regarding diachronic development, we will briefly touch upon the changes from Old English (OE) to Modern English (NE), via Middle English (ME), and Old High German (OHG) to Modern German (NHG), via Middle High German (MHG). Where relevant, we will also refer to Middle Dutch (MDu) and Old Norse (ON).

In order to understand the foot, certain aspects of prosodic structure and organisation must first be established (for a thorough discussion of this topic, however, see Lahiri 2001). For present purposes, units above the word, such as the phonological phrase or intonational phrase, will not be relevant, meaning that our discussion can focus on the lower elements of the prosodic hierarchy. First proposed by Nespor & Vogel (1986), the current received hierarchy can be said to comprise the following constituents up to the level of the prosodic word: Syllable (σ) > Foot (F) > Prosodic Word (ω). According to the standard theory of prosodic phonology, each constituent can be said to be composed of (dominate) units at the level immediately below it. One of these will have greater

prominence than the others and is referred to as the 'head' of the dominating constituent. Due to the longstanding tradition of representing prosodic structure via trees, the head unit is often referred to as occupying the 'strong branch', with non-head elements ('dependents') occupying a 'weak branch'. 'Strong' syllables are thus those which form the head of a foot; the most prominent foot in a word is likewise the one which carries main stress.

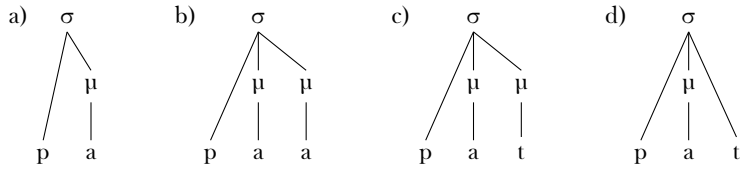
Continuing the arboreal metaphor, syllables—comprising an onset and a rhyme (itself comprising a nucleus and any coda consonants)—can be said to have branching or non-branching rhymes. A non-branching rhyme would have a single short vowel and no coda consonants (e.g. [pa]), whereas a syllable with a branching rhyme would have a (branching) nucleus containing a long vowel (or diphthong) or at least one coda consonant, e.g. [paː]/[paʊ̯], [pat]. This is illustrated in (1):

(1) Examples of non-branching (a) and branching (b,c) rhymes



Syllables can furthermore be characterised as 'heavy' (H) or 'light' (L); broadly speaking, heavy syllables ($\bar{\sigma}$) are those with a branching rhyme and light syllables ($\breve{\sigma}$) are those with a non-branching rhyme. However, this is highly language-specific; some languages may not consider weight distinctions significant, while others may consider only syllables with a branching *nucleus* to be heavy (e.g. Huasteco, Lahiri & Koreman 1988: 218). Others still (e.g. Cayapa, Lahiri & Koreman 1988: 219) treat both syllables with a long vowel and syllables closed by a coda consonant to be heavy (known as 'weight-by-position', cf. Hayes 1995; Lahiri 2001). The status of quantity in the modern Germanic languages is discussed in detail in Section 1.2. According to moraic theory, the unit of syllable weight is the mora (μ), determined by syllable quantity. Units which contribute weight to a syllable (in a given language) are thus each assigned a mora, as illustrated in (2). Therefore, in languages with a quantity distinction, a short vowel contributes one mora to the syllable (2a) and a long vowel two (2b). If a language has weight-by-position, a coda consonant also contributes one mora (2c); otherwise, it contributes none (2d). Generally, onset consonants do not contribute weight to a syllable. In this framework, a heavy syllable is bimoraic (i.e. it carries two moras) and a light syllable is monomoraic:

(2) Moraic representation of light (a,d) and heavy (b,c) syllables



Assigning word stress does not only involve locating which syllable carries maximum prominence, but entails metrical organisation composed of independent but interrelated parameters. A key insight of metrical theories of stress assignment is that all word stress is assigned on the basis of feet. The foot is a constituent of prosodic structure which is constructed from groups of syllables, which could be light or heavy. If the language is quantity-sensitive, the construction of the foot is affected by syllable weight (a product of vowel and consonant quantity, denoted by moras). In

quantity-sensitive languages, the foot can be either left or right-headed; left-headed feet are referred to as trochees, and right-headed feet are referred to as iambs. Iambs are therefore the reverse of trochees and can be built on two light syllables (LĹ), a light-heavy sequence (LH́) or a single heavy syllable (H́).[2] Headedness is only relevant if the foot is branching; whether it is a trochee or an iamb, a monosyllabic foot will comprise a single strong (heavy) syllable, necessarily the head of the foot. If a trochee is insensitive to weight, as in Pintupi (Hayes 1995: 62–4), it is referred to as a syllabic trochee (3a). In contrast, a moraic trochee (3b) is weight-sensitive and maximally bimoraic. A moraic trochee could therefore be built on two light syllables (ĹL) or a single heavy syllable (H́). An asymmetric trochee, on the other hand, ideally comprises a bimoraic head and a monomoraic dependent, as demonstrated in (3c).

Germanic languages are all trochaic with respect to their foot structure, in their present forms as well as historically. The direction of parsing in foot construction is also significant, as this can determine which syllable constitutes the head of a foot (Lahiri 2015). Feet can be constructed from the right or the left edge of the word and main stress is placed on the strong branch of either the rightmost or leftmost foot of the word ('End Rule left/right'). Thus, the three parameters for assigning words stress are foot type, direction of parsing and end rule. The direction of parsing becomes relevant during the mediaeval period and is discussed in detail in Section 3. Trochees are central to any discussion of foot structure in Germanic and will be of particular relevance in Section 2; possible trochaic foot structures are therefore illustrated in (3):

(3) Trochaic foot structures. The foot is enclosed in parentheses, with the strong branch indicated by [x] and the weak branch by a dot [.]. In the case of the resolved moraic trochee, the head is enclosed by vertical bars [|x|]. Main stress is indicated by [X].

a. Syllabic trochee

X	
(x	.)
σ	σ

b. Moraic trochee (two options)

X		X	
(x)		(x	.)
μμ		μ	μ
H		L	L
σ̄		σ̆	σ̆

c. Resolved (asymmetric) trochee: the head |x| minimally comprises two moras[3]

X		X			X			
(|x|)		(|x	|)		(|x	|)	
μμ		μ	μ		μ	μμ		
H		L	L		L	H		
σ̄		σ̆	σ̆		σ̆	σ̄		
X		X			X			
(|x|	.)	(|x	|	.)	(|x	|	.)
μμ	μ	μ	μ	μ	μ	μμ	μ	
H	L	L	L	L	L	H	L	
σ̄	σ̆	σ̆	σ̆	σ̆	σ̆	σ̄	σ̆	

1.1 Synchronic facts of the modern languages

In contrast to the free accent system of Indo-European, stress in Proto-Germanic had settled on the root syllable, which was invariably the initial syllable of the word. The metrical foot has always been left-headed and inherited words are consequently invariably stressed on the same syllable, as can be seen in Table 1. Discussion about foot structure across Germanic must refer to stress across different word types. Germanic monomorphemic words are rarely more than two syllables long and have often been converted into a monosyllabic word in one member of the language family; for instance, English *weather* and German *Wetter* consist of two syllables, but Danish *vejr* and Dutch *weer* only one. Table 1 includes both disyllabic words and some original compounds, all underscoring the fact that stress always falls on the first syllable and that the foot is left-headed.

West Germanic			North Germanic		
E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*
h**á**rvest	H**é**rbst	h**é**rfst	h**ø**st	h**ø**st	h**ö**st
w**éa**ther	W**é**tter	w**ée**r	v**é**jr	v**æ**r	v**ä**der
f**éa**ther	F**é**der	v**é**der	fj**é**r	fj**æ**r	fj**ä**der
b**á**ker	B**ä**cker	b**á**kker	b**á**ger	b**á**ker	b**á**gare
d**é**vil	T**éu**fel	d**úi**vel	dj**æ**vel	dj**é**vel	j**ä**vel
br**í**degroom	Br**äu**tigam	br**úi**degom	br**ú**dgom	br**ú**dgom	br**ú**dgum
br**ó**therhood	Br**ú**derschaft	br**óe**derschap	br**ó**derskab	br**ó**rskap	br**ó**derskap
m**ó**nday	M**ó**ntag	m**áa**ndag	m**á**ndag	m**á**ndag	m**å**ndag

Table 1: Inherited Germanic monomorphemic words and original compounds with stress on the first syllable

However, current Germanic lexicons include a large number of foreign words. Romance loans, which entered the different Germanic languages at various points in time, have caused significant disruption to metrical patterns. The nature of the metrical adjustments in response to these loans critically depends on the point at which they were borrowed. Substantial numbers of Romance words entered late Old English and early Middle English as a result of the historical situation following the Norman conquest. For the other languages, large numbers of loans were absorbed much later, possibly as late as the sixteenth century. The synchronic systems of the individual languages were thus rather different at the time of adaptation. A small sample of words in Table 2 indicates that there is considerable variety in the modern languages with respect to metrical stress.

E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*	STRESS
c**ó**lony	Kolon**íe**	kol**ó**nie	kolon**í**	kolon**í**	kolon**í**	E≠Du≠G=Da=N=S
órthodox	orthod**ó**x	orthod**ó**x	ortod**ó**ks	ortod**ó**ks	ortod**ó**x	E≠G=Du=Da=N=S
gr**á**phic	Gr**á**fik	graf**íe**k	graf**í**k	graf**í**kk	graf**í**k	E=G≠Du=Da=N=S
cr**ó**codile	Krokod**íl**	krokod**íl**	krokod**íl**le	krokod**íl**le	krokod**íl**	E≠G=Du=Da=N=S
élephant	Elef**á**nt	**ó**lifant	elef**á**nt	elef**á**nt	elef**á**nt	E=Du≠G=Da=N=S

Table 2: Similarities and differences in metrical stress in Romance loan words across Germanic. The shading refers to similarities in stress placement.

Despite the surface variation amongst Romance loans, the standard analysis for all Germanic languages holds that the foot itself continues to be left-headed, and thus trochaic. The foot in Germanic has remained constant; as will be shown in Section 3, it is the other parameters which have changed: the direction of parsing has become right-to-left (rather than left-to-right) and the most prominent foot falls on the right edge rather than the left.

However, a further point first requires attention, namely affix-sensitive foot structure. All Germanic languages have borrowed Romance suffixes, but in the early periods of the languages, the only stress-related morphemes were stressless verbal prefixes, some of which survive in the modern WGmc languages (e.g. E *begin,* G *bekommen,* Du *vergeten*). English has lost most such verbs (cf. Molineaux 2012), but they remain in Dutch and German. The modern NGmc languages share these prefixes, but they are loans from MHG (cf. Lahiri et al. 2005) and the synchronic system must assume them to be pre-tonic (Riad 2014). From the middle period onwards, a whole range of Romance suffixes have become part of the Germanic vocabulary and it is here that the metrical system exhibits substantial variation. Once Romance-affixed words had become sufficiently entrenched for the affixes to be treated as separate morphemes, most Germanic languages took recourse to a level-ordered phonological system (cf. Kiparsky 1982 for English; Wiese 1996 for German; Booij 1995 for Dutch).[4] With level-ordered systems, affixes are added at different phonological levels, each constituting a separate domain for a set of phonological rules. The lowest level would be most restrictive while the word level or postlexical level would contain more general rules. For instance, the rule of Trisyllabic Shortening (TSS, the shortening of a long vowel preceding two unstressed syllables) is a Level 1 rule in English, applying only to particular affix domains, such as the derivational suffix *-ous, -al* (*omen~ominous, nation~national*), while aspiration of pre-stress voiceless stops in English is a postlexical rule ([p^{h}]*in~s*[p]*in*). Metrical stress is assigned at Level 1 in all Germanic languages (cf. Table 3) and is only sensitive to affixes added at that level. An alternative solution would be to lexically indicate whether particular suffixes bear stress (e.g. G *-ität,* Du *-iteit*) or if the stress falls on the syllable preceding the suffix (e.g. E *-ity*). A few examples of suffixed forms are given in Table 3. Note that the semantics of these Romance words can easily differ from both their source and their counterparts in other Germanic languages.

E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*	STRESS
univ**é**rsity	Universit**ä**t	universit**éi**t	universit**é**t	universit**é**t	universit**é**t	E≠G=Du=Da=N=S
combin**á**tion	Kombinati**o**n	combin**á**tie	kombinati**ó**n	kombinasj**ó**n	kombinati**ó**n	E=Du≠G=Da=N=S
óptimal	optim**á**l	optim**áa**l	optim**á**l	optim**á**l	optim**á**l	E≠G=Du=Da=N=S
p**ó**litic	Polit**í**k	polit**íe**k	polit**í**k	polit**í**kk	polit**í**k	E≠G=Du=Da=N=S
oper**á**tion	Operati**o**n	oper**á**tie	operati**ó**n	operasj**ó**n	operati**ó**n	E=Du≠G=Da=N=S

Table 3: Stress-affecting Romance suffixes in the Germanic languages

Before we consider the various synchronic analyses of metrical feet proposed in the literature, it is necessary to discuss the status of vowel and consonant quantity across Germanic languages and their relation to syllable weight.

1.2 Quantity Sensitivity

All Germanic scholars agree that the modern languages have maintained a trochee; controversy centres on the quantity sensitive nature of the foot (i.e., whether the foot is a *syllabic* or *moraic* trochee, cf. (3)). Of particular interest are the moraic status of geminate or ambisyllabic medial consonants and short and long vowels. Aside from a few isolated NGmc dialects, such as Nord Gudbrandsdalska (cf. Lahiri et al. 1999), the quantity systems of the modern descendants of Proto-Gmc have undergone significant adjustment and no longer maintain the quantity distinction for both vowels and consonants found in Proto-Gmc. The modern languages can be said to fall into three broad groups: (i) those which have lost underlying quantity distinctions altogether (Icelandic and Faroese), (ii) those which have retained either vowel quantity (English and Danish[5]) *or* consonant quantity (Swedish and Norwegian) and (iii) those which have an ambiguous status (German and Dutch).

To a greater or lesser extent, these languages followed a general trend towards the standardisation of the quantity of stressed syllables, conspiring towards a bimoraic requirement for stressed syllables (obligatory in all of the consonant-quantity languages, but never fully achieved in English or Danish). Thus, following a range of independent but interacting processes affecting the quantity of stressed syllables (such as WGmc consonant gemination and open syllable lengthening, followed by degemination in the WGmc languages), there was no clear evidence to maintain the more marked double quantity distinctions, ultimately leading the languages to select either vowel or consonant quantity and lose the other (see Lahiri et al. 1999 for a thorough discussion). The standardisation of stressed syllables resulted in both vowel and consonant lengthening in Swedish and Norwegian (e.g. Old Swedish *dootter* > *dotter*, *dooter* (dial.) ‘daughter’), with these languages ultimately phonologically maintaining geminate consonants (even lengthening consonants in moraic coda position, e.g. Old Swedish *skip* > *skepp*) and losing underlying vowel quantity,[6] replacing it with synchronic processes of vowel lengthening[7] (cf. Lahiri et al. 1999: 364). In contrast, Danish and the WGmc languages invariably lengthened the vowel and ultimately lost their geminate consonants (cf. Lahiri et al. 1999), as vowel lengthening processes in the mediaeval period of these languages predated degemination, rendering distinctions in consonant quantity largely redundant

and no longer unambiguous to the learner. The differences between the various WGmc and NGmc languages are summarised in Table (4):

	E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*	
Segmental quantity	V	V	V	V	C	C	E=G=Du=Da≠N=S
Quantity sensitive?	Yes	Yes	Yes	Yes	Yes	Yes	E=G=Du=Da=N=S
Quantity & weight	$V_{[q]}$=H	$V_{[q]}$≠H	$V_{[q]}$≠H	$V_{[q]}$=H	$C_{[q]}$=H	$C_{[q]}$=H	E=Da≠G=Du≠N=S

Table 4: A comparison of the quantity systems of the West and North Germanic languages

In English, both closed syllables and syllables with long vowels are considered to be heavy. There is some controversy in German and Dutch, centring on Romance loans, where the medial consonant is suspect and it is claimed that there is no transparent relationship between quantity and weight. Although they maintain an underlying contrast in vowel quantity, there is no such distinction in open syllables, where only long (or tense) vowels are permitted (cf. van der Hulst 2010). It has been argued that these languages have a requirement that all syllables have a branching rhyme (i.e. the syllable must contain a long vowel or be closed by a coda consonant, resulting in ambisyllabicity). This contrasts with Swedish and Norwegian, where this requirement only applies to stressed syllables. Furthermore, a branching rhyme does not necessarily make a syllable heavy in German and Dutch, where only closed syllables are treated as heavy. Various analyses have been proposed for this, as will be discussed in relation to Modern German in Section 4.[8]

1.3 Quantity of final syllables

As was illustrated in Section 1.1, native vocabulary inherited from Proto-Gmc is almost exclusively mono- or disyllabic. As a result, such items are predominantly only a single foot long and thus continue to bear initial stress, as in Table 1. In contrast, words of Romance origin are not only invariably longer, but were frequently borrowed with final heavy or superheavy syllables (particularly in the continental languages). They therefore usually comprise more than one foot—even when disyllabic—and it is in such cases that we see variation in the placement of stress across the languages, due to the differing ways in which they treat the quantity of the final syllable. Table 5 demonstrates the behaviour of monomorphemic trisyllabic loans shared by the six languages which end with either a heavy (VV or VC) or superheavy (VVC or VCC) syllable:

	E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*
V(V)C	**í**nstitute	Institú**t**	institú**u**t	institú**t**	institú**tt**	institú**t**
V(V)C	cr**ó**codile	Krokodí**l**	krokodí**l**	krokodí**lle**	krokodí**lle**	krokodí**l**
V(V)C	p**á**radise	Paradí**e**s	paradí**j**s	p**á**radis	paradí**s**	p**á**radis, paradí**s**
V(V)C	**á**lcohol	**Á**lkohol, Alkoh**ó**l	**á**lcohol	**á**lkohol	**á**lkohol, alkoh**ó**l	**á**lkohol, alkoh**ó**l
V(V)C	m**á**rzipan	M**á**rzipan, Marzip**á**n	m**á**rsepein	marcip**á**n	marsip**á**n	marsip**á**n
V(V)C	b**á**ritone	B**á**riton	b**á**riton	b**á**ryton	b**á**ryton	b**á**ryton
VCC	**é**lephant	Elef**á**nt	**ó**lifant	elef**á**nt	elef**á**nt	elef**á**nt
VCC	**í**ntellect	Intell**é**kt	intell**é**ct	intell**é**kt	intell**é**kt	intell**é**kt
VCC	**á**sterisk	Aster**í**sk	aster**í**sk	aster**í**sk	aster**í**sk	aster**í**sk
VCC	ap**ó**calypse	Apokal**ý**pse	apocal**ý**ps	apokal**ý**pse	apokal**ý**pse	apokal**ý**ps
V(C)C	**á**lbatross	**Á**lbatros	**á**lbatros	**á**lbatros, albatr**ó**s	**á**lbatross	**á**lbatross, albatr**ó**ss
VC	cons**é**nsus	Kons**é**nsus	cons**é**nsus	kons**é**nsus	kons**é**nsus	kons**é**nsus
VC	st**á**dium	St**á**dium	st**á**dium	st**á**dium	st**á**dium	st**á**dium
VC	mus**é**um	Mus**é**um	mus**é**um	mus**é**um	mus**é**um	mus**é**um
VC	c**á**binet	Kabin**é**tt	kabin**é**t	kabin**é**t	kabin**é**tt	kabin**é**tt
VC	p**á**rallel	Parall**é**le	parall**é**l	parall**é**l	parall**é**ll	parall**é**ll
VC	imp**é**rium	Imp**é**rium	imp**é**rium	imp**é**rium	imp**é**rium	imp**é**rium
VC	(j**ú**bilee)	Jubil**ä**um	jubil**é**um	jubil**æ**um	jubil**é**um	jubil**é**um
VV	espr**é**sso	Espr**é**sso	espr**é**sso	espr**é**sso	espr**é**sso	espr**é**sso
VV	**é**mbryo	**É**mbryo	**é**mbryo	**é**mbryo	**é**mbryo	**é**mbryo
VV	torn**á**do	Torn**á**do	torn**á**do	torn**á**do	torn**á**do	torn**á**do
VV	f**á**ntasy	Fantas**í**e	fantas**í**e	fantas**í**	fantas**í**	fantas**í**
VV	f**ó**lio	F**ó**lio	f**ó**lio	f**ó**lio	f**ó**lio	f**ó**lio
VV	c**ó**lony	Kolon**í**e	kol**ó**nie	koloni	koloni	koloni
VV	pyj**á**ma(s)	Pyj**á**ma	pyj**á**ma	pyj**á**mas	pysj**á**mas	pyj**á**mas
VV	c**á**napé	K**á**napee	canap**é**	kanap**é**	kanap**é**	kanap**é**
VV	flam**í**ngo	Flam**í**ngo	flam**í**ngo	flam**í**ngo	flam**í**ngo	flam**í**ngo
V	harm**ó**nica	Harm**ó**nika	harm**ó**nica	harm**ó**nika	harm**ó**nika	harm**ó**nika
V(C)	ap**ó**stle	Ap**ó**stel	ap**ó**stel	ap**ó**stel	ap**ó**stel	ap**ó**stel

Table 5: Stress in polysyllabic monomorphemic loans. The shading refers to similarities in stress placement.

English clearly stands out as distinct from the other Germanic languages in that stress in trisyllabic simplex nouns falls predominantly on the antepenultimate syllable, only falling on the penult when it is heavy and can form its own foot. This is a product of the extrametricality of the final syllable in English nouns, to which stress is not attracted, even when it is superheavy (verbs instead have final consonant extrametricality, leading to a slightly different pattern). Trisyllabic words thus behave like disyllables and it is only in cases where the continental languages also happen to have antepenultimate or penultimate stress that all West and North Germanic languages align, as in *cons**é**nsus*. In contrast, superheavy final syllables always attract stress in the continental Gmc languages, although there is more variation in the quantity of final VVC syllables—which are often VC in at least one language—leading to some variation in stress placement across the languages (cf. Da [ˈpɑːɑˌdiˀs], G [paʁaˈdiːs]). A final generalisation which can be observed is the reluctance of penultimate /i/ to carry stress in an open syllable (compare *St**á**dium* and *Mus**é**um* or *Imp**é**rium* and *Jubil**ä̆**um*), accounting for many cases of antepenultimate stress in German, Dutch and the NGmc languages. Final VV or VC syllables attract stress much less reliably than final superheavy syllables and closed syllables are more frequent than open VV syllables, which more commonly predict penultimate stress. Here there are certain endings which do reliably attract stress, namely <et(t), el(l), é/ee>, all featuring the vowel /e/, and <ie> (except for Du, where this is exceptional).

Due to the extent of borrowing across all three languages, there are a number of complex words which, although initially treated as simplex, were later morphologically decomposed, leading to a range of derivational suffixes of Romance origin which are common to all of the Gmc languages discussed here. A subset of these are presented in Table 6. Crucially, these suffixes are always capable of forming a foot on their own:

E *English*	**G** *German*	**Du** *Dutch*	**Da** *Danish*	**N** *Norwegian*	**S** *Swedish*	English example
-**é**ss	-**é**sse	-**é**s	-**é**sse	-**é**sse	-**é**ssa	*princess*
-**é**tte	-**é**tte	-**é**t	-**é**t	-**é**tt	-**é**tt	*cigarette*
ǵ-ity	-it**ä̆**t	-it**éi**t	-it**é**t	-it**é**t	-it**é**t	*university*
ǵ-tion	-ti**ó**n	ǵ-tie	-ti**ó**n	-sj**ó**n	-ti**ó**n	*combination*
ǵ(ŏ)-ate	-**á**t	-**áa**t	-**á**t	-**á**t	-**á**t	*magistrate*
ǵ-ier, -íer	-**íe**r	-i**é**r	—	—	—	*hotelier*
ǵ-ery	-er**éi,** -er**íe**	-er**íj**, -er**íe**	-er**í**	-er**í**	-er**í**	*bakery*

ǵ(ŏ)-al	-**é**ll, -**á**l	-**ée**l	-**é**l, -**á**l	-**é**ll, -**á**l	-**é**ll, -**á**l	*formal*
ǵ(ŏ)-ous	-**ő**s	-**éu**s	-**ó**s	-**ó**s	-**ő**s	*melodious*

-ise	-is**íe**r(en)	-is**é**r(en)	-is**é**r(e)	-is**é**r(e)	-is**é**r(e)	*nationalise*

Table 6: Stress-affecting derivational affixes of Romance origin

Once again, English stands out due to the extrametricality of the final syllable of nouns (cf. Chomsky & Halle 1968, Kager 1989, Hayes 1982 among others).[9] Here, stress falls on the foot immediately preceding the extrametrical syllable, such that the penultimate syllable of the word will be stressed if it is heavy (and thus a monosyllabic foot), or the antepenultimate if the penult is light, forming either (Ĺ)L‹σ› or (Ĺ)‹σ› (e.g. *atrócious* ~ *melódious*).[10] In the case of the other languages, these affixes are always capable of forming a foot, either being heavy (or superheavy) or a sequence of two syllables (as in the case of G *-esse* and *-ette*, which have retained a schwa). Superheavy syllables will always attract stress in the continental languages, and even in English are capable of bearing secondary stress, unlike final heavy syllables (e.g. ˈ*magiˌstrate*, ˈ*publiˌcise*). Furthermore, more recent (particularly learnèd) loans are more likely to exhibit final stress and marked

pronunciation. Compare, for example, E *hotélier* [ˌhəʊˈtɛlɪə] and E *chocolatíer* [ˌtʃɒkələˈtɪə, ˌʃɒkəlatɪˈeɪ] or G *Bäckeréi*, Du *bakkerij* (‘bakery’) and G *Parfümerie*, Du *parfumerie* (‘perfumery’).

Section 1 has provided a comparative overview of the West Germanic and continental Scandinavian languages’ synchronic systems. Sections 2, 3 and 4 will turn to the diachronic development of the structure of the foot in Germanic. Section 2 considers the system in Proto-Germanic and the early period, focusing on Old High German and Old English, before Section 3 considers the changes which arose during the middle period, providing an overview of the development from Middle English towards Modern English. Finally, Section 4 will consider the complex and ambiguous nature of the foot in Modern Standard German, where segmental quantity and syllabic weight have a more complex relationship and the precise status of the foot remains controversial.

2. Early Germanic systems

Our knowledge of Old English, Old High German and Old Norse informs us that the foot in early Germanic was definitely a left headed, quantity-sensitive trochee, with main stress on the initial syllable. We will touch on Old English in some detail, referring also to older stages of German, which, like the other Germanic languages, are considered to have inherited the Proto-Germanic metrical system intact, retaining its quantity sensitivity, foot structure and left-edge stress. For trochaic feet, built from left to right, the weight of syllables is only relevant if feet are quantity sensitive. As noted in Section 1, syllabic trochees simply form left-headed, disyllabic feet, regardless of the weight of the syllables. In contrast, moraic trochees are quantity sensitive and form bimoraic feet, either from a single heavy syllable or two light syllables. Asymmetric trochees, which involve (HL) structures, have also been proposed for older Germanic languages (e.g. Dresher & Lahiri 1991, 2022; Lahiri 2001, 2015; see also Jacobs 2000 for Latin). *Resolved* asymmetric trochees are weight sensitive and ideally comprise a head and an optional dependent (always a single light syllable). The head must be minimally bimoraic (even if this means containing two syllables) and can form a foot on its own, without a dependent. Possible head structures are thus |H|, |LL| or |LH|.

The precise nature of the foot in the early period has been the subject of debate; many have proposed that the Old English foot was a simple moraic trochee, as illustrated in (3), maximally comprising two moras, (Keyser & O’Neil 1985; Halle et al. 1993; Idsardi 1994; Hutton 1998; Bermúdez-Otero & Hogg 2003; Bermúdez-Otero 2005; Goering 2016*a*,*b*; see also the discussion in Section 2.1, where this argument is explained in greater detail, with reference to the example of OE *hēafudu* ‘heads’). Others (Dresher & Lahiri 1991, 2022; Lahiri & Dresher 1999; Fikkert et al. 2006) have argued in support of what was termed the ‘Germanic Foot’ (Dresher & Lahiri 1991), a resolved asymmetric trochee, which was introduced in (3) and is discussed in more detail in Section 2.1.

2.1 The Resolved Trochee

The Germanic Foot, inherited from Proto-Germanic, can be summarised as in (4), with relevant parsings for Old English given in (5) (after Dresher & Lahiri 2022):

(4) The Germanic Foot (Dresher & Lahiri 1991, 2022; Lahiri et al. 1999; Fikkert et al. 2006)

a. Germanic Foot: From left to right, construct a resolved and expanded moraic trochee of the form (|head| dependent), where the head must consist of at least two moras and the dependent may have at most one mora.
b. Main stress is on the leftmost foot.
c. Defoot a foot (|⋇|) that does not carry the main stress, is final in the word and has no dependent.

(5) Old English stress: sample parsings (the head of the foot is indicated by |x|)

a. 'ship NOM.SG'
X
(|x|)
[H]ω
sċíp

b. 'word GEN.PL'
X
(|x| .)
[H L]ω
wór da

c. 'army GEN.PL'
X
(|x | .)
[L L L]ω
wéo ru da

d. 'king DAT.SG'
X
(|x | .)
[L H L]ω
cý nin ge

e. 'ship NOM.PL'
X
(|x |)
[L L]ω
sċí pu

f. 'other NOM.SG'
X
(|x|) (|⋇|)
[H H]ω
ő þer

g. 'other ACC.SG'
X
(|x|) (|x| .)
H H L
ő þèr ne

We will first critically review the arguments that have been advanced in support of the regular moraic trochee in the context of Old English as it is attested in the written record, before considering the synchronic facts of Old English that motivated Dresher & Lahiri (1991) to propose the Germanic Foot, additionally drawing on evidence from Old High German.

Bermudez-Otero (2005) and Goering (2016*a*,*b*) argue that the pre-Old English foot was definitely a regular moraic trochee rather than a resolved moraic trochee, due to the difficulty of accounting for the reason that the medial */u/ is retained in the nominative/accusative plural form of 'head', *hēafudu*, but not the dative singular, *hēafde*. Goering (2016*b*) suggests that (|LH|) feet are only possible in initial position and that feet are otherwise precisely bimoraic, with High Vowel Deletion (HVD) deleting unfooted high vowels. In this way, *hēafudu* has its medial /u/ protected (*|hēa| |fu.du|), unlike *hēafdum* (*|hēa| fu |dum|). The form *hēafde* is accounted for by the fact that the dative singular ending was historically long and thus formed a heavy syllable in Pre-Old English (*-ǣ). Thus **hēafudǣ* behaved in the same way as *hēafdum* (*|hēa| fu |dǣ|).

However, all arguments in support of a moraic trochee are based on the Mercian *Vespasian Psalter* (*Ps(A)*) forms of *hēafudu* and these are convincingly argued by Dresher & Lahiri (2022) to be exceptional from the very beginning (and not in fact a complication to the metrical coherence of the system which only arose in Old English). Even assuming a moraic trochee analysis for Pre-OE, in synchronic OE, the shortening of unstressed long vowels would have posed a challenge to the metrical coherence of this earlier system, as the original moraic trochees would have become an unsuitable environment for HVD. If the Pre-Old English foot truly was a regular moraic trochee, metrical coherence could thus have been restored through a reanalysis exploiting the Germanic Foot, adding one mora to the trochee and treating the formerly regular *-u* suffix of forms like *hḗafudu* as exceptional.

Arguments in favour of a moraic trochee analysis thus rest exclusively on the exceptional form *hēafudu* found in *Ps*(*A*) and, comparing the two proposed foot structures, one can see that the

moraic trochee corresponds to the head of the Germanic Foot, with any unfooted light syllable following a moraic trochee incorporated as the weak branch of the Germanic Foot. Although the moraic trochee and the Germanic Foot yield similar results in many forms, evidence for the reality of this structure can be found in a range of phonological processes, such as Sievers's Law in Gothic or High Vowel Deletion (HVD), the syncope of medial unstressed high vowels which affected all of the older Germanic languages and served to optimise metrical structures. Furthermore, the Germanic Foot can help to define secondary stress in OHG, in line with Sievers's (1893) observation that it should never fall on a light syllable immediately following a stressed heavy one. Assuming the Germanic Foot, secondary stress can thus be said to fall on the heads of feet in post-tonic position, but never the final syllable, even if heavy. This lack of final stressed syllables leads Dresher & Lahiri (1991) to argue that final non-branching feet in WGmc were defooted (see Fikkert 2000 and Booth 2020 for similar arguments for MDu and MHG).

The precise conditions of HVD have been difficult to capture in accounts relying on a simple moraic trochee, certainly in synchronic Old English. Its effects are demonstrated in (6), providing a range of contexts from both OE and OHG. Whilst words such as 6(c,e,f,g,k,m,o) might suggest that high vowels are deleted when they are stray and not incorporated into a simple moraic trochee, this is contradicted by words such as 6(b,p,q), where a moraic trochee analysis would expect the high vowel to form the strong branch of a foot. However, with reference to the Germanic Foot, Dresher & Lahiri (1991) claimed that high vowels are simply deleted when they form the dependent of a foot:

(6) High Vowel Deletion in the weak branch of a foot: OE (a-i) and OHG (j-r)

OE

a) 'head NOM.SG'
X
(|x|) (|~~x~~|)
[H H]ω
hḗa fud

b) 'head DAT.SG'
X
(|x| .) .
[H L L]ω
hḗa fu~~u~~ de

c) 'head DAT.PL'
X
(|x| .) (|~~x~~|)
[H L H]ω
hḗa fu~~u~~ dum

d) 'army NOM.SG'
X
(|x |)
[L H]ω
wéo rud

e) 'army NOM.PL'
X
(|x | .)
[L L L]ω
wéo ru d~~u~~

f) 'word NOM.PL'
X
(|x| .)
[H L]ω
wór d~~u~~

g) 'journey NOM.SG'
X
(|x | .)
[L H L]ω
fǽ rel d~~u~~

h) 'journey GEN.PL'
X
(|x | .)
[L H L]ω
fǽ rel da

i) 'journey DAT.PL'
X
(|x |) (|~~x~~|)
[L H H]ω
fǽ rel dum

OHG

j) 'word DAT.SG'
X
(|x| .)
[H L]ω
wor te

k) 'word NOM/ACC.PL'
X
(|x| .)
[H L]ω
wor t~~u~~ (<*worðu)

l) 'son NOM/ACC.SG'
X
(|x |)
[L L]ω
su nu

m) 'hand NOM/ACC.SG'
X
(|x| .)
[H L]ω
han t~~u~~ (<*handu)

n) 'hand DAT.PL'
X
(|x|) (|~~x~~|)
[H H]ω
han tum

o) 'take 3.SG.PRES'
X
(|x | .)
[L L L]ω
ni mi t~~i~~ (< *nemeti)

p) 'fell 3.SG.PRET'
X
(|x| .) .
[H L L]
fal l~~i~~ ta (falta < *falliða)

q) 'teach 3.SG.PRET'
X
(|x| .) .
[H L L]
lē r~~i~~ ta (lērta < *lēriða)

r) 'tell 3.SG.PRET'
X
(|x | .)
[L L L]ω
we ri ta (< *wariða)

HVD applies in a straightforward fashion to all forms in the *a*-stem paradigms except for *hēafudu*.[11] Putting that form aside for the moment, we observe in 6(b,c) that HVD applies consistently to the stem vowel *u* when it is in an open syllable following a heavy syllable, regardless of the weight of the following syllable. In 6(a), *u* is in a closed syllable and does not delete. In 6(d–e), the stem-internal *u* follows a light syllable and must be part of the head of the foot, where it does not delete; an inflectional final *-u*, however, is in the weak branch of the foot and deletes 6(e). In 6(f) the head of the foot is a heavy syllable and the inflectional *-u* deletes in the weak branch of the foot. In 6(g–i), the stem-initial light syllable of the masculine *u*-stem (or neuter *a*-stem) noun *fǽreld* (*fǽrelt*) must join with the following heavy syllable to make up the head of the foot, leaving room for an additional light syllable in the weak branch; a final *-u* deletes in this position 6(g), as it does after a single heavy syllable 6(f) and after two light syllables 6(e).

The data in 6(j–r) demonstrate that HVD was operating in the same way in OHG. Of particular interest are the old *u*-declension nouns; this declension was preserved in Gothic, but was lost from

OHG, where those words with an initial heavy syllable were integrated into the *a*- and *i*-declensions, leaving only traces of the old declension in contexts where the /u/ escaped high vowel deletion, such as masculine words with light stems, as in 6(l), *fridu* ('peace') or *situ* ('custom') in the NOM/ACC.SG. Heavy-stemmed forms, such as *tōd* ('death', compare Gothic *dáuþus*) lost their /u/, as with heavy-stemmed feminine nouns such as 6(m), *flout* or *lust*. However, the old /u/ ending was retained in its DAT.PL form in 6(n), where HVD did not apply.

Weak verbs also demonstrate an interesting alternation in the preterite, depending on whether their stems were inherited from Proto-Germanic as heavy, as with *stellen* (<*stalljan) or *hōren* (<*haurjan), or became heavy through WGmc Gemination, as with *zellen* (<*taljan). In the latter case, the consonant was never geminated in the preterite, leading to forms such as *zelita* or 6(r). In such cases, the high vowel formed part of a resolved (|LL|L) head and did not undergo HVD, whereas the high vowels in 6(p,q), *stalta* (<*stallita) and *hōrta* (<*hōrita) were the dependent in words of the structure (|H|L)L and were thus deleted. In such cases, deletion results in the structure ([μμ]μ) rather than the less optimal ([μμ]μ)μ, with the former class of verbs maintaining their existing ([μμ]μ) structure.

Even if the Pre-Old English foot were a simple moraic trochee, this analysis is not appropriate for synchronic Old English, as demonstrated above. One could potentially account for this by proposing that the Germanic Foot replaced an earlier moraic trochee due to the shortening of unstressed inflectional vowels, which made the original moraic trochee an unsuitable environment for HVD. However, this raises the question of the status of the Germanic Foot, particularly given the facts of other Gmc languages. Three possibilities present themselves: the moraic trochee is in fact the true Germanic foot, with the 'Germanic Foot' arriving on the scene only in the early period (and independently in each dialect); the Germanic Foot began as a truly pan-Germanic foot, gave way to the moraic trochee in Pre-Old English, and then returned in OE (and indeed the other WGmc languages, OHG and ODu); or the Germanic Foot was the true Proto-Germanic foot and was inherited by the various Germanic languages, only being lost at a much later stage.

In summary, whatever the structure of Pre-Old English, a moraic trochee or the Germanic Foot, the metrical system of Old English had to make an accommodation for data that did not fit (following the shortening of unstressed inflectional vowels in the moraic trochee account). By the time we reach synchronic Old English, however, the evidence suggests that the resolved trochee is very much the preferred foot, with the exception of a small number of words which had two /u/s. Assuming the continuity of the Germanic Foot, the resolved trochee was inherited from Proto-Germanic and already in place in Pre-Old English, as was the exceptional treatment of forms like *xauƀudu > *hḗafuđu*.

3. Changes in directionality in Mediaeval Germanic

Stress parameters such as foot type, direction of parsing and End Rule are central to stress assignment and a change in any one of them can affect the entire metrical system and lead to changes in surface stress placement. This is as true for direction of parsing as the other parameters, although its effects are more subtle. In Mediaeval Germanic, most native words were monopedal, meaning that evidence for parsing direction and End Rule were in short supply (a situation ripe for reanalysis). A change of parsing direction would only have affected the location of stress in a small subset of words, as illustrated in (7):

(7) Main stress assignment with a resolved trochee, End Rule left and (a) left-to-right parsing or (b) right-to-left parsing

a)

X	X	X	X	X
(|x |)	(|x| .)	(|x| .)	(|x | .)	(|x | .)
[L L]$_\omega$	[H L]$_\omega$	[H L L]$_\omega$	[L L L L]$_\omega$	[L H L]$_\omega$

b)

X	X	X	X	X
(|x |)	(|x| .)	(|x|) (|x |)	(|x | .)	(|x| .)
[L L]$_\omega$	[H L]$_\omega$	[H L L]$_\omega$	[L L L L]$_\omega$	[L H L]$_\omega$

As these examples demonstrate, it is only the final two structures, [LLLL]$_\omega$ and [LHL]$_\omega$, where main stress falls on a different syllable (although the underlying parsing of [HLL]$_\omega$ is also altered). Disambiguating evidence must therefore be found in examples such as these. In WGmc, the switch to right-to-left parsing appears to have occurred during the late mediaeval or early modern period and is clearly in evidence by the sixteenth century in both German[12] and English (although End Rule left still persisted, cf. Lahiri 2015), as illustrated in (8). Note that these words mirror the final two structures in 7(a) and 7(b). This will be discussed in greater detail in Sections 3.1, 3.2 and 3.3.

(8) Evidence of right-to-left parsing in sixteenth-century English and German

Early NE c.1570	MHG c.1200	Early NHG c. 1540
X	X	X
(|x | .)	(|x| .)	(x .)
[L L L L]$_\omega$	[L H L]$_\omega$	[L L L]$_\omega$
<se ve ri ty>	<ka pel le>	<ka pe lle>

3.1 Middle High German

The Germanic Foot and initial stress appear to have persisted into the early period of the Germanic languages, but at some point the system found in the modern languages developed. Although the details of the different languages' systems vary, all of them continue to rely on quantity-sensitive trochees (although the quantity systems of the different languages vary considerably), construct feet from right-to-left and place main stress within a three-syllable window at the right edge of the word. It has been suggested that the prosodic systems of the WGmc languages diverged in the mediaeval or early modern period due to an influx of Romance loan words, as well as various sound changes affecting vocalic and consonantal quantity. However, unlike the other WGmc languages, the diachronic development of the German prosodic system has received comparatively little attention in the literature. Section 3 therefore begins with a brief overview of the development of the foot from OHG to MHG and related stress processes (see Lahiri et al. 1999 for a comprehensive overview), before turning to ME in Section 3.2 and the status of the foot in modern German in Section 4.

A crucial difference between OHG and the other early WGmc dialects, is the fact that the High German Consonant Shift resulted in a great many more closed initial syllables than the other WGmc languages, changing all postvocalic voiceless stops into geminate fricatives. This would have had significant consequences for foot structure and syllable weight following the effects of open syllable lengthening (OSL, a general process lengthening short vowels in open syllables) and degemination in later MHG. Unlike OE, where defooted final heavy syllables could easily be reinterpreted as light syllables with consonant extrametricality (due to the lack of long vowels in final closed syllables), this was not possible in German or Dutch, as they maintained long vowels in word-final closed syllables, as in words such as *mahtîg* ('mighty'), *tiurlîh* ('dear'), *mahhôn*

(‘make’) and *sindôn* (‘travel’). They were, however, shortened if the syllable was open, leading to pairs such as *pfanna* (‘pan NOM.SG’) and pfannûn (‘pan ACC/GEN/DAT.SG’). Despite the fact that many such syllables were subsequently shortened or lost (particularly in inflexional morphology), long vowels in final closed syllables remained a feature of MHG (e.g. *mânôt* ‘month’, *negelkîn* ‘clove’), where they carried secondary stress and remained unreduced. Such syllables were particularly prominent in derivational morphology, for example *-lîn* (a common diminutive suffix) and *-lîch* (an adjectival suffix which alternated with *-lich*, cf. Paul & Mitzka 1959: 84). In contrast to ME, this allowed Romance loan words to be borrowed into MHG with stressed superheavy final syllables, leading to contrasts such as MHG *calcidôn* (NHG *Chalzedón*) and ME *calcedun*, *calcidoine* (NE *chálcedony*).[13] This had sweeping consequences for the metrical and prosodic systems in the middle period, as superheavy final syllables seem to have escaped final defooting.

The middle period was critical in the development of the German foot. Early MHG still maintained a quantity distinction in both vowels and consonants, with a transparent relationship between quantity and weight; geminate consonants were still genuinely long and word-initial light syllables could still bear stress. MHG was unambiguously quantity-sensitive, as illustrated in (9):

(9) Syllable weight in MHG (after de Boor & Wisniewski 1965)

Heavy		Light	
VV]$_\sigma$	*sê.wes* / *bî*	V]$_\sigma$	*le.ben* / *kü.nec*
VC]$_\sigma$	*waz.zer* / *spil*		
VVC]$_\sigma$	*dâh.te* / *guot*		

Foot structure is neglected in the MHG grammars (e.g. Paul 2007; Mettke 1983 and de Boor & Wisniewski 1965), but it appears that it inherited the Germanic Foot and that stress remained initial for most words.[14] It is often assumed that Romance loans had little lasting effect before the fifteenth century, restricted to a courtly sociolect (Wells 2005: 1403). However, this assumption is surprising, given that the shift of stress in simplex words from the initial syllable to the end of the word began in the middle period, particularly in the stressed suffixes *-ieren* and *-îe*, which entered the language in the twelfth century (cf. Vennemann 1995). As Schönefeld notes in discussing Dutch, the final stress of many French words and suffixes ‘weakened the feeling for accenting the first syllable and increased the chance for stress shifts in native words’ (1947: 102, in: Fikkert 2000: 303). Given the fact that stress-attracting derivational suffixes of Romance origin were being used productively with native vocabulary, even outside of a learned context, a change in the system was inevitable.

It has been argued that Romance loans were accommodated as simplex words into the native system through the adjustment of certain metrical parameters; the Germanic Foot was still a feature of the language, but the direction of parsing had changed, starting at the right edge rather than the left (Booth 2020). Although Fikkert (2000) does not suggest a comparable change in parsing direction in her analysis of MDu, this analysis of MHG shares her suggestion that the language continued to defoot final non-branching feet (but that superheavy syllables were seen as metrically equivalent to a branching foot). Stress thus continued to fall at the left edge, but could be attracted away if the final foot was branching and more complex than the first (i.e. an uneven moraic trochee of the structure (|H|L) or a monosyllabic superheavy syllable). These changes will not have greatly affected most native vocabulary, which was ‘characterized by short words, rarely attaining two full feet. Long words can be created by compounding, but then each member of the compound forms its own metrical domain’ (Dresher & Lahiri 1991: 272). However, it aided the accommodation of non-native vocabulary with right-edge stress and crucially restricted the context in which resolution could occur, limiting resolved heads of feet with the structure (|LH|) to word-initial position. Resolution thus became opaquer, although it was at this stage still recoverable.

Unlike the consonant extrametricality found in ME, Lahiri & Fikkert (1999) and Lahiri & Dresher (1999) argue that Romance borrowing led to the defooting of final non-branching feet being analysed as syllable extrametricality (SEM) in MHG and MDu, due to the number of final superheavy syllables, which ultimately led to OSL. Booth (2020) makes a similar argument, but specifically links this analysis to the abovementioned changes to foot parsing. SEM would have increased uniformity across the system, serving to maintain the Germanic foot and improve the structure of native words. For instance, the change in parsing direction would have blocked resolution in earlier (|**L**H|L) or (|**L**L|L) feet, producing the sub-optimal structures **L**(|H|L) or **L**(|LL|), but SEM repairs these, reducing such words to a single disyllabic foot where resolution is permitted, allowing stress to fall on the initial syllable: (|**L**H|)‹L› or (|**L**L|)‹L›. This furthermore halves the number of possible foot structures in line with the following 'prosodic preference scales and principles of interpretation' (Lahiri & Dresher 1999: 710):

(10) Prosodic preference scales and principles of interpretation (Lahiri & Dresher 1999: 710)

1. Maximization of foot (|Head| Dependent) >> (|Head|)
2. Incorporate unfooted syllables into feet
3. Maximization of head: (|H|) >> (|L H|) >> (|L|)
4. Main stressed foot not less complex than secondary stressed feet

OSL then ultimately had the effect of improving metrical coherence by decreasing the number of possible foot structures further and increasing the quantity of stressed syllables so that all stressed syllables were heavy (cf. Lahiri & Dresher 1999), removing the last remaining evidence for resolution and restricting possible feet to (|H|) or (|H|L). In this way, Vennemann's (1995) intuition that OSL was the cause of a loss of resolution appears to be correct, as well as Lahiri & Dresher's (1999) suggestion that a reanalysis of defooting as SEM (although qualified to exclude superheavy syllables) paved the way for OSL, which served to improve structures and increase uniformity of the system. Subsequent degemination will then have reintroduced light stressed syllables, likely contributing to the breakdown of quantity, as Vennemann (1995) suggests.

3.2 Middle English

As mentioned in Section 1, foot form is only one aspect of WGmc foot-related metrical structure that has changed over time. The metrical structure of Modern English, for example, resembles that of Latin: a moraic trochee computed from the right edge, with main stress assigned to the rightmost foot (with various exceptions).[15] As in MHG and other Germanic languages, this shift in the metrical system occurred under the influence of Romance loanwords, but was not abrupt (cf. Lahiri 2015). We summarize the proposed chronology in (11):

(11) Approximate dates of changes in direction and position of English stress

a. Gmc–ME: Foot direction *left*, main stress *left*;
b. c1570: Foot direction is changing to *right*.
c. c1660–: Main stress changes to *right* in stages.

During the early period, as noted in Section 3.1, final defooting was likely reinterpreted as final consonant extrametricality in English, where long vowels no longer appeared in final closed syllables: ǿþer (|H|)(|~~H~~|) > ǿþe‹r› (|H|L). This, in combination with Trisyllabic Shortening (TSS, the shortening of a long vowel preceding two unstressed syllables), had the ultimate effect of metrically shortening to a single foot many words which had comprised more than one foot in OE. Although

this did not impact the placement of stress, it meant that native words in ME tended to be just one foot long, as demonstrated in (12):

(12) Metrical shortening of OE words (after Lahiri 2015)

OE	*hḗringes	*lā́verke	*cī́cenes	*clā́vere
Defooting	(|H|)(|H|)(|~~H~~|)	(|H|)(|H|L)	(|H|L)(|~~H~~|)	(|H|L)L
Extrametricality	(|H|)(|H|L)	—	(|H|L)L	—
TSS	(|LH|L)	(|LH|L)	(|LL|L)	(|LL|L)
ME	héringes	láverke	cícenes	clávere
	'herring-GEN'	'lark'	'chicken-GEN'	'clover'

It can be shown that the influx of Anglo-Norman and Old French words following the Norman conquest made little impact on Middle English prosody (Minkova 1997; Redford 2003; Dresher & Lahiri 2005; Lahiri 2015), contrary to what has sometimes been claimed. Early Romance loans appear to have been borrowed as simplex words and (unlike MHG) were invariably borrowed with native, rather than Romance, stress, suggesting that no parameters had changed before 1530. Following Danielsson (1948) and Poldauf (1981), Lahiri (2015) suggests that it was only after c.1570 that the direction of parsing began to change, with the increase in stress-alternating doublets and borrowed words with Latin suffixes, such as *-able, -ity, -ation* etc., which were capable of forming feet on their own and behaved like compounds.

Importantly, there was also an influx of pairs differing in word class and stress. This is evident in Levins (1570) where we see disyllabic nouns with initial stress contrasting with disyllabic verbs with final stress, such as *rébel* vs. *rebél* and *quárrel* vs *quarrél.* Unstressed prefixed verbs were not uncommon in OE, but they had depleted in ME and around 1600, such pairs increased again.

3.3 Towards Modern English

A more drastic change was the shift of main stress to the right edge. Comparing Levins (1570) and Walker (1791), we see differences in the placement of main stress. This was evident in longer words. Danielsson (1948) claimed that when there were two stresses, there was a tendency for the second stress to have greater prominence. Thus, comparing Levins and Walker, we can observe conflicting pairs: Levins *ánniversary* vs. Walker *annivérsary* (Lahiri 2015). Danielson speculated that the 'turning point' came around 1660 when some French words kept their final accent in English such as *paráde* (1656) and *payée* (1758). Further details are available in Lahiri (2015) and Dresher & Lahiri (2005, 2022).

4. Modern Standard German

In contrast to English, the modern system of German is the subject of much greater debate (for a comprehensive overview, see Jessen 1999). It is clear that German requires the foot as a constituent of prosodic structure, as demonstrated by phonological rules, such as glottal stop insertion in foot-initial position, and word-formation processes, such as plural and hypocoristic formation (see Wiese 1999: §3.3). However, the foot has received comparatively less attention than other areas of German prosody and the discussion has unsurprisingly focused on lexical stress, where the foot is necessary to account for the assignment of relative prominence (despite some past attempts to do so without reference to the foot). It is generally accepted in the literature that feet are trochaic and constructed from the right edge of the word, with stress falling within a three-syllable window and adhering to certain principles or tendencies. Furthermore, Modern Standard German does not appear to exploit the Germanic Foot. However, fundamental aspects of the stress system, such as

quantity sensitivity, definitions of weight, foot (and even syllable) structure and extrametricality, are still fiercely debated.

Whilst accounts proposing a dual system do exist, with native vocabulary governed by one (word-initial) stress system and non-native vocabulary governed by another (assigning stress from the right edge), e.g. Benware (1980), these have been superseded by the unitary approach. Jessen (1999: 516–7) illustrates the flaws of such a dual system with examples both of patently non-native words, such as *Champignon*, borrowed comparatively recently but stressed on the first syllable, and native words inherited from OHG, such as *Holúnder* and *Hornísse*, with non-initial accent. Such words are particularly challenging, as they had initial accent in OHG, but it shifted rightwards at a later stage. A more parsimonious account which does not require lexically marking words as native or non-native seems preferable. As Vennemann (1995: 209–10) demonstrates with reference to the word *Pínguin*, ostensibly initial stress can be an illusion; the only words with true initial stress are grammatical terms, such as *Nóminativ*, or certain proper names, such as *Túrandot* (notably non-native words). Both of these defy powerful generalisations: *Nóminativ* is counter to the three-syllable restriction and *Túrandot* the penultimate restriction (Vennemann 1995: 206–7).

Regardless of framework, such generalisations are broadly accepted, particularly the four most reliable: schwa syllables are incapable of bearing stress; main stress in simplex words is required to fall within the last three syllables ('the three-syllable restriction', a strong typological tendency); stress is prevented from falling to the left of a closed penultimate syllable (the 'closed penult' restriction); a final schwa syllable leads to penultimate stress, unless it has no onset, in which case stress is antepenultimate (the 'final schwa' restriction). These generalisations, after Vennemann (1992) are powerful, but, as Féry (1998) notes, they have no explanatory power. Jessen (1999) additionally list three less reliable tendencies: superheavy finals and diphthongs tend to attract stress; final -VC syllables sometimes receive main stress and sometimes do not (a division reflected in the literature, with some authors considering final -VC stress to be regular, others exceptional); and final -VV syllables are also inconsistently stressed. Giegerich (1985) treats stressed final -VV syllables as regular, but most other authors, such as Wiese (1996), assume that these are irregular.

A significant controversy in the literature is the question of quantity sensitivity. Unlike MHG, the situation in NHG is much more complex, where segmental quantity and weight are no longer isomorphic. Indeed, as Wiese notes, 'surface vowel length in German does depend on stress, but […] stress does not depend on length' (1996: 277), with vowel length neutralised in unstressed syllables (e.g. *Mus**i**:k~Mus**i**kálisch*), leading him to abandon quantity sensitivity altogether. This issue is central to the debate over German foot structure. The fact that Vennemann's generalisations hold so well testifies to the fact that syllable structure has an impact on foot construction, but it cannot be as simple as the transparent system proposed by authors such as Giegerich (1985) and Yu (1992) (where both long vowels and closed syllables contribute to syllable weight). This is illustrated by the fact that Yu is forced to appeal to consonant extrametricality, suggesting that syllables behave differently word-medially and word-finally:

(13) Syllable weight in NHG (after Yu 1992: 56)

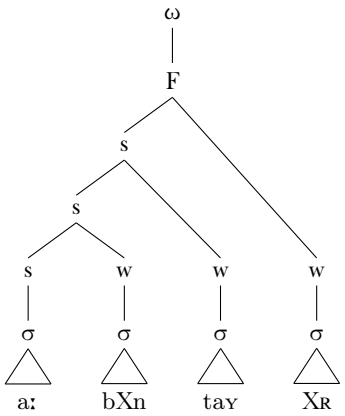
Word-medial	Word-final		
V	V(C)	–	light
VC	VCC	}	heavy
VV	VV(C)		

However, this requires that the whole final coda be extrametrical (as opposed to the final consonant only, a not uncontroversial position). Most recent literature denies a transparent relationship between segmental quantity and syllable weight, with Wiese advocating a quantity insensitive

analysis (see also Eisenberg 1991 and Kaltenbacher 1994), although he does suggest that schwas are 'skipped' in stress rules. Nevertheless, the more common position, maintained by Vennemann (1991, 1994, 1995) and Hall (1992) amongst others, is that vowel length does not contribute weight to a syllable and only closed syllables are heavy, although vowel length is phonemically distinctive (cf. Hall 1992). Vennemann states that a full vowel is light if it is monophthongal and open, or 'smooth cut', else heavy; if you allow a syllable to be closed ('virtually' in his terminology) by the offglide of a diphthong or through ambisyllabicity (caused by 'sharp cut'), this can be rephrased as follows: 'Im Standarddeutschen ist eine Silbe schwer, wenn sie (naturā oder virtuell) geschlossen ist, sonst leicht'[16] (1995: 190, n. 10). This is supported by the closed penult restriction, which suggests that closed syllables, but not long vowels, count as heavy (if diphthongs count as closed). Indeed, it has even been proposed that a syllable is considered closed if it is followed by a syllable with an onset consonant, even though German has no geminate consonants.

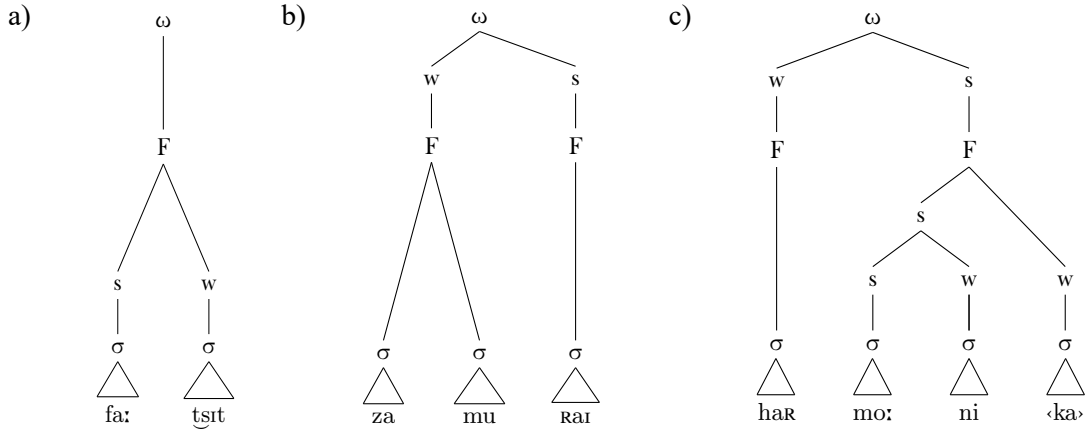
In excluding quantity sensitivity, Wiese (1996) is obliged to posit the penultimate syllable as the default position of stress. Binary trochaic feet are then constructed from right to left or, 'if not possible', a monosyllabic foot is formed (1996: 282). However, as Féry (1998) notes, a binary foot should always be possible if German is truly quantity insensitive. This highlights a core concern with Wiese's approach; whilst many words in German do exhibit penultimate stress, any other stress placement is completely unpredictable and has to be lexically stored (one almost has to know the stress in advance in order to apply the stress rules). His approach has the advantage of accounting for problematic words such as *Arbeit* and *Ameise* (assuming schwa lacks a nucleus and thus permits the first two syllables to form a foot), which are for instance treated as pseudo-compounds by Yu (1992). However, all examples of marked stress (antepenultimate or final) are obliged to have a lexically specified marker in the underlying representation, either of a foot or extrametricality (Wiese 1996: 282–5). Unlike other proposals, which include minimal and maximal feet, usually restricted to one or two syllables, Wiese proposes a quantity-insensitive analysis with no upper limit on the number of syllables contained within a foot, which contains all syllables from one stressed syllable up to (but not including) the next. Wiese's adjunction rule thus allows for feet longer than two syllables, but he never accounts for the internal structure of such feet, despite acknowledging the undefined 's' constituent to be suspicious, as in the word *Abenteuer*:

(14) Foot structure of *Abenteuer* (from Wiese 1996: 286)



His conception of extrametricality, whilst still observing the peripherality condition, differs from that of Hayes (1995), as it is lexically specified for individual words, not the product of a general rule or parameter. Even more troublingly, it is specified in the underlying representation, where there is no syllabification, obliging him to specify individual segments as extrametrical, with this extrametricality then inherited by the syllables they form. To justify specifying a foot in the lexical entry, he appeals to Kiparsky (1982: 50), although this is controversial. Following his stress rules (1996: 282), the words *Fázit*, *Samurái* and *Harmónika* would be stressed as follows:

(15) Foot structures of German words (from Wiese 1996)



Reliance upon extrametricality is common to most accounts, although the precise nature of the extrametrical unit is still debated, from Wiese's lexically specified syllable extrametricality and Yu's final coda to the more recent proposal of final -VC syllables, as summarised by van der Hulst (2010: 445–6):

- Primary stress is final if the vowel is long or there are two closing consonants.
- In other cases, stress falls on the penult if closed by a consonant.
- Else, stress falls on the antepenult.
- Secondary stress falls on alternate syllables to the left (many exceptions)

According to this approach, final VC syllables are extrametrical and only closed syllables are heavy, with stress assigned to the rightmost heavy syllable. It thus broadly adheres to Giegerich's main stress rule (1985: 31) and the weight system proposed by Vennemann (1994); all open syllables count as light, as weight correlates with closure. Indeed, amongst quantity-sensitive accounts, much of the difficulty comes from the variable behaviour of final syllables. This insight, that final superheavy syllables attract stress, but CVV or CVC syllables typically do not, has been discussed by others. For instance, Janßen (2003) found that 88% of all trisyllabic nouns ending with a superheavy syllable attracted stress. In a data-based approach within an OT framework, Féry (1998) suggests that German does exhibit a weight distinction, but of a different kind, feeling that Vennemann's (1992) claim that all and only closed syllables are heavy is too strong. In her analysis, all CV, CVV and CVC syllables pattern as light and only superheavy syllables (CVCC or CVVC) are heavy, accounting for their tendency to attract stress at the end of words. Schwa syllables are defective and stressless. According to this classification of weight, main stress falls on a final trochee constructed from the right edge, with final stress resulting from a stressed final monosyllabic foot or exceptional stress assignment, noting that heavy syllables (by her classification) are generally final and stressed, schwas are never stressed and the penult or antepenult is stressed if there is no final heavy syllable. These generalisations clearly demonstrate the relationship between weight and stress. It is claimed that the three types of exceptional stress are simply prespecified in the lexicon, but she admits that her model is unable to account for the restriction of antepenultimate stress to words with an open penult and falls back on an assertion that segmental quantity only plays a role in this 'one special context' (1998: 130). However, Féry (2003) ultimately rejects this analysis of weight, suggesting instead that all syllables are minimally *and* maximally bimoraic, rejecting her earlier conception of superheavy syllables. Instead, she advocates

a syllabic trochee, suggesting that final consonants contributing weight in fact project a semisyllable forming the weak member of a final trochee (2003: 213).

Results from ERP studies, such as Domahs et al. (2008), provide further, experimental evidence for the foot as a constituent of prosodic structure, suggesting that 'German word stress relies not only on the distinction between default stress and lexically specified stress, but also on the structural properties of a word determining its foot structure' (2008: 29). In their experiment, they found that stress errors only produced effects when they necessitated a restructuring of feet, suggesting that different stress positions are produced by different metrical groupings, with trisyllabic words with an open final syllable generally parsed σ(σσ) and stressed on the penultimate syllable, but words ending in a closed syllable both parsed as (σσ)(σ) and either stressed on the first or second foot. Much work remains to be done on the precise nature of the foot in Modern Standard German, but its existence and importance to German phonology is clear. Past scholarship strongly suggests that the fundamental foot structure is a minimally bimoraic, quantity-sensitive (moraic) trochee, either monosyllabic or disyllabic, built from right to left, with main stress falling on the rightmost foot. The precise nature of weight and how this relates to segmental quantity, remains an area for further research, but it seems clear that the syllabic structure of the final three syllables is crucial in determining foot construction and stress placement, leading to the powerful generalisations identified in the literature.

5. Concluding remarks

The foot in Germanic has seen surprisingly few changes across West and North Germanic languages. It appears that the earlier foot was a resolved moraic trochee, built from left to right, with left edge word prominence, whereas the modern foot is a simple moraic trochee, built from right to left, with right edge word prominence. In other words, it has consistently remained trochaic, and quantity sensitivity still prevails (although details differ). This is quite remarkable, given that all of the Germanic languages we have discussed have borrowed a considerable number of Romance words. Original Germanic words were shorter and often consisted of a single foot, whilst Romance words were longer and could thus easily comprise more than one foot. Consequently, a choice was available of which foot to stress and all the languages have moved towards having main stress towards the right edge. Nevertheless, processes like the rhythm rule in English can once again retract stress towards the left edge. The actual placement of surface stress may differ from language to language, but only for borrowed words (cf. Tables 1–3). The way in which the vowel and consonant quantity of borrowed words were adapted into the native system contributed to the variation. Despite this, the metrical foot remains constant.

Further Reading

Basbøll, Hans. 2005. *The Phonology of Danish*. Oxford: Oxford University Press.

Burzio, Luigi. (1994). *Principles of English stress*. Cambridge: Cambridge University Press.

Halle, Morris. & Samuel J. Keyser (1971). *English stress. Its form, its growth, and its role in verse*. NewYork: Harper & Row.

Hayes, Bruce. 1981. *A metrical theory of stress rules*. Cambridge, Mass.: MIT PhD dissertation. Distributed by Indiana University Linguistics Club and published by Garland Press in 1985.

Heck, Casimir. (1906a/b/c). Die Quantitäten der Accentvokale in ne. offenen Silben mehrsilbiger nicht-germanischer Lehnwörter. *Anglia* 29: 55–119, 205–55, 347–77.

Hulst, Harry van der. 1984. *Syllable structure and stress in Dutch*. Dordrecht: Foris.

— — 1999. *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter.

Kager, René. (1989). *A metrical theory of stress and destressing in English and Dutch*. Dordrecht: Foris.

Kiparsky, Paul. (1979). Metrical structure assignment is cyclic. *Linguistic Inquiry* 10: 421–41.

Kristoffersen, Gjert. 2000. *The Phonology of Norwegian*. Oxford: Oxford University Press.

Lahiri, Aditi and Paula Fikkert. 1999. Trisyllabic shortening in English: past and Present. *English Language and Linguistics* 3(2): 229–267.

Liberman, Marc Y. and Alan Prince. 1977. On stress and linguistic rhythm. *Lingustic Inquiry* 8: 249–336.

Luick, Karl. (1907). Beiträge zur englischen Grammatik V. Zur Quantitierung der romanischen Lehnwörter und den Quantitätsgesetzen überhaupt. *Anglia* 30: 1–55.

Luick, Karl. (1914/1964). *Historische Grammatik der Englischen Sprache*, vol. 1, part 1. Fotomechanischer Nachdruck der ersten Auflage 1914. Oxford & Stuttgart: Bernhard Tauchnitz.

Metzger, Ernst. (1908). *Zur Betonung der lateinisch-romanischen Wörter im Neuenglischen*. Heidelberg: Carl Winters Universitätsbuchhandlung.

Prince, Alan. (1990). Quantitative consequences of rhythmic organization. In Ziolkowski, M., M. Noske & K. Deaton (eds.), *Parasession on the syllable in phonetics and phonology*. Chicago: CLS. 355–98.

Riad, Tomas. 2014. *The Phonology of Swedish*. Oxford: Oxford University Press.

Trommelen, Mieke and Wim Zonneveld. 1999. Dutch. In Harry van der Hulst (ed.), *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 335–422.

Wiese, Richard. 1996. *The Phonology of German*. Oxford: Clarendon.

List of abbreviations and symbols

C	consonant
Da	Danish
Du	Dutch
E	English
F	foot
G	German
Gmc	Germanic
H	heavy
HVD	High vowel deletion
L	light
MDu	Middle Dutch
ME	Middle English
MHG	Middle High German
N	Norwegian
NE	Modern English
NGmc	North Germanic
NHG	Modern German
OE	Old English
OHG	Old High German
ON	Old Norse
OSL	Open syllable lengthening
S	Swedish
s	strong (branch)
SEM	Syllable extrametricality
TSS	Trisyllabic shortening
V	vowel
w	weak (branch)
WGmc	West Germanic
X	main stress
x	strong branch (of a foot)
.	weak branch (of a foot)
μ	mora
σ	syllable
$\breve{\sigma}$	light syllable
$\bar{\sigma}$	heavy syllable
(|*|)	defooted foot
‹ ›	extrametrical unit
< >	orthographical spelling
[ ]$_{\sigma}$	syllable boundary
| |	foot head boundary
( )	foot boundary
[ ]$_{\omega}$	word boundary
[g]	quantity
V	stressed vowel

References

Basbøll, Hans. 2005. *The Phonology of Danish*. Oxford: Oxford University Press.

Behne, Dawn and Peter E. Czigler and Kirk P. H. Sullivan. 1998. Perceived Swedish vowel quantity: effects of postvocalic consonant duration. *Phonum* 6: 91–97.

Benware, Wilbur A. 1980. Zum Fremdwortakzent im Deutschen. *Zeitschrift für Dialektologie und Linguistik* 47: 289–312.

Bermúdez-Otero, Ricardo. 2005. *A*-stem nouns in West Saxon: Synchrony. Chapter 4 of *The life cycle of constraint rankings: Studies in early English morphophonology*. MS. http://www.bermudez-otero.com/lifecycle_chapter4.pdf [accessed 28th February 2022].

Bermúdez-Otero, Ricardo and Richard M. Hogg. 2003. The actuation problem in Optimality Theory: Phonologization, rule inversion, and rule loss. In D. Eric Holt (ed.), *Optimality theory and language change*. Boston; London: Kluwer Academic. 91–120.

Blake, Norman Francis. 1996. *A history of the English language.* London: Macmillan Press.

de Boor, Helmut and Roswitha Wisniewski. 1965. *Mittelhochdeutsche Grammatik*. Berlin: Mouton de Gruyter.

Booij, Geert. 1995. *The Phonology of Dutch.* Oxford: Oxford University Press.

Booth, Joshua. 2020. *The metrical treatment of Romance loan words in Middle High German and its impact on the native word prosodic system.* Thesis (MPhil), University of Oxford, Oxford.

Bruce, Gösta. 1999. Swedish. In van der Hulst (ed.), *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 554–567.

Chomsky, Noam and Morris Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.

Danielsson, Bror. 1948. *Studies on Accentuation of Polysyllabic Latin, Greek, and Romance Loan-words in English*. Stockholm: Almqvist & Wiksells.

Domahs, Ulrike and Richard Wiese and Ina Bornkessel-Schlesewsky and Matthias Schlesewsky. 2008. The processing of German word stress: Evidence for the prosodic hierarchy. *Phonology* 25: 1–36.

Dresher, B. Elan. 1985. *Old English and the Theory of Phonology*. New York: Garland Publishing.

— — 2013. The influence of loanwords on Norwegian and English stress. *Nordlyd: Tromsø University Working Papers on Language & Linguistics* 40(1): 55–43.

Dresher, B. Elan and Aditi Lahiri. 1991. The Germanic Foot: Metrical Coherence in Old English. *Linguistic Inquiry* 22(2): 251–286.

— — 2005. Main stress left in Early Middle English. In Michael Fortescue, Eva Skafte Jensen, Jens

Erik Mogensen, and Lene Schøsler (eds.), *Historical Linguistics 2003. Selected Papers from the 16th International Conference on Historical Linguistics, Copenhagen, 10–15 August 2003*. Amsterdam: John Benjamins. 76–85.

— — 2022. The foot in the history of English: Challenges to metrical coherence. In Bettelou Los, Claire Cowie, Patrick Honeybone, and Graeme Trousdale (eds.), *English historical linguistics: Change in structure and meaning*. Amsterdam: John Benjamins. 42–59.

Eisenberg, Peter. 1991. Syllabische Struktur und Wortakzent: Prinzipien der Prosodik deutscher Wörter. *Zeitschrift für Sprachwissenschaft* 10: 37–64.

Féry, Caroline. 1998. Word Stress in Optimality Theory. *The Journal of Comparative Germanic Linguistics* 2: 101–142.

— — 2003. Onsets and Nonmoraic Syllables in German. In Caroline Féry and Ruben van de Vijver (eds.), *The syllable in optimality theory*. Cambridge: Cambridge University Press. 213–237.

Fikkert, Paula. 2000. Prosodic variation in 'Lutgart'. In Aditi Lahiri (ed.), *Analogy, levelling, markedness: Principles of change in phonology and morphology*. Berlin: Mouton de Gruyter. 301–332.

Fikkert, Paula and Elan B. Dresher and Aditi Lahiri. 2006. Prosodic Preferences: From Old English to Early Modern English. In Ans van Kemenade and Bettelou Los (eds.), *The Handbook of the History of English*. Oxford: Blackwell. 125–150.

Fulk, Robert D. 2010. The roles of phonology and analogy in Old English high vowel deletion. *Transactions of the Philological Society* 108(2): 126–144.

Giegerich, Heinz J. 1985. *Metrical phonology and phonological structure: German and English*. Cambridge: Cambridge University Press.

Goering, Nelson. 2016*a*. *The linguistic elements of Old Germanic metre : phonology, metrical theory, and the development of alliterative verse*. Thesis (DPhil), University of Oxford, Oxford.

— — 2016*b*. Early Old English Foot Structure. *Transactions of the Philological Society* 114(2): 171–197.

Gussenhoven, Carlos. 1994. English stress in lexical phonology. In Wolfgang U. Dressler, Martin Prinzhorn and John R. Rennison (eds.), *Phonologica 1992. Proceedings of the 7th International Phonology Meeting*. Turin: Rosenberg & Sellier. 87–96.

Hall, Tracy A. 1992. *Syllable structure and syllable-related processes in German*. Tübingen: Niemmeyer.

Halle, Morris and Wayne O'Neil and Jean-Roger Vergnaud. 1993. Metrical coherence in Old English without the Germanic foot. *Linguistic Inquiry* 24(3): 529–539.

Halle, Morris and Samuel Jay Keyser. 1971. *English Stress: Its Form, its Growth, and its Role in Verse.* New York: Harper & Row.

Hayes, Bruce. 1982. Extrametricality and English stress. *LI* 13: 227–276.

Hayes, Bruce P. 1995. *Metrical stress theory: Principles and case studies*. Chicago: Chicago University Press.

Hogg, Richard M. 2000. On the (non-)existence of high vowel deletion. In Aditi Lahiri (ed.), *Analogy, levelling, markedness: Principles of change in phonology and morphology*. Berlin: Mouton de Gruyter. 353–376.

Hulst, Harry van der. 1984. *Syllable Structure and Stress in Dutch*. Dordrecht: Foris.

— — 2010. Word accent systems in the languages of Europe. In Harry van der Hulst, Rob Goedemans and Ellen van Zanten (eds.), *A survey of word accentual patterns in the languages of the world.* Berlin; New York: Mouton de Gruyter**.** 429–508.

Hutton, John. 1998. The development of secondary stress in Old English. In Linda van Bergen and Richard M. Hogg (eds.), *Historical Linguistics 1995 Volume 2: Germanic linguistics*. Amsterdam: John Benjamins. 115–30.

Idsardi, William. 1994. Open and closed feet in Old English. *Linguistic Inquiry* 25: 522–33.

Jacobs, Haike. 1989. *Historical studies in the nonlinear phonology of French*. Dissertation (PhD), University of Nijmegen, Nijmegen.

— — 2000. The revenge of the uneven trochee: Latin main stress, metrical constituency, stress-related phenomena and OT. In Aditi Lahiri (ed.), *Analogy, levelling, markedness: Principles of change in phonology and morphology*. Berlin: Mouton de Gruyter. 333–352.

Janßen, Ulrike. 2003. *Untersuchungen zum Wortakzent im Deutschen und Niederländischen*. Thesis (PhD), University of Düsseldorf, Düsseldorf.

Jessen, Michael. 1999. German. In van der Hulst (ed.), *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 515–545.

Kager, René. 1989. *A metrical theory of stress and destressing in English and Dutch*. Dordrecht: Foris.

Kaltenbacher, Erika. 1994. Typologische Aspekte des Wortakzents: zum Zusammenhang von Akzentposition und Silbengewicht im Arabischen und im Deutschen. *Zeitschrift für Sprachwissenschaft* 13: 20–55.

Keyser, Samuel J. and Wayne O'Neil. 1985. *Rule Generalization and Optionality in Language Change*. Dordrecht: Foris.

Kiparsky, Paul. 1979. Metrical structure assignment is cyclic. *Linguistic Inquiry* 10: 421–41.

— — 1982. Lexical Morphology and Phonology. In The Linguistic Society of Korea (ed.), *Linguistics in the Morning Calm, 1–91*. Seoul: Hanshin. 3–91.

Kraehenmann, Astrid. 2001. Swiss German stops: Geminates all over the word. *Phonology* 18: 109–145.

Kristoffersen, Gjert. 2000. *The Phonology of Norwegian*. Oxford: Oxford University Press.

Lahiri, Aditi. 1982. *Theoretical implications of analogical change: Evidence from Germanic languages*. Thesis (PhD), Brown University, Providence.

— — 2001. Metrical patterns. In Ekkehard König and Martin Haspelmath (eds.), *Language Typology and Language Universals*. Berlin: Mouton. 1347–1367.

— — 2015 Change in word prosody: Stress and quantity. In Patrick Honeybone and Joseph Salmons (eds.), *The Oxford handbook of historical phonology*. Oxford: Oxford University Press. 219–244.

Lahiri, Aditi and B. Elan Dresher. 1999. Open syllable lengthening in West Germanic. *Language* 75(4): 678–719.

Lahiri, Aditi and Paula Fikkert. 1999. Trisyllabic shortening in English: past and present. *English Language and Linguistics* 3(2): 229–67.

Lahiri, Aditi and Jacques Koreman. 1988. Syllable weight and quantity in Dutch. *Proceedings of the West Coast Conference on Formal Linguistics VII*: 217–228.

Lahiri, Aditi and Thomas Riad and Haike Jacobs. 1999. Diachrony. In Harry van der Hulst (ed.), *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 335–422.

Lahiri, Aditi and Allison Wetterlin, and Elisabet Jönsson-Steiner. 2005. Lexical specification of tone in North Germanic. *Nordic Journal of Linguistics* 28: 61–96.

Levins, Peter. 1570. *Manipulus Vocabulorum: A rhyming dictionary of the English language*. Edited with an alphabetical index by Henry Wheatley 1867. London: Trübner & Co.

Mettke, Heinz. 1983. *Mittelhochdeutsche Grammatik*. Leipzig: Bibliographisches Institut.

Minkova, Donka. 1997. Constraint ranking in Middle English stress-shifting. *English Language and Linguistics* 1: 135–75.

Molineaux, Benjamin J. 2012. Prosodically conditioned morphological change: preservation vs loss in Early English prefixes. *English Language and Linguistics* 16(3): 427–458.

Nespor, Marina and Irene Vogel. 1986. *Prosodic phonology*. Dordrecht: Foris.

Paul, Hermann. 2007. *Mittelhochdeutsche Grammatik*. Berlin: De Gruyter.

Poldauf, Ivan. 1981. The genesis of terminational stress in English. *Lingua* 54: 335–59.

Redford, Michael. 2003. Chaucer and Middle English stress. MS., Leiden University.

Riad, Tomas. 2014. *The Phonology of Swedish*. Oxford: Oxford University Press.

Rice, Curt. 2006. Norwegian stress and quantity: The implications of loanwords. *Lingua* 116: 1171–1194.

Sievers, Eduard. 1893. *Altgermanische Metrik*. Halle: Niemeyer

Trommelen, Mieke and Wim Zonneveld. 1999. Dutch. In Harry van der Hulst (ed.), *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 335–422.

Vennemann, T. (1991) Syllable structure and syllable cut prosodies in Modern Standard German. In Pier Marco Bertinetto, Michael Kenstowicz and Michele Loporcaro (eds.). *Certamen Phonologicum II: papers from the 1990 Cortona Phonology Meeting*. Turin: Rosenberg & Sellier. 211–243.

— — 1992. Language universals: Endowment or inheritance? *Diachronica* 9: 47–60.

— — 1994. Universelle Nuklearphonologie mit epiphänomenaler Silbenstruktur. In Karl Heinz Ramers, Heinz Vater, and Henning Wode (eds.), *Universale phonologische Strukturen und Prozesse*. Tübingen: Niemeyer. 7–54.

— — 1995. Der Zusammenbruch der Quantität im Spätmittelalter und sein Einfluss auf die Metrik. *Amsterdamer Beiträge zur Älteren Germanistik* 42: 185–223.

Wells, Christopher J. 2005. Epoch vocabularies I: German. In D. Alan Cruse, Franz Hundsnurscher, Michael Job and Peter Rolf Lutzeier (eds.), *Lexikologie. Ein internationales Handbuch zur Natur und Struktur von Wörtern und Wortschätzen*, vol. 2. Berlin; New York: de Gruyter. 1399–1419.

Walker, John. 1791. *A Critical Pronouncing Dictionary and Expositor of the English Language*. London: Robinson.

Wetterlin, Allison. 2010. *Tonal accents in Norwegian : phonology, morphology and lexical specification*. Berlin: De Gruyter.

Wiese, Richard. 1996. *The Phonology of German*. Oxford: Clarendon.

Yu, Si-Taek. 1992. *Unterspezifikation in der Phonologie des Deutschen*. Tübingen: Niemeyer.

[1] Throughout, the *Bokmål* written standard is used for Norwegian.
[2] Iambs are not relevant for a discussion of Germanic foot structure, but for a thorough discussion, see Hayes (1995), Lahiri (2001) and Lahiri (2015).
[3] The head must be minimally bimoraic (even if this means containing two syllables) and can form a foot on its own, without a dependent. Possible head structures are thus |H|, |LL| or |LH|.
[4] Most affixed words were borrowed without decomposition. Indeed, words such as *sanity* were borrowed well before their 'base' *sane* (Lahiri & Fikkert 1999). Word pairs such as *revere~reverence, preside~president, potent~impotent, relate~relative* do not fit the 'regular' stress rule. In pairs such as these, the forms with initial stress were borrowed much earlier than their counterparts. These pairs have always been treated as exceptions (cf. Gussenhoven 1994, Kiparsky 1979, Kager 1989 and references therein).
[5] cf. Basbøll (2005: 79–82).
[6] In monosyllables, coda geminates are not necessarily phonetically realised, as has been assumed for Old English and Old High German, e.g. OE *cyn(n)~cynnes*. However, the contrast is certainly present (see, for example, Rice 2006 for Norwegian; Behne et al. 1998 for Swedish; and Krahenmann 2001 for Swiss German).
[7] Stressed syllables always surface as heavy in Norwegian and Swedish, either due to synchronic processes of vowel lengthening in open syllables (in line with Prokosch's Law) or the presence of a moraic consonant: underlyingly moraic (geminate consonants) or moraic by position (non-geminate consonants in coda position). Vowel length in Swedish and Norwegian is thus analysed as not underlying, but rather synchronically derived from syllable structure and stress (see Riad 2014 for Swedish; Kristoffersen 2000 for Norwegian). However, see also Rice (2006), who, whilst agreeing that surface long vowels are derived from underlyingly short vowels in open syllables, argues that underlyingly bimoraic

vowels are additionally required in order to account for stress assignment in certain Romance loan words, e.g. *orkidé* (/orkideː/, 'orchid') and *kókos* (/koːkos/, 'coconut').

[8] For detailed discussion of the other languages, see Hulst (1984), Kager (1989) and Tommelen & Zonneveld (1999) for Dutch; Basbøll (2005) for Danish; Kristoffersen (2000) and Wetterlin (2010) for Norwegian; and Riad (2014) and Bruce (1999) for Swedish. English will be discussed further in Section 3.

[9] Chomsky & Halle did not refer to syllables but vowels. They state that verbs have stress on the final vowel unless they end with 'a nontense vowel followed by a single consonant' (1968: 69); thus, final VC are not stressed and behave like light syllables. As for the nouns, they are the same as verbs 'except for the final extra syllable, which, it will be observed, consists in each case of a nontense (lax) vowel followed by zero or more consonants' (1968: 72). This can be translated into final syllable extrametricality.

[10] The exceptions to this are the feminine or diminutive suffixes *-ess* or *-ette*, which do attract stress, due to their contrastive function (e.g. prínce~princéss, cigár~cigarétte).

[11] The form *hēafudu* stands out, in that it does not fit the pattern in (4). Indeed, it appears to have been problematic even for Old English speakers, as shown by the fact that such forms show considerable variation across dialects (see above). Nevertheless, Fulk (2010) argues that the phonologically expected outcome in early Old English is indeed *hēafudu*, a form that appears (though not the only form that appears) in the Mercian *Vespasian Psalter* (*Ps(A)*).

[12] The word [ka.ˈpɛ.lə] (*Kapelle* 'chapel') was borrowed into OHG with initial stress as *káp(p)ella*. By the MHG period, we find variants with initial and penultimate stress, with differing syllabic structure *káp.pel(le) ~ ka.pélle*. It is also attested with penultimate stress in the sixteenth century, by which time resolution had been lost and degemination had changed its syllabic structure from $[LHL]_{\omega}$ to $[LLL]_{\omega}$. For instance, it appears in Erasmus Alberus's 1540 rhyming dictionary, *Novum dictionarii genus*, as <Capell>, rhyming with words such as <Gesell> (final schwas were elided). Similarly, Johann Hübner's 1696 *Poetisches Handbuch* lists <Capelle> under *Elle*, rhyming with words such as <bey dem Qvelle>, <die Bålle> and <Geselle>.

[13] The differing stress placement in the languages' modern reflexes testify to the importance of this difference, allowing MHG to borrow such words with final stress, leading to divergence in the languages' prosodic systems.

[14] Exceptions include: unstressed prefixes, such as *be-*, *en-*, *ge-* and *zer-* (including nominal forms derived from prefixed verbs, such as *behältnisse*); separable verbs, where the separable particle before the verb would not carry main stress; verbal compounds, producing contrasts between words such as *wíderrede* and *widerréden*; and Romance loan words, which are generally considered to maintain the stress of the donor language.

[15] We present the Latin stress system because this system characterised the Latin words that were imported into English (French borrowings followed a different rule; see Halle & Keyser 1971 and Dresher & Lahiri 2005). The modern English stress system is more complicated, being the result of the way in which the Latin system was adapted to English, including the complications discussed in Sections 3.1 and 3.2.

[16] 'In standard German a syllable is heavy if it is (naturally or virtually) closed, else light'. Smooth and sharp cut are terms used by Vennemann, relating to the theory of *Silbenschnitt* ('syllable cut'), which due to space limitations cannot be introduced in detail here.