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6 Diachronic prosody

6.1. Introduction

Alterations in prosodic systems are less well documented than sound changes. In this chapter, we view stress and metrical structure from a diachronic perspective, our goal being to provide a detailed report of the changes in word prosody in Germanic and Romance. Space considerations have effectively limited our selection to rather a small number of European languages; nevertheless, we hope to provide a comprehensive overview of the changes in the two language families, from the reconstructed stages to modern times. While the principal focus is on changes in stress patterns, we discuss all modifications pertinent to syllable structure, quantity, and weight. As we discuss the changes we will continually refer to the synchronic descriptions of the individual languages given in chapters 8, 9, and 10.

The first part of this chapter focuses on Germanic, beginning with a brief overview of Common Germanic and moving on to detailed accounts of West and North Germanic languages respectively. Next comes a typological survey of the quantitative changes followed by a discussion on the development of tone in Germanic. In view of the fact that loans from Romance are considered to have had a significant effect on the stress system in Germanic, a separate section has been devoted to this topic. The Romance section follows, beginning with an account of the Classical Latin system and continuing with a comprehensive discussion of the development of the metrical structure through Gallo-Romance to Old French. In the final section, we summarize the changes and speculate on the causes responsible for such changes in the stress patterns, incorporating notions of defaults and marked options, and assuming a close interaction of language acquisition and language change.

6.2. Common Germanic

We will be using the term Common Germanic when referring to the stage preceding the separation of the Germanic family of languages into North Ger-

manic (NGmc.), West Germanic (WGmc.), and Gothic. The West Germanic family of languages includes Dutch, English, Frisian, and German, while Danish, Faroese, Icelandic, Norwegian, and Swedish are part of the North Germanic group. Since no documentary evidence exists of Common Germanic, we base our discussion of the prosodic system of this period on comparative evidence from the oldest written records including the runic inscriptions, Gothic, Old High German (OHG), Old English (OE), and Old Icelandic (OI).

Common Germanic primary stress invariably occurred on the root syllable, which in the vast majority of cases was the first syllable of a word. There are two schools of thought regarding the change of Indo-European free accent to Germanic fixed accent. Kuhn (1863: 142, "Stammsilbe"), Scherer (1878: 85, "Wurzelsilbe"), and Wright & Wright (1925: 16, "root- or stem syllable") are among the group of scholars who argue that the accent shift in Germanic resulted in word accent falling on root syllables. In contrast, Streitberg, Michels & Jellinek (1936: 347–348, following Lachmann 1831–1834: "Handelt es sich im Germanischen wirklich um die Durchführung der 'Wurzelbetonung'? Die Frage ist unbedingt zu verneinen."), Krahe & Meid (1969: 48, "Anfangsbetonung" or "Initial-Akzent"), and Kluge (1891: 339, "Betonung der I. Silbe jedes Wortes") among others, oppose the idea of root stress and propose instead that the shift led to the accent originally falling on the first or word-initial syllable. One reason for this controversy lies in the variability in stressing certain prefixes. Modern language correspondences like English *álmost* against *almíghty*, or German *allmáchtig* 'all powerful' beside *állzeit* 'always' led scholars like Hammerich (1921–1922: 295–304) to posit two different Proto-Germanic sources – a weak prefix **ala-* ("druckschwaches Präfix") and an adjective **álla-*, both of which were retained in the later stages, and contributed to the difference in stress. Scholars adhering to the principle of "stress the initial syllable" are thus required to explain the alternate stress pattern, and vice versa, proponents of root syllable stress have to account for the stressed prefixes. Prokosch (1939: 118–119), for instance, initially states that in "Italic, Celtic, and Germanic, the accent was, in prehistoric times, essentially fixed on the first syllable" but then adds on the following page that "the Germanic stress was not necessarily shifted to the first syllable".

Sometimes the variation in the stress of prefixed forms is attributed to their having a clitic or compound-like structure. According to Campbell (1959: 30), although primary stress was "... fixed on the initial syllable", exceptions to initial stress arose from the fact that prefixed verbs were often not single words, and that later they developed into compound words stressed on the second element. Similarly, referring to compound adverbs, Wright & Wright (1925: 19)

comment that "... the first element had the chief or secondary stress according as it was the more or less important element of the compound". Normally, for compounds, if the second element was a noun or an adjective, stress fell on the initial syllable of the first word. However, verbal prefixes ended up with different stress patterns depending on whether they formed nouns, adjectives, or verbs. Some doublets in the later stages are: OE *begān* 'occupy', *bīgenga* 'inhabitant'; OI *svara* (from Proto-Nordic **and-svaroon*) 'to answer', *ánd-svar* 'answer' where the unstressed prefixes were lost; Gothic *frakúnnan* 'to despise', *frákunþs* 'despised'.

In current research, there are again two claims regarding main stress assignment in the oldest Germanic languages – stress was either phonologically assigned (cf. McCully & Hogg 1990; Dresher & Lahiri 1991) or was based on morphological grounds (cf. Suphi 1988; Riad 1992; Lass 1994, but see footnote 1; Minkova & Stockwell 1994) where there was no necessity to refer to prosodic structures for the placement of stress. (cf. also Halle & Keyser 1971 who propose different types of junctures to allow certain prefixes to remain unstressed.) We shall be discussing this in more detail in the subsequent sections.

Common Germanic had both vowel and consonant length, i. e., there was a distinction between long and short vowels and long and short consonants. Light syllables consisted of syllables with short vowels, while closed syllables and syllables with long vowels were heavy. Although overlong syllables, i. e., syllables with long vowels followed by a coda consonant, also existed in all the languages, long vowels followed by geminates were infrequent. Some words of this type are hypothesized for early Old English (generally from assimilation to a following *r*, and most probably with concomitant vowel shortening) and in Old High German (a result of the High German consonant shift, see § 6.3.1.2, later degemination after long vowels), and a very few are found in North Germanic.

(1) Germanic initial syllables: light, heavy, overlong

Light		Heavy		
		consonant cluster	long V	geminate
Gothic	budum	bundum	bērum	rinnan
OE	budon	bundon	bæron	rinnan
OI	buðom	bundom	bārom	
OHG	butum	buntum	bārum	rinnan
	'we offered'	'we bound'	'we bore'	'to run'

Overlong (long vowel + geminate)			
eOE	āttres	'poison, GEN SG'	> attres
	hlæddres	'ladder, GEN SG'	> hlædder
eOHG	lāẓẓan	'to let, leave'	> lāẓan
	slāffan	'sleep'	> slāfan
OI	dōttir	'daughter'	
	nātt	'night'	

A light primary stressed syllable could be followed by a heavy syllable, e. g., **geβan* 'to give', **geβoo* 'gift'. There are several proposals as to how this word type should be analyzed (Keyser & O'Neil 1985; Lahiri & van der Hulst 1988; Dresher & Lahiri 1991; Riad 1992, among others). The predominant view is to treat LH as a resolved H, just like LL sequences (Lahiri & van der Hulst 1988; Dresher & Lahiri 1991). This accords well with several analyses of verse meter (e. g., Allen 1973; Hanson 1991; Hanson & Kiparsky 1996). The second syllable thus remains unstressed but contributes weight to the first foot (or head of foot), making it meet the bimoraic weight minimum. We shall discuss this in detail in the next section.

6.2.1. Primary stress

The stress systems in all the oldest Germanic languages were essentially trochaic (see chapter 1.6.5, and chapter 8). As we mentioned in the previous section, there are two claims regarding primary stress for the common ancestor – stress was morphologically conditioned (stem based, prohibiting certain prefixes from being stressed) or phonologically assigned. In the phonologically based analysis proposed in Dresher & Lahiri (1991), it is claimed that the foot responsible for stress in Common Germanic is quantity-sensitive, left-branching, where the head of the foot obligatorily dominates at least two moras. Common Germanic did not require that these two moras belong to one syllable. If the first syllable has only one mora, it is "resolved" – that is, bound together with the second syllable into a single metrical position.[1] This foot can therefore be characterized as a "resolved moraic trochee" where resolution means that a sequence of a light syllable followed by any syllable is equivalent to a heavy syllable (LX = H). The foot is defined as in (2) (square brackets around the moras indicate the head of the foot, $\bar{\sigma}$ = a heavy syllable, $\breve{\sigma}$ = a light syllable, and σ = a light or a heavy syllable; the parentheses around the mora indicate optionality):

(2) Resolved moraic trochee

Form	(x	.)	or	(x		.)	if possible
	([μμ]	μ)		([μ	μ(μ)]	μ)	
	σ̄	σ̆		σ̆	σ	σ̆	
else,	(x)		or	(x	.)		
	([μμ])			([μ	μ(μ)])		
	σ̄			σ̆	σ		

Stress, in Common Germanic, can be described by the following parameters:

(3) Foot type: resolved moraic trochee
Direction of parsing: left-to-right
End rule: left

As we will see, this equivalence of a heavy bimoraic syllable to a sequence of a light monomoraic syllable followed by any syllable (i.e., LX = H) plays a role throughout the Germanic languages.

6.2.2. Secondary stress

The location of secondary stress is somewhat unclear, though it seems likely that long vowels were stressed when not directly adjacent to a primary stressed syllable. Some scholars, including Lachmann (1831–1834), argue that secondary stress depended on the weight of the initial stressed syllable. If the initial stressed syllable was short, then secondary stress fell on the third syllable; if the initial stressed syllable was long, the immediately following syllable bore secondary stress even if it was light. Sievers (1877: 525) objects to the last statement and claims that secondary stress could never have fallen on light syllables immediately adjacent to the primary stressed syllable, since these were often syncopated at a later period. Indeed, syncope patterns are a valuable source for inferring earlier stress patterns (cf. § 6.3 and § 6.4). We can account for these facts on the basis of the resolved moraic trochee. A light syllable immediately following a primary stressed syllable would always be part of the stressed foot. Hence, secondary stress would never fall, as Sievers argues, on a light syllable immediately following the primary stressed syllable; it would fall on the head of any foot following the primary stressed foot. We give below hypothesized parsings with the resolved moraic trochee, indicating primary stress by an uppercase X.

(4) Common Germanic secondary stress:

a. (X .) (x .) b. (X .) (x)
([μμ] μ) ([μ μ] μ) ([μμ] μ) ([μμ])
σ̄ σ̆ σ̆ σ̆ σ̆ σ̄ σ̆ σ̄

Although the parsing in (4 b) suggests that a final heavy syllable (i. e., the head of a non-branching foot) could have borne secondary stress in Common Germanic, this is only conjecture. Evidence from the oldest documented stages of the individual languages indicates that a final non-branching foot did not receive secondary stress; i. e., a final non-branching foot was defooted (see § 6.3.1.1).

At first glance it may appear that the prosodic system that was prevalent in Common Germanic has remained essentially unchanged through the ages. For instance, other than Faroese and Icelandic which have quantity-insensitive systems, the modern Germanic languages including English, Danish, Dutch, German, and Swedish are considered to have left dominant, quantity-sensitive trochaic feet (Bruce 1993; Hayes 1981; Giegerich 1985; van der Hulst 1984; Lahiri & Koreman 1988; Kager 1989, among others; cf. also chapter 8, this volume) – similar to Common Germanic. There are, however, many disparities. A major difference is that the head of the foot for modern Germanic languages need not obligatorily dominate two moras, and the possibility of resolution, which was an important distinguishing feature of the earlier stage, has not carried over to the modern languages. Notwithstanding language particular details extrametricality, quantity/weight isomorphism, etc.), the basic foot type for the quantity-sensitive languages is generally assumed to be a moraic trochee which is built on two moras, either from one heavy syllable or from two light syllables (see chapter 1.3.6).[2] In addition, the direction of parsing in Common Germanic was left-to-right, with main stress assigned at the left edge, while in the modern languages the parsing is from right to left, with the rightmost foot being the most prominent.

Further, whereas Common Germanic had both vowel and consonant quantity distinctions, few modern dialects have retained both contrasts. In general, the West Germanic languages have lost the consonant quantity distinction while the North Germanic languages like Swedish, Norwegian, and Icelandic still retain it. Only some of the North Germanic dialects like Nord Gudbrandsdalska (in Norway) and Älvdalska (in Sweden) have retained both consonant and vowel quantity. Finally, the relationship between vowel quantity and syllable weight is not entirely isomorphic in some of the West Germanic languages like Dutch and German. Instead of the clear short/long distinction with a transpar-

ent characterization of weight in the older West Germanic languages, Dutch and German appear to have a vowel quantity distinction, but where weight is determined only by closed vs. open syllables (cf. chapter 8).[3] Whatever the appropriate synchronic analysis may be, what is important for our purposes is that the quantitative aspects of the vowels and their corresponding weight have altered considerably.

These synchronic properties are a direct consequence of a number of lengthening and shortening processes that applied independently throughout the Germanic languages. Processes like West Germanic gemination, the High German consonant shift, open syllable lengthening, syncope of unstressed vowels, shortening of stressed vowels in trisyllabic words, and North Germanic syncope and consonant lengthening were some of the processes responsible for the changes. The various shortening, lengthening, and deletion processes which contributed to the prosodic changes in West and North Germanic are discussed in the following sections.

6.3. West Germanic

The modern languages of this family are Dutch, English, Frisian, and German. The stress system of West Germanic has remained essentially the same as that of Common Germanic, the foot type being the resolved moraic trochee. One important consonant lengthening process and some vowel shortening processes distinguish West Germanic from the other Germanic groups. These processes occurred before West Germanic split into the individual languages, and since there is no documentary evidence of this period, we will largely refer to comparative evidence from Old English and Old High German. In the following sections, while discussing the different stages we will often refer to the languages as if they were single dialect groups, which they were not. A brief summary of the various language groups and dating of the oldest documents is as follows. The West Germanic group includes High German (including Upper German, i.e., Alemannic and Bavarian, and Middle German, i.e., Rhine Franconian and East Franconian), with the oldest monuments belonging to the eighth century, Low German (including Low Franconian or Old Dutch until about 1200, and Low Saxon, which is generally called Old Saxon up to 1200) with records going back to the ninth century, English (reference will be made mostly to the West Saxon dialect), with the oldest records belonging to the end of the seventh century, and Frisian, the oldest records dating back to the fourteenth century.

Lengthening

With respect to changes in syllable structure and syllable weight, the major consonant lengthening rule in this period was West Germanic gemination. The standard description of this rule is that all consonants except *r* were doubled when preceded by a short stressed syllable and followed by the front glide *j* (cf. Prokosch 1939; Streitberg 1916; etc.). Synchronic manifestations of this gemination are apparent by comparing the West Germanic languages to Gothic. The following examples are from class I weak verbs where the glide *j* is a stem extension and triggered lengthening.

(5) West Germanic gemination

	with gemination			without gemination		
OE:	biddan	liċgan	sellan	dælan	læfan	līesan
OHG:	bitten	liggen	sellen	tēilen	lēifen	lōsen
Gothic:	bidjan	ligjan	saljan	dailjan	bi-laibjan	lausjan
	'to pray'	'to lie down'	'to sell'	'to divide'	'to leave'	'to set free'

The actual context was more complex than the standard description as can be seen in words like OE *wēstenne* < *wēstenje* where gemination occurred in an unstressed syllable (cf. Kiparsky & O'Neil 1976; Lahiri 1982). The fact that words like OE *cynne* < *cynje* 'race, DAT SG' and *wēstenne* < *wēstenje* 'desert, DAT SG' did undergo gemination while *wīte* < *wītje* 'punishment, DAT SG' and *æþele* < *æþelje* 'noble, DAT SG' did not, can be accounted for if we consider the West Germanic foot which was still the resolved moraic trochee. Gemination occurred everywhere except where it would have adversely affected the head of the foot as can be seen in (6).

(6) Constraining gemination

gemination blocked (see fn. 13)

```
( x   . )                    ( x     . )
[[μμ] μ ]      μμμ  μ        [[μ  μ ] μ ]      μ  μμ  μ
 wī  tje  >  +wītt  e          æ  þe  lje  >  +æ  þel  le
```

gemination permitted

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( x   . )       ( x ) ( x   . )     ( x    )    ( x   . )
[[μμ] μ ] μ     [[μμ]] [[ μμ ] μ ]  [[μ  μ ]]    [[μμ] μ ]
 wē  ste  nje >  wē    sten  ne       cy  nie  >   cyn  ne
```

If gemination applied to *æþelje*, the weak branch of the head would have been strengthened which was unacceptable, and gemination would have made the first syllable of *wītje* trimoraic, which was also not preferred. Recall that al-

though overlong stressed syllables existed in Common Germanic (cf. § 6.2), long vowels before geminates were not favoured. In contrast, *wēstenje* > *wēstenne* did not affect the head of the stressed foot and *cynje* > *cynne* affected the head only so far as to make the bimoraicity available on a single syllable. As a result of this gemination, some but not all initial stressed monomoraic syllables became bimoraic (*cynne* but not *æþele*).

Another lengthening process, although less visible, was the doubling of the voiceless stops and [x] before liquids, most of which was evident in the inflected forms and later extended to the uninflected forms. Compare, for example, Old English and Old High German forms with the corresponding ones from Gothic and Old Icelandic (OI): OE *bittres*, OHG *bittres*, Gothic *báitrs* 'bitter'; OE *æpples*, OHG *aphles*, OI *epli* 'apple'.

Shortening

Unlike Common Germanic, West Germanic did not permit unstressed long vowels at the end of a word. Unaccented long vowels which were final or became final due to the loss of final consonants were shortened in West Germanic: e. g., OE *daga*, OHG *tago*, from **dazōn* 'day, GEN PL'; OE *tunge*, OHG *zunga*, beside Gothic *tuggō*, from **tuŋzōn* 'tongue'; OE *ēage*, OHG *ouga*, beside Gothic *áugō* 'eye'.

To sum up, consonant lengthening had the effect of making the stressed syllable bimoraic, and vowel shortening reduced the moraic value of the unstressed syllable, as a result of which the initial stressed syllable became either heavier than the unstressed syllable or had at least the same weight (cf. OHG *tago*). This, however, did not eliminate stressed LH heads, but only reduced the number. Although there were processes conspiring to make the initial stressed syllable bimoraic, the resolved moraic trochee with LH heads persisted throughout the oldest documented stages of the West Germanic languages.

6.3.1. The early period

In this section, we focus primarily on Old English and Old High German. The inscriptions and manuscripts till the end of the eleventh century are generally considered to be representative of the oldest period of these languages.

6.3.1.1. Primary and secondary stress

The main stress of uncompounded words is as discussed before: stress fell on the root syllable, which in most instances was the initial syllable of a word (cf.

Lass 1994: 91 for a detailed description). The resolved moraic trochaic foot still accounts for stress in Old English and Old High German. What we know of secondary stress is based on indirect evidence from vowel reduction and verse (cf. Sievers 1893). Secondary stress fell on metrical feet after main stress, but not on a final syllable. In the synchronic stage of Old English, for instance, only a branching foot received secondary stress and a non-branching foot was defooted (Dresher & Lahiri 1991). In the following examples, the square brackets around the moras represent the heads of feet, primary stress is indicated by uppercase X, and the defooting by ⊗.

(7) Primary and secondary stress in Old English

with secondary stress:

(X) (x .)	(X) (x) (⊗)
([μμ]) ([μμ] μ)	([μ μ]) ([μμ]) ([μμ])
ō þer ne	æ þe lin ges
'other, ACC SG'	'prince, GEN SG'

no secondary stress (defooting):

(X) (⊗)	(X) (⊗)	(X) (⊗)
([μμ]) ([μμ])	([μ μ]) ([μμ])	[μ μμ] [μμ]
ō þer	æ þe ling	cy nin ges
'other'	'prince'	'king, GEN SG'

a single foot:

branching		non-branching	
(X .)	(X .)	(X)	(X)
([μ μμ] μ)	([μ μ] μ)	([μ μμ])	([μ μ])
we sen de	na co de	ha mor	ho fe
'be, PRS PART'	'naked'	'hammer'	'dwelling, DAT SG'

Additional evidence for the resolved moraic trochee which was responsible for stress comes from several syncope and apocope rules which were sensitive to the same metrical pattern. For instance, in Old English high vowels in the weak branch of a foot were deleted (Dresher & Lahiri 1991).[4] The following Old English words illustrate the metrical pattern, where the underlined high vowels were deleted in the weak branch of the foot. As before, square brackets around moras indicate the head and uppercase X marks primary stress:

(8) Resolved moraic trochee and high vowel deletion in Old English

(X .)	(X .) (x)	(X .)
([μμ] μ) μ	([μμ] μ) ([μμ])	([μμ] μ)
hēa fu̲ de	hēa fu̲ des	wor du̲
'head, DAT SG'	'head, GEN SG'	"word, NOM PL'

(X .)	(X .)	
([μ μμ] μ)	([μ μ] μ)	
fæ rel dų	we ru dų	
'journey, NOM SG'	'troop, NOM PL'	
(X .)	(X)	(X)
([μμ] μ) μ	([μ μ])	([μ μμ])
clī we nu	lo fu	su num
'clew, NOM PL'	'dwelling, NOM PL'	'son, DAT PL'

Similar instances of syncope of medial unstressed high vowels were found in both Old English and Old High German particularly in the preterite forms of the heavy stems of the class I weak verbs. The palatal glide, which was the original stem extension of this class of verbs (cf. 6), was vocalized when followed by the consonantal preterite marker *-d* and deleted as a high vowel in the weak branch of the stressed foot. Again, the metrical foot matched the one required for stress. Compare, for instance, OE *dēmde* < *dēm-i-de* (stem *dēm-j*) 'to judge, 1 SG PST' beside *fremede* < *frem-i-de* (stem *frem-j* with vowel lowering in unstressed syllables) 'to perform, 1 SG PST'; OHG *suochta* < *suoch-i-ta* 'to seek, 1 SG PST' beside *nerita* 'to save, 1 SG PST'.

Thus, evidence for the resolved moraic trochee is still apparent in the oldest stages of Old English and Old High German. In the next two sections we will discuss lengthening and shortening processes which affected the syllable structures of the language but did not eliminate any of the existing structures.

6.3.1.2. Lengthening

One of the marked differences between Old High German and the other West Germanic languages was a set of consonant modifications known as the High German consonant shift. The most striking result of this consonant shift was the change of postvocalic voiceless stops to corresponding geminate fricatives. The consequence of this was another increase of initial closed syllables in Old High German as compared to Old English:

(9) High German consonant shift

OHG:	slāffan	offan	ëzzan	zeihhan
OE:	slæpan	open	etan	tācen
	'sleep'	'open'	'eat'	'token'

This change had crucial consequences in the medieval period when there was a considerable amount of lengthening in open syllables. Although Old English did not have any comparable consonant lengthening, consonants frequently doubled before liquids and especially before *r*: eOE *blǣddre* from *blǣdre* 'bladder' (most probably with the shortening of the preceding vowel – cf. § 6.2). There were also some instances of compensatory lengthening of vowels due to the loss of consonants. Short vowels were lengthened after the loss of *g* before a following consonant (OE *mǣden*, earlier *mǣgden* 'maiden') and by the loss of a nasal before a following voiceless spirant (OE *sōfte*, cf. OHG *samfto* 'softly').

6.3.1.3. Shortening

Consonants: Degemination occurred word finally in both Old High German and Old English; OE *cyn* 'race, NOM SG', but *cynnes* 'race, GEN SG'; OHG *kus* 'kiss, NOM SG', but *kusses* 'kiss, GEN SG'. Consonants were also shortened medially before other consonants as in OHG *brennen*, beside *branta* 'to burn'; OE *cyssan*, beside *cyste* 'to kiss'. The consequence of this was that the initial syllable was restricted to no more than two moras. As for unstressed syllables, there was a tendency at a later period to reduce them to monomoraic structure by degemination. In late Old English, consonants were often degeminated in unstressed syllables: *yefelic* beside *yefellic* 'bad'; *bliccetan* beside *blicettan* 'to glitter' (Wright & Wright 1925: § 260; Campbell 1959: § 453). In addition, frequently in Old High German geminates were shortened after a long vowel: OHG *slāffan* > *slāfan* 'to sleep', *lūttar* > *lūtar* 'pure'.

Vowels: Stressed long vowels and diphthongs were shortened before certain consonant combinations, especially during the late Old English period: sporadically before geminates, before three consonants, and before groups of two consonants in polysyllabic forms if at least two unstressed syllables followed; OE *enne*, older *ǣnne* 'one'; *blæddre*, older *blǣddre* 'bladder' (after the doubling of consonants before liquids – cf. § 6.3.1.2); *hlammasse*, older *hlāfmasse* 'Lammas'. It is important to note that this type of shortening was the predecessor of the system developed during the transition from Old to Middle English leading to trisyllabic shortening, whereby vowels shortened before a single consonant or consonant group if at least two unaccented syllables followed (Campbell 1959: § 285; Wright & Wright 1925: § 150; Hogg 1992: 212). This has played a crucial role in distinguishing English from Dutch and German which we will discuss in greater detail in the next section.

Incidentally, it is worth noting that Old English and Old High German dealt with overlong syllables consisting of long vowels followed by geminates in different ways – Old English shortened the vowels, while Old High German preferred degemination.

All long vowels which did not bear main stress were shortened in prehistoric Old English. This is clearly seen in comparison to Gothic: OE *sealfaþ*, Gothic *salbōþ* 'he annoints'; OE *tungum*, Gothic *tuggōm* 'tongue, DAT PL'. Consequently, final syllables in heterosyllabic words always had short vowels in Old English. This was not the case in Old High German, where although long vowels in final open syllables were shortened, they remained in closed syllables: OHG *mahtīg* 'mighty', *tiurlīh* 'dear', *habēn* 'to have', *salbōn* 'to anoint'; cf. OHG *zunga* 'tongue, NOM SG' but *zungūn* 'DAT/ACC/GEN SG' (Braune & Mitzka 1967: 56–69; Wright 1906: § 57–58). We will show that this difference led to a split in prosodic structures in the two languages in the middle period.

In sum, although some of the lengthening and shortening processes conspired towards making the stressed syllable bimoraic, both Old English and Old High German allowed short stressed syllables and still maintained LH structures. Indeed, the introduction of trisyllabic shortening during the late Old English period again led to an increase rather than a decrease of short stressed syllables.

6.3.2. The middle period

While discussing this period (approximately late eleventh century to the beginning of the sixteenth century) we will refer to Middle Dutch (MNL) along with Middle High German and Middle English. During the earliest stages of the middle period, the languages showed predominantly traditional Germanic stress patterns. We will focus the discussion on (a) shortening and lengthening processes relevant to syllable weight (particularly open syllable lengthening), (b) stress patterns of foreign words, and (c) the development of the modern stress system.

6.3.2.1. Shortening

Vowels: During the middle period, vowels in closed syllables were generally shortened in Middle English which gave rise to morphological alternations: OE *flǣsc* 'flesh', ME *flesch*, but *flęsches*; OE *brēost* 'breast', ME *brest*, but *brēstes*. In Middle High German as well, long vowels were often shortened in closed syllables: German *Lerche*, earlier *lērche* 'lark'; *Schloß*, earlier *slōz* 'castle'; but,

leichte from earlier *līhte* 'light', *groß* from earlier *grōʒ* 'big' (Paul & Mitzka 1959: 79). Further, it is claimed that in Middle High German long vowels which did not bear main stress, especially long *ī*, could alternate with their short counterparts; for example, both *-lich* and *-līch* occurred in various Middle High German dialects (Paul & Mitzka 1959: 84).

The most notable shortening process, however, was trisyllabic shortening in early Middle English, where long vowels in initial stressed syllables were shortened when followed by two or more syllables (Wright & Wright 1928: § 88, and others). This shortening led to quantity alternations in inflected and uninflected forms of bisyllabic stems.

(10) Trisyllabic shortening

OE	ME		
lāwerke	laverke		'lark'
ærende	erende		'errand'
hæring	heringes (PL)	hēring (SG)	'herring'
ċīecen	cicenes (PL)	cīcen (SG)	'chicken'
clāfre	clavere (PL)	clo͝ver (SG)	'clover'
tā(c)en	takenes (PL)	to͝ken (SG)	'token'

Why trisyllabic shortening? Shortening of a stressed vowel in an open syllable followed by two unstressed syllables was rather a strange process to introduce if one assumes that there was a general tendency to maintain and produce heavy stressed syllables. In words like *ċicenes* from original *ċīecenes* where the syllable following the stressed syllable was light, one could argue that the shortening led to a more preferred initial moraic foot [LL][H] from the original resolved moraic trochee ([H]L)L.[5] However, this could not have been the real motivation since the stressed syllable was shortened regardless of the length of the following syllable. In older *lāwerke*, the second syllable was closed, since the word had a HHL structure. After trisyllabic shortening, the structure changed to LHL, surely not an improvement if the language prefers a moraic trochaic stressed foot. Instead, this shortening process can be explained if we take into account the possibility of consonant extrametricality and assume that the foot at this stage was still the same resolved moraic trochee and that the language preferred to maximize the stressed foot. We believe that this was the beginning of consonant extrametricality which made the final syllable light. Recall that the final foot in Old English was defooted if it did not branch (see § 6.3.1.1) and word final long vowels had been shortened earlier (cf. § 6.3.1.3). Thus, final closed syllables did not bear stress and behaved as if they were light, which quite naturally led language learners to posit consonant extrametricality.

Extrametricality led to two significant changes in the metrical pattern – a great many final stranded syllables, and an increase in words where the second foot was branching while the main stressed foot was not. Languages prefer to maximize the foot template whenever possible, and we believe this is what led to trisyllabic shortening. The maximal foot could be ([H]L) or ([LX]L), such that if the first syllable is light and the second heavy, the head of the foot could span two syllables and be trimoraic: ([μ·μμ] μ) (cf. 2). The crucial examples with their metrical structures and subsequent changes are as follows:

(11) Metrical structures after trisyllabic shortening

		Extrametricality	Trisyllabic shortening	Examples[6]
	eOE	ME: stage I	ME: stage II	
a.	(H)(H)(H)	(H)(HL)	([LH]L)	*hēringes > heringes
b.	(H)(HL)	– –	([LH]L)	*lāverke > laverke
c.	(HL)(H)	(HL)L	([LL]L)	*čīcenes > cicenes
d.	(HL) L	– – –	([LL]L)	*clāvere > clavere

Extrametricality allowed the last two syllables to form a branching foot in (11 a), in contrast to the main stressed foot which remained non-branching, as was the case originally in (11 b). In (11 c), a light syllable was stranded as a result of extrametricality as was already the case in (11 d). We suggest that it was the strong preference, on the one hand, to have a branching structure for the main stressed foot, and on the other hand, not to have any stranded final syllables that led to trisyllabic shortening. In each case, after the shortening, all the syllables could be incorporated into a maximally branching foot where the head could be either [LH] or [LL]. Notice that in bisyllabic words, extrametricality would have merely led to the second syllable being incorporated into the initial foot – there would have been no necessity for any vowel shortening.

(12) Extrametricality in bisyllabic words

[H][H] > extrametricality > [HL]

As a result of alternations like those in (10), often one of the forms was taken to be the base form at a later stage and a new singular was created: for instance, in words like *herring* and *chicken* the plural was taken as the base form and hence they have short vowels in Modern English, while for *clover* and *token* the singular has been used as the base form and hence they have long vowels.

It should be noted that neither Middle High German nor Middle Dutch showed comparable shortening processes. Recall that in Old High German in contrast to Old English, long vowels in final closed syllables were retained (see § 6.3.1.3). Thus, Old High German final syllables could not have been easily assumed to be light as is possible for Old English, which in turn led to consonant extrametricality. Further, as we mentioned above, long vowels in final syllables still existed in Middle High German. Thus, there could be no reason for introducing consonant extrametricality and hence a process like trisyllabic shortening was not required to be part of the grammar.

Consonants: A second process of shortening involved degemination and this was evident in all the languages. Original geminates (either original Proto-Germanic geminates or those that developed due to various lengthening processes) in Middle English, Middle Dutch, and Middle High German which were truly long in the first half of this period, were degeminated medially during the later stages; recall that in the earlier stages, there was word final degemination along with a tendency to shorten geminates after long vowels. Both Dutch and German often maintain the spelling, although the sounds in the modern languages are short: cf. Dutch *bed, bedden*; German *Bett, Betten*; 'bed, beds'. English also sometimes preserves the spelling: *bladder, apple, sell*, etc. We will discuss the consequences of this degemination after discussing vowel lengthening, which occurred while these consonants were still long.

6.3.2.2. Lengthening

A general vowel lengthening rule occurred in Middle High German, Middle Dutch, and Middle English at varying periods whereby short vowels in open syllables were lengthened (open syllable lengthening). In Middle High German, it is claimed that the vowels in short stressed syllables started lengthening from the twelfth century starting with Low Franconian, which spread throughout Middle Dutch and then through the whole of the Germanic area except for the southern German Alemannic dialects (Weinhold, Ehrismann & Moser 1968; Paul & Mitzka 1959, and others). A similar lengthening process occurred in the Middle English dialects in the first half of the thirteenth century (twelfth century in the north; cf. Jordan 1934, among others), whereby the non-high short stressed initial vowels were lengthened.[7] The effect of this lengthening was not often transparent and in the following examples, which give the modern correspondences of Old English and Old High German words, we see that while Dutch and German have consistently long initial vowels, English sometimes does not.

(13) Open syllable lengthening (OSL)
Initial vowels marked for length – long vowel [V̄], short vowel [V]

OHG	zala	nasa	namo	fogal	[V]	sunu	fedara	honag	chuning	[V]
OE	talu	nosu	nama	vogel	[V]	sunu	fiþere	honinc	cyning	[V]
Dut.	taal	neus	naam	vogel	[V̄]	zoon	veder	honing	koning	[V̄]
Ger.	Zahl	Nase	Name	Vogel	[V̄]	Sohn	Feder	Honig	König	[V̄]
Eng.	tale	nose	name	fowl	[V̄]	son	feather	honey	king	[V]

The synchronic manifestations of open syllable lengthening were not as clear as the above example may suggest. We will consider each language in turn. First, the effects of open syllable lengthening are most transparent in Dutch, where the lengthening applied wherever the context was available independent of the nature of the following syllable. This had two consequences: (a) Dutch developed a quantity alternation in paradigms where there were both closed and open syllables most clearly visible in the plural formation, and (b) where open syllable lengthening interacted with the later loss of final schwa in the singular (a morphological process), the singular forms showed a long vowel in a closed syllable. Some examples of the lengthened singular forms are given in (13): Dutch *taal*, *zoon*, etc. We give some examples from present day Dutch of the lengthened plurals with monosyllabic stems in (14 a), and (14 b) gives examples of lengthened heterosyllabic words in Middle Dutch:

(14) OSL in Dutch:

a. Lengthened plurals

Dutch		OE	
dag	dāgen	dæg	'day'
pad	pāden	pad	'path'
glas	glāzen	glas	'glass'
hol	hōlen	hol	'hole'

b. Heterosyllabic words in Middle Dutch

MNL	vōgel, hāmer, vēdele, nāket, vēdere, hōnich wēduwe, swāluwe, cōninc.
OE	vogel, hamor, fiðele, nacod, fiþere, honinc, widuwe, swaalwe, cyning.
Gloss	'bird', 'hammer', 'fiddle', 'naked', 'feather', 'honey', 'widow', 'swallow', 'king'.

Although open syllable lengthening applied just as consistently in Middle High German as in Middle Dutch, the effects of open syllable lengthening were less

transparent in German for two reasons: (a) the High German consonant shift had given rise to many more closed syllables than present in Dutch and English, and (b) instead of maintaining quantity alternations within a paradigm, German chose to level the quantity distinctions and opted for the long vowel.[8] Examples in (15) give the Old English and Old High German words showing the effect of the consonant shift along with the corresponding words in Dutch with open syllable lengthening:

(15) High German consonant shift and blocking of OSL

OE	OHG	German	Dutch	
water	waʒʒer	Wasser [a]	water [a:]	'water'
open	offan	offen [ɔ]	open [o:]	'open'
lacen	wehha/wohha	Woche [ɔ]	week [e:]	'week'
nacod	nachut	nackt [a]	naakt [a:]	'naked'

Examples in (16) illustrate the levelling of quantity in the nouns where Dutch has the so-called special plurals, with the corresponding Old English words with short vowels as reference:

(16) German levelling and Dutch quantity alternations

a. with OSL in German and stem restructured as long

Dutch special plurals			German		OE	
dag	–	dāgen	Tag	[a:]	dæg	'day'
pad	–	pāden	Pfad	[a:]	pæþ	'path'
glas	–	glāzen	Glas	[a:]	glæs	'glass'
hol	–	hōlen	hohl	[o:]	hol	'hollow, hole'
weg	–	wēgen	Weg	[e:]	weg	'road, way'
hof	–	hōven	Hof	[o:]	hof	'courtyard'

b. High German consonant shift in German, no OSL, stem short

Dutch special plurals			German		OE	
schip	–	schēpen	Schiff	[ɪ]	scip	'ship'
dak	–	dāken	Dach	[a]	þæc	'roof'
god	–	gōden	Gott	[ɔ]	god	'god'
blad	–	blāderen	Blatt	[a]	blæd	'leaf'

The greatest confusion lies in Middle English, where the vowel quantity alternations after open syllable lengthening occurred not only in monosyllabic stems with inflections, but also in bisyllabic stems with vowel inflections which

then underwent trisyllabic shortening. Thus, original bisyllabic stems with LH structures underwent open syllable lengthening and were subject to trisyllabic shortening (TS), merging with the stems which were originally HH. After open syllable lengthening and trisyllabic shortening, words could have had the following paradigmatic alternations:

(17) Middle English: interaction of OSL and TS

	brōdor	water	brōdores	wateres
OSL	–	wāter	–	wāteres
TS	–	–	brodores	wateres
	brōdor	wāter	brodores	wateres

Like German, English also levelled out the stems, but unlike German, the levelling went in both directions. This levelling is found in both monosyllabic and heterosyllabic stems:

(18) Levelling in favour of both long and short vowels in English

Bisyllabic stems:

short: oven, water, saddle, copper, hammer, etc.
long: acre, beaver, staple, open, cradle, etc.

Monosyllabic stems:

short: grass, black, path, glad, brass, god, etc.
long: dale, hole, whale, grave, tame, coal, etc.

Thus, although open syllable lengthening was found in all the West Germanic languages in the middle period, due to language independent interactions and levelling, cognate words can easily have different vowel quantity:

(19) Different vowel quantity in Dutch, English, and German:

Ger.	Name	[a:]	Woche	[ɔ]	Pfad	[a:]			Wasser	[a]
Dut.	naam	[a:]	week	[e:]	pad	[a]	– paden	[a:]	water	[a:]
Eng.	name	[e:]	week	[i:]	path	[a]			water	[ɔ]

The modern English stressed vowels in *water*, *path*, *grass*, etc., can be phonetically long. Our concern is the length of the vowel in Middle English before the vowel shift. A long [a:] at the time of vowel shift becomes [e:], a short one remains low, creating the contrast between words like *saddle* and *cradle*. This is the contrast that is relevant here.

6.3.2.3. Conflict in lengthening and shortening

It is obvious from the above discussion that there appear to have been conflicting shortening and lengthening processes during the same period. The conflict is particularly evident in Middle English where both trisyllabic shortening and open syllable lengthening occurred. If trisyllabic shortening is ignored, one could argue that open syllable lengthening was introduced to make the stressed syllable heavy. But certainly this was not the case for trisyllabic words in Middle English. We suggest that the pressure was not to make the stressed syllable heavy, but rather to make the stressed foot maximal (cf. 11). We hypothesized earlier that consonant extrametricality had been introduced in Middle English. As a result, after extrametricality, words with [H][H] structures would have ended up with a maximal main stressed foot: ([H]L). If on the other hand, the words had an [LH] structure, the main stressed foot would have had a bimoraic [LL] head, but would not have been a maximal foot. However, once open syllable lengthening applied, the stressed foot became maximal: ([H]L). Note that if open syllable lengthening applied to words like ([LL]L]), the main stressed foot would have become branching ([H]L)L, but there would have been a stranded final syllable. Such a word then underwent trisyllabic shortening thereby incorporating all the syllables into a foot. Similarly, if a ([LH]L) word underwent open syllable lengthening, it would have had two feet ([H])([H]L), but the main stressed foot would have not been maximal. Hence, it would have also undergone trisyllabic shortening. Thus, both open syllable lengthening and trisyllabic shortening occurred simultaneously conspiring towards not leaving any stranded syllables if possible and making the main stressed foot maximal.

What of Middle High German and Middle Dutch? These languages did not undergo trisyllabic shortening but only open syllable lengthening. One possible hypothesis is that in the continental languages syllable extrametricality (and not consonant extrametricality) was introduced probably due to the influence of Romance loans (which we will discuss in detail in § 6.7). If this is correct, then it is clear why in words like Middle Dutch *wāter*, the initial syllable was lengthened: to be able to have a regular moraic trochaic stressed foot (H). But what of words like *weduwe* > *wēduwe*, or *vedere* > *vēdere*? Even after the final syllable was extrametrical, the first two syllables would make an appropriate moraic trochee (LL). Perhaps the answer is the same as that in Middle English, namely that the foot was still the resolved moraic trochee and after consonant extrametricality, the pressure to make the main stressed foot branching led to lengthening in words like *wēduwe*. Assuming a resolved trochee, the earlier form would have had a ([LL]L) foot; after extrametri-

cality, this would have become a non-branching foot: ([LL])<σ>. Once open syllable lengthening applied, the stressed foot would have become maximal: ([H]L)<σ>. The change of the foot structure to a regular moraic trochee in all probability happened after the degemination and after the various levellings took place – indeed after the absorption of the Romance loans and a change in the direction of parsing, as we will discuss in § 6.5 and § 6.7.

The lack of trisyllabic shortening in Middle High German and Middle Dutch, and the introduction of open syllable lengthening in all the languages, subsequently led to a significant difference between German and Dutch on the one hand, and English on the other. As a result of open syllable lengthening, Middle High German and Middle Dutch ended up with all initial stressed syllables being bimoraic: either with long vowels or closed syllables; recall that other than consonant clusters, the languages had geminates. English, however, was different. Due to trisyllabic shortening and levelling in both directions, Middle English retained short stressed syllables. What then was the consequence of medial degemination which applied after open syllable lengthening? Potentially, degemination in words like German *Betten* would have given a light syllable. However, this was not the case. Since degemination, German and Dutch have treated an initial short vowel followed by a single consonant as heavy; English, on the other hand, has treated it as light.[9] The reason is clear if we look at the situation before degemination. Middle English was the only language which had a light-heavy distinction in a stressed syllable; i. e., short vowels in open syllables could bear stress. In Middle High German and Middle Dutch, both short and long vowels and short and long consonants co-existed, but stressed syllables were always bimoraic either as closed syllables or as syllables with long vowels. That is, there was never any contrast between a short and a long vowel in an open stressed syllable. Thus, a constraint was introduced in both languages which disallowed vowel contrasts in open stressed syllables – i. e., no light stressed syllables. Once phonetic degemination applied, the languages would have been able to introduce light open syllables again; however, this constraint dominated such that these consonants still (phonologically) closed the preceding syllable. The synchronic situation was such that there was no phonological consonant length, and no vowel length contrast in open syllables – phonological weight, therefore, was reinterpreted as not being a function of a branching rhyme but as a function of open and closed syllables.[10]

Therefore, the asymmetry in weight and quantity in the different West Germanic languages lies in the intricate interactions of several lengthening and shortening processes and related differences in analogical levelling; a detailed discussion of the treatment of weight and quantity for stress in the modern

languages is found in chapter 8. Another important factor in the change in the predominant Germanic stress pattern, particularly in the direction of parsing, lies in the incorporation of foreign words which we discuss in § 6.7.

6.4. North Germanic

The North Germanic languages form an eastern group (Swedish, Danish) and a western group (Norwegian, Icelandic, Faroese), with regard to historical rules like breaking (OSw. *fiät* vs. OI *fet* 'step') and lowering (OSw. *broo* vs. Nw. *bruu* 'bridge'). Roughly, one could say that the split of the North Germanic dialects into separate languages was clearly underway towards the year 1000 (Noreen 1923: 2; Haugen 1976).

The North Germanic runic inscriptions (attested from the second century onwards, although scarce before ca. 800), are of great value for the reconstruction of Common Germanic and the early stages of its dialects. Several linguistic changes developed in similar fashion in the early Germanic dialects, but since they occurred later and more slowly in North Germanic, an older Germanic stage emerged in the runic evidence (Noreen 1904: 5–8; Wessén 1968: 9–10).[11] In this section, we turn first to a discussion of syncope and vowel shortening, processes that demonstrate a general diachronic tendency of *reduction* of quantity. We then turn to processes that could be called *expansion*, that is vowel epenthesis, syllable lengthening, and the quantity shift. The important structural changes, and areas of controversy, will be indicated at the relevant points.[12]

6.4.1. Reduction

Early Common Germanic reduction is reflected in runic inscriptions. Apart from syncope (deletion of moras and/or vowels in light syllables) and vowel shortening, reduction was manifested as nasal coalescence/deletion and other segment loss. Syncope and vowel shortening interacted in crucial ways. The predominant diachronic pattern was strengthening of prosodically strong positions and weakening of prosodically weak positions.

6.4.1.1. Syncope

Representative North Germanic target forms for syncope are given in (20), divided into two sets according to diachronic periodicity. The leftmost column

contains reconstructed and attested early Proto-Nordic forms, unless otherwise indicated. To the right of the arrow are Old Icelandic (Old Norse) forms and later Proto-Nordic (lPN) forms.

(20) First syncope period (sixth–seventh century)

a.	*hér.ði.jòoz	>	OI her.ðar	'shepherds'
	*ká.ti.lòoz	>	OI kat.lar	'kettles'
	*ká.βi.sì.jaz	>	OI kef.sir	'slave'
	*fá.ti.lòo.þaz	>	lPN fat.laþz	'bound'
b.	*hér.ði.jaz	>	OI hir.ðir	'shepherd'
	*ká.ti.laz	>	OI ke.till	'kettle'
	*néþ.jaz	>	lPN *ni.þiz	'relative'
c.	wúl.faz	>	lPN wulfz	'wolf'
	gás.tiz	>	lPN gestz	'guest'
d.	*dá.gaz	>	OI dagr	'day'
	*wí.raz	>	OI verr	'man'

Second syncope period (eighth–ninth century)

e.	lPN *ní.þiz	>	OI niþr	'relative'
	sí.tiz	>	OI sitr	'sits'
	sú.nu	>	OI sun	'son ACC'
	lPN *gé.βu	>	OI giǫf	'gift'

The syncope deletion pattern provides evidence that final obstruents did not contribute to syllable weight. The fact that *i* in the final syllable of *gas.tiz* 'guest' was a target of syncope indicates that the syllable that contained it was light, the final obstruent (of disputed quality) hence was non-moraic. Syncope did not apply to the final *a* in **doo.mi.jan* (Gothic *doom.jan*, OSw. *döö.ma*) 'to judge', because it was closed by a sonorant.

The application of syncope also provides (diachronic) evidence for an often noted generalization concerning the weight of the primary stressed syllable (sometimes referred to as Prokosch's Law), namely that it be preferably bimoraic (Prokosch 1939; Murray & Vennemann 1983; Vennemann 1988). Thus, the form *gastiz* was syllabified *gas.tiz* rather than +*ga.stiz*,[13] since it underwent syncope together with the bisyllabic heavy stems (e. g., *wul.faz*), in the first period, at least a century earlier than the bisyllabic light stems (e. g., *sunuz*), which underwent syncope at a later date.[14] A small number of bisyllabic light stems, however, did undergo syncope in the earlier period (20 d), as discussed below.

Trisyllabic light stems with only light syllables (*ka.ti.laz*) underwent syncope in the first period, and it is the final syllable, rather than the penultimate, which was lost. These facts indicate that the initial bimoraic domain (foot or head of foot, depending on analysis) enjoyed a special status. The absence of syncope in bisyllabic light stems in the first period could be seen as a word minimality effect (cf. McCarthy & Prince 1986, 1993; Wilkinson 1988; Riad 1992), or a structural property of the foot (Dresher & Lahiri 1991). The putative bisyllabic light stem targets contained only two moras, the measure of exactly one minimal foot, and were therefore protected from syncope in the first period. This brings us to the crucial observation that syncope in the first period deleted moras, rather than just vowels (for a different view, cf. Calabrese 1994).

In the second period, the bisyllabic light stems became targets for syncope, and the bimoraic minimality constraint would seem to be violated. Our analysis in this instance will be that later syncope was actually a rule of vowel deletion, not mora deletion.

The important thing to see, then, is the fact that syncope by mora deletion ($\mu > \emptyset$) was a rule that reduced the weight of syllables (cf. also vowel shortening, below). While it was a type of reduction, syncope by vowel deletion ($v > \emptyset$) in bisyllabic light stems was not quantitative, since the targeted syllable retained its second mora, which linked to the former onset consonant by resyllabification.[15] It was therefore not relevant to the bimoraic minimality constraint. This mora relinked by resyllabification to the consonant following the first vowel (*sunu* > *sun*). The bimoraic minimality constraint was thus respected. The (resyllabified) output of both syncope processes greatly increases the number of heavy stems in the languages (*sun, kat.lar*), thus contributing to the diachronic development towards the quantity shift.

As seen, the syncope pattern gives us valuable information on the presence of secondary stresses, or at least relative prominence in strings of syllables outside of the primary stressed syllable, since some syllables following the primary stress did not undergo syncope. As mentioned earlier, long vowels were invariably prominent. In sequences of three light syllables (*katilaz* 'kettle'), the last one was the least prominent, and underwent syncope. We attribute this to the fact that it was outside the minimal bimoraic domain. The weak syllable inside this domain was retained (*ketill*). However, in the plural of such a light stem (*katilooz*), the middle syllable was the least prominent, indicating word level secondary stress on the final syllable. In sequences of four light syllables (**ká.βi.sì.jaz* 'slave'), syncope deleted the second and fourth syllable indicating original alternating stress.

6.4.1.2. Vowel shortening

General reduction occurred in most positions outside the primary stressed syllable, which appears to have become increasingly prominent as more words came to meet Prokosch's Law and new contrasts are introduced by *i*-umlaut and breaking (cf. Sigurd 1962). Long vowels shortened primarily when adjacent to other prominent syllables, i. e., in the context of stress clash. In the period before syncope, forms could well have consisted of two heavy syllables, e. g., **wúr.ðoo* 'words, NOM/ACC PL'. At some point the adjacency of prominences came to be considered less eurhythmic and measures to resolve the stress clash were taken.[16]

Stress clash was resolved in a couple of structural steps. The first step was destressing, which was a purely rhythmical reaction to the undesired clash. We illustrate this rhythmical event using grid structure (cf., e. g., Nespor & Vogel 1989 for theory).

(21) Destressing

foot	x x	→	Ø
syllable	x x		
phonetic material	p p		

Destressing creates a structure in which a heavy syllable is matched with a weak position. This is prohibited by rhythmic wellformedness (Kager 1989: 19; Prince 1990: 3–4; Riad 1992: 134; McCarthy & Prince 1993), and consequently one of the moras in the destressed syllable deletes, instantiating vowel shortening. The result is diachronically reinterpreted and the vowel became underlyingly short.[17] This development, given in (22), was common to North and West Germanic.

(22)

(X) (x)	X .	X .
σ σ	σ σ	σ σ
∧ ∧	∧ ∧	∧ |
μμ μμ	μμ μμ	μμ μ
|| ∨	|| ∨	|| |

*wur ðo > destress > *wur ðo > μ-del, VS > *wor ðu

Vowel shortening (VS) was active already before the syncope period, as shortened forms like *wor.ðu* constituted input to syncope, yielding OI *orð*, OE *word*. Once stress clash resolution was in the language, it stayed and the many clashing structures that resulted from syncope were subject to subsequent vowel

shortening. Thus, an original form **hér.ði.jooz* 'shepherds, NOM PL' underwent medial syncope, resulting in intermediate **hér.ðooz*. This form subsequently underwent exactly the same vowel shortening as (unsyncopated) **wúr.ðoo*, the end result being OI *her.ðar*. One indication of immediate vowel shortening in medially syncopated forms was the fact that the middle stage, **hér.ðooz*, is not attested in the North and West Germanic languages, which had extensive vowel shortening.[18]

Visible signs of reduction cognate to vowel shortening also occurred with heavy final syllables consisting of a short vowel and a nasal, e. g., **val.jan* 'to choose'. Here, the resolution of the clash led to nasal coalescence (*vel.jã*).[19] Runic graphonomy, where different graphs were used for non-nasal *a* and nasalized *ã*, at the crucial time, provides evidence for such an analysis, apart from the ultimate loss of the final nasal in that position (in North Germanic), see Williams (1990) and Riad (1992: 138).

We conclude the discussion of the reduction period in the history of Germanic prosody, with the summary chart below.

(23) Relative chronology: the reduction period

Proto-Germanic syncope:
Deletion of word-final moraic segments[20]

Vowel shortening
First syncope period:
Medial syncope
Final syncope, except bisyllabic light stems

Loss of final nasals
Second syncope period:
Vowel deletion in bisyllabic light stems

The situation at the end of the reduction period points towards the quantity shift in several respects.

1. Syncope caused an increase of the number of heavy primary stressed syllables (**ka.ti.looz* > **kat.lar*, **sunuz* > *sunr*).
2. The resolving light + heavy syllable sequences disappeared from the language (**ge.ßan* > OI *ge.fa*).
3. Syncope and vowel shortening in interaction completely eliminated the vowel length distinction outside the primary stressed syllable (at least in Old Norse and Old English).

6.4.2. Expansion

The sign that the reduction period was over in the North Germanic standard dialects-to-be is the occurrence of widespread epenthesis. Epenthetic vowels are attested in various positions from runic inscriptions from the Proto-Nordic period. Around 1200, however, epenthetic vowels began to show up more regularly before sonorant consonants that were syllabic. They appeared earlier before *r* than before *l*, and earlier before *l* than before *n* (Ralph 1975: 43): *fiskr* > *fisker* 'fish', *fogl* > *fogel* 'bird', *sokn* > *socken* 'parish'. Epenthesis, along with a couple of other rules – sonorization of *z*, and the loss of final *z/r* (cf. Tjäder 1961; Peterson 1983; Riad 1992: 250–251) – provides evidence for the lightness of final closed syllables. If epenthesis added a mora, rather than taking over the mora from the syllabic sonorant, this would have led to clash (HH) or resolved structures (LH), which the languages did not accept. Also there is no evidence of stress (in terms of quality) on the epenthetic vowels. Epenthesis appears to improve the sonority of syllable nuclei. Epenthesis also indicates that extrametricality became general to all final consonants, not only final obstruents as earlier on. Minimal monosyllables (CVC) remained exempt from extrametricality yet a while (cf. § 6.4.2.2).

The other, and more fundamental exponent for expansion, was the quantity shift, which involved the quantitative standardization of stressed syllables to canonical bimoraic size. The processes that led to this situation involved both shortening of long vowels before long consonants or consonant clusters, and lengthening of short vowels and consonants in light stressed syllables. All Germanic languages displayed tendencies towards standardization, but the quantity shift was not fully implemented everywhere, because it depended on the choice of the underlying quantity distinction – vowel or consonant quantity – and the status given to Prokosch's Law (cf. § 6.5 for the typology).

6.4.2.1. The old quantity system

In the old quantity system in Proto-Nordic and the other early Germanic dialects, both vowels and consonants had distinctive quantity. Stressed syllables could have been light (CV, monomoraic), heavy (CVV, CVC, bimoraic) or overlong (CVVC, trimoraic).[21] The table below lists Old Swedish words before the quantity shift.

(24) Stressed syllable categorization

Monosyllables		Examples			
light σ:	CV	–			
heavy σ:	CVV(C)	broo	'bridge'	trää	'wood'
		book	'book'	gaas	'goose'
		mooln	'cloud'		
	CVC(C)	nät	'net'	skip	'boat'
		färþ	'trip'	mark	'weight'
		fall	'fall'	katt	'cat'
overlong σ:	CVVC(C)	naatt	'night'	soott	'illness'
Polysyllables					
light σ:	CV.CV	ga.ta	'street'	vä.va	'to weave'
heavy σ:	CVV(C).CV	döö.ma	'to judge'	bryy.ta	'to break'
		gaar.der	'yard'		
	CVC.CV	bin.da	'to bind'	fal.la	'to fall'
overlong σ:	CVVC.CV	räät.ter	'right'	doot.ter	'daughter'

In this system, syllabic weight was completely dependent on the underlying specifications of the segments, and there was no synchronic vowel lengthening or consonant gemination. The quantity shift replaced this segmental quantity system with a prosodic one in most of the Nordic languages, where there was a condition on stressed syllables to be bimoraic.

6.4.2.2. Shortening and lengthening

Vowel shortening before consonant clusters adjusted the segmental material to meet the bimoraic weight precisely (25 a). Underlying geminates following long vowels occurred in North Germanic and in such cases either the vowel or the consonant could shorten (25 b). Derived geminates (*blöd-de*) behaved like consonant clusters.

(25) Vowel shortening before clusters and geminates (Old Swedish examples)

a.	döögn	>	dygn	'day'
	öömka	>	ynka	'pity'
	kööpte	>	köpte	'bought'
	blöödde	>	blödde	'bled'
	byytt	>	bytte	'changed'

b.	dootter	>	dotter/dooter (dial.)	'daughter'
	naatt	>	natt/naat (dial. nåål)	'night'

(26) Syllable lengthening

	OSw. (ONw., OI)				ODa. (SOSw., and WGmc.)			
a.	tala	>	taala	'to speak'		>	taale	
	vika	>	vekke	'week'		>	uuge (SOSw. veeka)	
	drupi	>	dropp	'drop'		>	droope	
					glade	>	glaade	'happy'
b.	tak	>	taak	'roof'		>	taak	
	sun	>	soon	'son'				
c.	spil	>	speel	'game'	spil	=	spil	
	skip	>	skepp	'ship'	skip	=	skip (SOSw. skeep)	
	bik	>	bekk	'pitch'	bik	>	beek	

In Swedish, Norwegian and Icelandic, lengthening could target vowels or consonants,[22] while in Danish (and the West Germanic languages) the vowel invariably lengthened (open syllable lengthening, cf. § 6.3.2.2). Lengthening in monosyllabic forms (26 b, c) led to generalization of final consonant extrametricality to all positions, in Old Swedish, Old Norwegian, and Old Icelandic.

6.4.2.3. The quantity shift

The implementation of lengthening added to the effects of syncope and made the double quantity system largely redundant. As a simple quantity system took its place, the languages had an obvious choice between retaining vowel quantity ($V_{[q]}$) or consonant quantity ($C_{[q]}$). Both choices were represented within the Nordic languages.

(27)

$C_{[q]}$	$V_{[q]}$
Swedish	Danish
Norwegian	English
Icelandic	Dutch
Faroese	German

The choice of underlying vowel quantity on the part of Danish and the West Germanic languages led to the disappearance of geminate consonants in those languages.

In the Nordic languages except Danish, consonant quantity was chosen and no degemination took place. On the contrary, consonants in moraic coda positions were lengthened (*skip* > *skepp*). Previous underlying long vowels got their length by a synchronic rule.

(28) Consonant lengthening

Old Swedish

skip	>	ske[p:]	'ship'
vika	>	ve[k:]a	'week'
gästir	>	gä[s:]tir	'guest'
vända	>	vä[n:]da	'turn'

In the $C_{[q]}$ languages, the relevant distinction between moraic and non-moraic consonants was signalled on the surface as a durational difference. Although in many languages the distinction was neutralized in non-contrastive positions, the Scandinavian languages have remained unusually clear in this respect and do indeed display length in all moraic positions (cf. Eliasson 1978, 1986; Árnason 1980). Some examples are as follows: in Swedish word-finally *kat:* 'cat', intervocalically *mat:an* 'the mat', and in consonant clusters *gäs:t* 'guest', *vin:dar* 'winds'; in Icelandic *hes:tur* 'horse'.

This lengthening in moraic position together with the requirement on stressed syllables to be bimoraic (which becomes obligatory in all the $C_{[q]}$ languages), was responsible for the quantitative complementarity between the vowel and the postvocalic consonant encountered in Swedish, Norwegian, and Icelandic stressed syllables. A heavy syllable was always attained; by virtue of an underlying long consonant, by syllabification (by position), or – in the case of an open syllable – by virtue of synchronic vowel lengthening, the effect of Prokosch's Law.[23]

6.5. Typology of Germanic quantity shift

As we have seen in § 6.3 and § 6.4, the West Germanic and North Germanic languages changed quite dramatically in their quantitative and weight distinctions. Six attributes determine the quantitative typology pattern of the various languages given in (29). First, the segment type (vowels or consonants) that carries the underlying quantitative distinction. This yields three groups: $V_{[q]}$ = vowel quantity languages, $C_{[q]}$ = consonant quantity languages, and $V_{[q]}$ & $C_{[q]}$ = double quantity languages. Second, whether or not syllable weight (i. e., heavy vs. light syllables) plays a role in the language. Third, whether the quan-

titative distinction translates itself directly into a weight distinction; i.e., whether both vowel and consonant quantity unequivocally contribute to weight. Fourth, whether or not the language prohibits short vowels in open syllables. Fifth, whether or not the language prohibits short stressed vowels in open syllables. And sixth, whether or not the language requires that a stressed syllable on the surface must be heavy. The last three attributes look rather similar and seem as if only the wording is different, but we will see that this is not the case. Also, we are deliberately keeping the notions "heaviness" and "rhyme-branching" apart given the somewhat indeterminate situation in German and Dutch. The following diachronic pattern emerges based on our discussion in the preceding sections.[24]

(29) Quantity, weight, and stress

a. Do all the languages, past and present, have underlying segmental quantity?

YES

Common Germanic, Nord Gudbrandsdalska, West Nyländska, Älvdalsmål	$V_{[q]}$ & $C_{[q]}$
English, Danish, Dutch, German	$V_{[q]}$
Icelandic, Faroese, Swedish, Norwegian	$C_{[q]}$

b. Does syllable weight play a role in all the languages?

NO	Icelandic, Faroese	quantity-insensitive
YES	All other languages	quantity-sensitive

c. Does underlying segmental quantity in the quantity-sensitive languages directly contribute to syllable weight?

YES

English, Danish	$V_{[q]}$ = heavy
Swedish, Norwegian	$C_{[q]}$ = heavy
Early Germanic, Nord Gudbrandsdalska, West Nyländska, Älvdalsmål	$C_{[q]}$ & $V_{[q]}$ = heavy

NO

Dutch, German (only closed syllables are heavy)	$V_{[q]} \neq$ heavy

d. Are short vowels in open syllables prohibited?

YES Dutch, German (all short vowels closed by ambisyllabic consonants)

NO Early Germanic, English, Danish, Nord Gudbrandsdalska, West Nyländska, Älvdalsmål, Swedish, Norwegian, Icelandic, Faroese

e. Are short vowels in stressed open syllables prohibited? That is, must all stressed syllables have a branching rhyme either by having a long vowel or by being closed?

YES Dutch, German

Swedish, Norwegian, Icelandic, Faroese (synchronic vowel lengthening)

NO Early Germanic, English, Danish, Nord Gudbrandsdalska, West Nyländska, Älvdalsmål

f. Must stressed syllables be heavy on the surface?

YES Swedish, Norwegian, Icelandic, Faroese (closed syllables and by synchronic vowel lengthening in open stressed syllables)

NO Early Germanic, English, Danish, Nord Gudbrandsdalska, West Nyländska, Älvdalsmål (short vowels in stressed syllables exist)

German, Dutch (long vowels are not heavy)

A very interesting pattern emerges from the diachronic changes given above.

- Although all languages have retained some form of segmental quantity, the double quantity system of early Germanic is retained only in certain North Germanic dialects like Nord Gudbrandsdalska, West Nyländska, and Älvdalsmål which allow the combination of a long vowel followed by a geminate consonant in a single morpheme (cf. Riad 1995).[25]
- Other than Icelandic and Faroese, all the languages have retained the quantity-sensitive pattern. That is, stress is sensitive to weight.
- However, segmental quantity and weight (which was isomorphic in early Germanic) have not remained the same. $C_{[q]}$ quantity languages have a totally transparent weight correspondence. But, as we can see in (29 c), Dutch and German do not have a transparent weight and segmental quantity relationship. What is interesting is that these are exactly the two languages where a $V_{[q]}$ quantity distinction exists, but where there is no contrast of this distinction in open syllables (cf. (29 d), which only allows long vowels in open syllables).
- If one considers only (29 e), one is led to believe that the quantity-sensitive languages, German, Dutch, Swedish, and Norwegian, appear to be identical: none of them allow short stressed vowels in open syllables. However, once (29 d) and (29 e) are compared, the difference is clear. Dutch and German must have a branching rhyme for all syllables, not just stressed syllables,

and therefore all short vowels must occur in closed syllables. In Swedish and Norwegian, it is possible to have short vowels in open syllables which are not stressed.

- Thus, (29 e) and (29 f) are not identical. The stressed syllable in Dutch and German, along with the C[q] languages, must have a branching rhyme, but this does not constitute syllabic heaviness by default. Therefore, the $C_{[q]}$ languages always have a bimoraic heavy stressed syllable, where bimoraicity and heaviness correspond to the branching rhymes. Dutch and German, however, have a branching rhyme constraint on all syllables and rhyme-branching does not necessarily mean heavy; rather, closed syllables are heavy while open syllables are light (29 c).
- Hence, there is a difference within the West Germanic $V_{[q]}$ languages. The long (tense) vowels in English are indeed heavy but this is not so in German and Dutch. As we have mentioned above, and as the synchronic descriptions elaborate (see chapter 8.3–8.4), analyses differ whether or not these vowels should be considered as tense and monomoraic (cf. Hayes 1995 for German), or as smooth cut syllables (cf. Vennemann 1991 for German), or heaviness should be treated as a function of two root nodes (cf. Kager 1989 for Dutch). Whatever the analysis, the fact remains that there is a clear quantitative separation which has emerged among the West Germanic $V_{[q]}$ languages in the last thousand years.

6.6. Development of tonal accents

A number of Germanic languages, notably the Scandinavian languages and some of the West Germanic languages around the Rhine, developed tonal systems. Since tonogenesis is evidently related to metrical structure, a review of some of the established theories concerning tonogenesis would be pertinent. A detailed synchronic description of the tonal phenomena is given in chapter 9 of this volume. We will first discuss the development of tonal accents in the Scandinavian languages and then move on to the West Germanic languages.

6.6.1. Scandinavian Accent II

The Scandinavian languages developed prosodies that are largely absent in the other Germanic languages. Norwegian and Swedish developed tonal accents, while Danish developed the so-called *stød*. In several geographically peripheral

Nordic languages and dialects, none of these prosodies occur, at least not today (the most important of these are Icelandic, Faroese, some Swedish dialects in Finland, southern parts of Danish isles, and the island of Bornholm).

We shall review here a couple of important theories of the origin of the accent distinction, without being able to provide full coverage. Summaries of various theories and fuller references occur in Oftedal (1952), Gårding (1977), and the very useful monograph of Liberman (1982). These are also the basic sources for this review.[26]

6.6.1.1. Oftedal (1952)

Oftedal (1952) reviews two older competing theories about the origin of the Scandinavian accents. One of these (hypothesis A), the basic tenets of which are now standardly assumed, holds that the accent distinction arose in late Proto-Nordic, after the syncope period (ending about 800). The general idea (due to Öhman 1967; cf. also Elstad 1980, and briefly reviewed in Bailey 1990) is that phrase final pitch shapes, relating to whether or not the final syllable was stressed or not, were reinterpreted as word accents. After the syncope period, a phrase final, stressed syllable would most often be a monosyllabic word, which would contrast with phrase final, unstressed syllables, which would get a different phrase final pitch pattern (Accent II to be). Subsequent changes that affected the number of syllables in words were cliticization of the definite article, epenthesis before liquids (§ 6.4.2), and perhaps restructuring of the quantity system (cf. Öhman 1967). Monosyllables which developed into bisyllables by these processes received Accent I (acute), while all other polysyllables received Accent II (grave). The remaining monosyllables are assumed not to have accent since there could have been no distinction in monosyllables. Later versions of this theory (Elert 1964) assume that Accent I was the tonal default and equal to plain stress, and would therefore have included all monosyllables in the Accent I class.

The monosyllables that expanded to bisyllables are of two types: (a) the definite form of basic monosyllabic stems, after the definite form became marked by enclisis, e. g., *and hinn* 'duck the' > *and-in* > *anden*, (b) monosyllabic stems which developed an epenthetic (*svarabhakti*) vowel before liquids and nasals, e. g., *akr* > *áker* 'field', *fugl* > *fúgel* 'bird', *sookn* > *sókken* 'parish'. Any exceptions to these generalizations (observed already before Aasen's 1848 grammar) are explained as analogical. The logic of this theory requires that the tonal distinction was phonologized sometimes around 1200, crucially before the cliticization of the definite article (tenth century, according to Seip

1955, twelfth century according to Gårding 1977; Wessén 1968) and before the development of the epenthetic vowel (twelfth century, cf. Ralph 1975). Both processes made monosyllables polysyllabic without inducing Accent II (Haugen 1967; Gårding 1977). This putative origin for the accent distinction finds support in the data, where the crucial set of minimal pairs are mono- and polysyllabic definite noun forms (Elert 1972; Gårding 1977).[27]

The other hypothesis reviewed in Oftedal (1952) is proposed by Axel Kock (1884–1885), who places the origin of the accent distinction further back in Proto-Nordic, during the syncope period. In this so-called hypothesis B, the vowel deletions of the syncope period are considered to be either the cause of the accent distinction, or an effect of the accent distinction.[28] The generalization is taken to be that any word that lost a syllable by syncope displayed Accent I, while words that preserved all their syllables display Accent II. Again, exceptions are explained as analogical.

Both of these theories relate the accent distinction to the number of syllables, one way or the other. Oftedal (1952) evaluates the two theories by exposing them to nine types of words which lost a medial syllable in the syncope period.[29] Hypothesis B is clearly the more problematic of the two. The modern dialects have predominantly Accent II in nearly all of Oftedal's word groups, for which hypothesis B predicts Accent I.[30] Moreover, the dialect geography indicates that Accent II is more likely to be original in medially syncopated forms, as it is found also at the outskirts of the accent distinction area, while dialects with Accent I in these forms tend to be central to the same area. This suggests that Accent I is the innovation. Many other innovations display this pattern in Scandinavia, as Oftedal points out.

Hypothesis A is much more consistent with the data and leaves a smaller set of problematic forms, which also occur with lower frequency (participles and superlatives). Oftedal thus contends that hypothesis A is more likely correct. For him, the definite article enclisis is the crucial datum for phonologization of the distinction, whereas epenthesis provides strong reinforcement of that distinction.

These theories are primarily concerned with the origin of the phonologized prosodic distinction and merely acknowledge the distributional connections between Swedish and Norwegian tonal accents and Danish stød. The prosodic or phonological connections are not directly central to the argument as given, but rather belong in other phonetically oriented hypotheses. For instance, Kock's (1878) view of Accent II is that the tonal peak on the post-tonic syllable originated from secondary stress. The corresponding Danish non-stød was the same as Accent II, but without the secondary stress. The nature of stød, however, is more unclear in Kock's argument (cf. Liberman 1982: 210).

The issue of which accent manifestation was historically primary does not arise clearly in Kock's theory, since such an argument presupposes clear hypotheses of the phonetic and phonological nature of the various accent manifestations. In Liberman's (1982) theory, accent manifestation is of central importance.

6.6.1.2. Liberman (1982)

In an extremely thorough study, Anatoly Liberman (1982) presents a theory based on the idea that the stød represents the older form of the accent distinction and that the tonal accents of Swedish and Norwegian have developed from a stød/non-stød-like distinction. As in hypothesis A above, Liberman identifies syllable counting as the functional basis for the accent distinction.

In the core data, the crucial phonological distinction between the stød/non-stød opposition and the Accent I/Accent II opposition resided in the relation between the prosodeme and the phonological string. Stød is invariably tied to sonority ("stød basis"), since stød generally required a heavy syllable containing either a long vowel or a short vowel followed by a sonorant consonant. The tonal accents, on the other hand, were only sensitive to the number of syllables, and not weight of syllables.[31] In the modern languages, this generalization boils down to the fact that Accent II requires more than one syllable, while Accent I requires only one (although it may be partly realized on a previous syllable in the string, if one is available, cf. chapter 4.2).

The functional overlap between tonal accents and stød is the obvious reason to connect them historically. Liberman assumes that the stød/non-stød distinction is older than the tonal distinction and that the tonal manifestations gradually came to overlay the stød manifestations. Support for the hypothesis is then to be sought in the dialectological typology of accent manifestations.

Evidence for the historical primacy of stød over tonal accents includes the following. A couple of older dialects of Dala-Bergslagen (Swedish) display a curious accentual pattern insofar as words containing *bb, dd, gg,* and palatalized gg invariably display Accent I. Liberman takes this and a similar pattern in Flekkefjord (Norwegian) as evidence for the last trace of a former stød opposition (presence of stød in Danish has a similar lexical distribution as Accent I in Swedish and Norwegian), because of the segmental conditioning (rather than the mere monosyllabicity). The inverse relation is clearly less attractive as the simple syllable count (as opposed to segmental conditioning of stød) is characteristic of the tonal accents. Furthermore, the tonal accent opposition across dialects has a relatively uniform distribution as opposed to

the greater disparity of stød distributions. Uniformity indicates relatively recent levelling. Third, the phonetic nature of stød indicates that it counts moras rather than syllables. This makes stød less suited as a (word) accentual unit (contra the tonal syllable counting accents). A development from tonal accent to stød would be harder to understand from a functional perspective because of the narrowing of manifestation from a word property to a syllable weight property. A development in the other direction would be more likely since mora counting may serve a syllable counting function and hence stød would contain the potential of developing into a (tonal) accent. "Everything (distribution, realization, role in the system) points to the fact that stød acquired the accentual function late and that this function has never become its organic part" (Liberman 1982: 191). The syllable counting appearance of stød, Liberman proposes, emerged as a reaction to apocope. In core stød – a bimoraic, sonorous domain in a bisyllabic word – apocope created monosyllabic stød forms. This allowed for a syllable counting interpretation of stød (i. e., stød occurring with monosyllabic words). Non-stød would have remained a property chiefly of polysyllables. This analysis relies on the attested core contexts for apocope in dialects, namely in bisyllables with an open second syllable containing a reduced vowel and with a sonorous bimoraic first syllable (Liberman 1982: 133). The correlation between stød/non-stød and the number of syllables (one vs. more than one) would not be perfect of course (stød would also occur in bisyllables with a closed second syllable, for instance), but at least a foundation would be present for generalizing this distinction. But the segmental conditions inhibit generalization based on stød. Rather, the unmarked member of the opposition, non-stød, could generalize, and play the crucial role of signalling polysyllabicity. It would then become the marked member of a future tonal and purely syllable counting opposition.

It might be added at this point that theories could be entertained that view the relation between tonal accent and stød as non-temporal, that is, they could be two different phonetic reactions to the same original (non-distinctive) state. Liberman acknowledges the fact that remarkably few dialects display traces of both tonal and stød accent. At the same time, this might be a question of interpretation. For instance, Liberman suggests that after the tonal accent took over, stød may have survived in other domains as preaspiration,[32] a consonant, or syllable weight (1982: 199).

The primacy of stød over tonal accents obviously leads to the question of the origin of stød itself. Liberman is careful to point out that we are unable to reconstruct Germanic prosody beyond the syncope period, but the basic contention is that stød was a mora counting device and, as such, it might have arisen at any time since the older stages of Germanic were quite clearly mora

counting. Why moras should be counted in a phonetically manifest fashion remains a riddle. See also chapter 9.1 for a discussion of tonal accents as compared to the Danish stød.

6.6.2. Tone in Limburgian and Rhine Franconian dialects

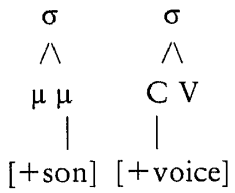
In the following discussion, we provide a summary of the distribution of two lexical tones (referred to as Accent I and Accent II) in the West Germanic dialects which include the Rhine Franconian or Rhenish German dialects and the Dutch Limburgian dialects (van der Vliet 1993; Gussenhoven & van der Vliet 1995). A map of the geographical area in which this opposition is found is given in chapter 4.2. The following description is based on Schmidt (1986) and Weijnen (1991).[33] Examples of minimal pairs differentiated only by tone are provided below in the orthographies of the respective standard languages. The lexical tone contrast only appears to occur on stressed syllables with two sonorant moras (long vowels, diphthongs, and short vowels followed by tautosyllabic sonorants). Syllables with one sonorant mora are either assumed to have Accent I or to have neither accent.

(30) Minimal pairs differentiated only by lexical tone

Accent I		Accent II		
Rhenish dialects:				
Kanne	'jug'	kann	'can (AUX)'	[kɑn]
weisen	'direct (V)'	weissen	'white (inflected)'	[vaese]
wellt	'curve (V, 3 SG)'	Welt	'world'	[velḍ]
grabe	'dig'	Grab	'grave (N)'	[grɑːp]
Steine	'stones'	Stein	'stone'	[ʃḍɛːn]
Limburgian dialects:				
stenen	'stones'	steen	'stone'	[stɛin]
graaf	'count'	graf	'grave (N)'	[ʏraːf]
wegen	'roads'	weg	'road'	[wɛːx]
wijze	'wise person'	wijzen	'direct (V)'	[wiːzɔ]

The German Rhenish dialects are divided into two broad groups depending on the diachronic distribution of tones: Rule A dialects and Rule B dialects. Rule B dialects are mainly found in areas to the northeast and west of Koblenz, i. e., in the southeastern part of the geographical area (Schmidt 1986: 139). In the Rule A dialects, the following vowels developed Accent I:

(31) Contexts in which Accent I developed in Rule A dialects:
a. MHG non-high vowels
b. long vowels, diphthongs, and short vowels followed by sonorants plus a voiced consonant in the onset of the next syllable, i. e.,



In the periphery of the geographical area there may be additional restrictions particularly on condition (31 b). By way of example, Schmidt (1986: 131) refers to Wiesinger's (1975) subrules A 1 and A 2 for different dialect groups in the northeastern area between Duisburg, Düsseldorf, and Remscheid. These additional restrictions give the following dialect divisions:

(32) Accent I in Rule A 1 and Rule A 2 dialects

Rule A 1 dialects:
a. Condition (31 a)
b. Condition (31 b) with additional restriction: schwa-apocope if the long vowel arose through open syllable lengthening

Rule A 2 dialects
a. Condition (31 a)
b. Condition (31 b) with additional restriction: schwa-apocope if there was a long vowel

There is a further subset of Rule A dialects – known as Rule 3 dialects – which do not have (31 a) at all, but only have Accent I in the (b) context given for Rule A 2 dialects:

(33) Accent I in Rule 3 dialects:
Condition (31 b) with schwa-apocope when there is a long vowel

In the Rule B dialects the conditions on developing the lexical tones are reversed; i. e., Accent II developed in exactly those conditions where the Rule A dialects had Accent I.

The development of the lexical tones in the Dutch Limburgian dialects appear to be similar to that of the German Rule A dialects, in that Accent I developed on non-high vowels (31 a), and on long vowels and on short vowels

followed by tautosyllabic sonorants optionally followed by a voiced consonant in polysyllabic words, i. e., condition (31 b) with the addition that the following voiced consonant was not obligatory.

In sum, the development of tones in the German Rhine Franconian and Dutch Limburgian dialects was dependent on context free vowel quality (non-high vowels) as well as on the bimoraic nature of the syllable (where the second mora had to be a sonorant), with an occasional constraint on the deletion of the following nucleus. The last condition is of special interest. In late Middle Dutch, deletion of final unaccented vowels in singular nouns was frequent especially where the contrast between singular and plural was obliterated (cf. § 6.3.2.2). If in the dialects that did develop tone, all final unaccented schwas were deleted, a tonal contrast could have developed to accentuate or re-establish basic morphological contrasts. Thus, along with the development of tonal contrasts on a purely vowel quality basis, tonal contrasts in both monosyllabic words and bisyllabic words are easily possible in all the West Germanic dialects with the exception of the Rule 3 dialects. In the Rule 3 dialects, tonal development was always dependent on apocope and hence the contrast between Accent I and II could only be found in monosyllabic words. This is exactly the opposite of the Scandinavian languages where Accent II could only appear in polysyllabic words. Thus, a crucial difference between the West Germanic languages and the Scandinavian languages discussed above is that in the former, monosyllabic minimal pairs exist which are only distinguished by tone. This is not possible in the Scandinavian languages where monosyllabic words can never be distinguished only by tone; unlike West Germanic, apocope never occurred after the introduction of Accent II.

6.7. Romance loans

The reason for having an independent section on Romance loans is that they played a prominent role in affecting the metrical patterns of most of the Germanic languages. The Germanic languages themselves borrowed from each other during different periods, but this had no significant effect on the stress systems when compared to the Romance loans.

It is generally accepted that the early borrowings in all the West Germanic languages were nativized so that stress on the borrowed words was predominantly initial. For instance, early Latin borrowings in German had initial stress: Latin *colónia*, German *Kőln*; Latin *Augústus*, German *Áugust*. In the Middle High German period, however, there were examples of stress shift; the most cited examples in the literature are: *lebéndig* 'alive', *Holúnder* 'elder(berry)',

Wachólder 'juniper', *Forélle* 'trout', *Hornísse* 'hornet' from earlier *lébendec, hólunder, wécholter, vórhele, hórnuz* (Paul & Mitzka 1959). In English, the Germanic stress rule was predominant till the early Modern English period: A vast number of words which are stressed according to the source language in German and Dutch are pronounced with initial stress in English. Words like *paper, baron, channel, satin, coral, Latin, salad, actual, moral* are all stressed initially in English, but the German and Dutch counterparts are stressed on the last syllable. The most elaborate discussion of the changes in the stress system of English is given by Halle & Keyser (1971). We will briefly present their analysis and discuss the proposed stages with Dutch and German.

Halle & Keyser propose six stages between the Old English period and the modern period. In Old English, as mentioned before, stress was stem-initial. In addition, there was a stress retraction rule which retracted the stress from stems to noun- and adjective-forming prefixes regardless of the number of intervening syllables, e.g. noun *ándgiet* 'intelligence' vs. verb *ongíetan* 'to understand'; *wíþersàca* 'adversy' vs. verb *wíþsácan* 'to refuse'. Stress was, however, not retracted in nouns derived from prefixed verbs, e.g. *forġífness* 'forgiveness', verb *forġíf* 'to forgive' (cf. discussion in § 6.2.1). The situation was primarily the same for Old High German. Halle & Keyser argue that this state of affairs persisted till the late Middle English period when initial stress and stress retraction remained, but a new Romance stress rule was added which stressed heavy final syllables, or the penult if heavy, or the antepenult. The crucial point in their argument is that the initial accented Romance words were not stressed by the Germanic stress rule, but rather by the Romance stress rule, assuming that final vowels were lax. Thus, there were two separate vocabularies. Recall, however, that during this period Romance loans were largely being stressed as Germanic words in Middle English. This does not seem to have been the case for late Middle High German and Middle Dutch. In the Middle High German dialects, there was a very strong French influence and the French loans of this period seem to have retained the foreign accent. This seems to have been true for Middle Dutch as well.

According to Halle & Keyser, it was only in the beginning of the sixteenth century (Levins 1570) that English finally lost the Germanic stress rule and all initial stress was therefore obtained by stress retraction (which always retracted stress to the first syllable) after the Romance stress rule applied. Further changes occurred in the early Modern English period until the transition into the present day stress pattern. Noun-verb stress alternation occurred only in the beginning of the modern period, and in the eighteenth century, stress was not necessarily retracted to the first syllable, but in accordance to the three syllable window from the right. Finally, in the nineteenth century, along with

the other rules, the alternating stress rule of Modern English was added which essentially retracted stress to the initial syllable regardless of weight.

A significant observation in Halle & Keyser's analysis is the change from a predominantly initial stress to a pattern where the parsing window began at the right edge and initial stress was the exception. The same principle (though not the details) is observable in the analysis of modern Dutch and German. However, there are two important differences in the way foreign loans were absorbed into the languages. First, in the medieval period, many more Romance words with their original stress were borrowed into Dutch and German than into English. In most instances, the penult was stressed unless the final syllable was superheavy. Since superheavy syllables (particularly closed syllables with long vowels) did exist in the language till a late stage, this borrowing is understandable. Second, English stress was more sensitive to Romance affixation than Dutch and German. In the latter two languages, for the most part, the suffixes were borrowed with stress. As a result, there exist alternating forms with the same stem where the stress does not fall on the same syllable, but the suffixes themselves are not truly stress shifting as in English: cf. English *démocrat, democrátic*; German *Demokrát, demokrátisch*; but, *Juwél* 'jewel', *Juwelíer* 'jeweller'. Again, from the details of the synchronic patterns given in the individual language chapters (see chapter 8.2–8.4) it is evident that the effect of the loans has not been the same. We conjecture that, due to the loans, either the suffixes in Dutch and German were borrowed with stress, or the penult was stressed if heavy, leading to syllable extrametricality (see § 6.3.2.3).

Romance loans also had a significant effect on the Nordic languages. The quantitative systems of these languages that emerged after the quantity shift are the same as those we find today.[34] While Danish has underlying vowel quantity, the other Nordic languages have consonant quantity. What did change in most Nordic languages is the stress system, largely because of the extensive borrowings of foreign, especially latinate, loans in the last half millennium. Old Swedish, for instance, experienced a strong influx of loanwords from Low German – a close prosodic relative – in the thirteenth and fourteenth centuries (Bergman 1962; Moberg 1989). Many borrowings contained prefixes that were in part foreign to Old Swedish (*be-, unt-, vor-*), but could nevertheless be easily accommodated because of the frequent cognateness between the Low German and Old Swedish roots they attached to (Moberg 1989: 228). Also, Swedish had the unstressed prefix *for-*, so the prosodic structure was not new. Some of the Low German loans became very frequent, e. g., *bliva* 'become', *måste* 'must', *gå* 'go, walk' (OSw. *ganga*), *stå* 'stand' (OSw. *tanda*) (Bergman 1968: 82–83).

From the sixteenth century to early seventeenth century, many High German loans entered Swedish (*främling* 'stranger', *dunkel* 'unclear, dark'), while the

Low German loans became sporadic. Many originally French words came into Old Swedish via High German (*bataljón* 'battalion', *armé* 'army'), often slightly altered in form by High German (*horisónt* 'horizon'). In the later period of the seventeenth and eighteenth century, the increased cultural and political connections with France and some immigration from France boosted the direct borrowing of French words (e. g., *adjö* 'goodbye', *journál* 'newspaper'). These words displayed radically different prosodic structure (final stress), but were nevertheless accommodated largely unchanged. Rather than adjusting the rhythmic structure of borrowed words, most Nordic languages changed the stress system so as to accommodate new stress patterns, like German for example. As in the West Germanic languages, primary stress is now best calculated from the right of the word (Bruce 1993, and chapter 8.5.2.).

Icelandic and perhaps also Faroese are interesting exceptions. The French and German cultures and vocabularies did not have as strong an influence on these languages as on the mainland Scandinavian languages. Like Swedish and Norwegian, Icelandic and Faroese implement the quantity shift, which caused all stressed syllables to be heavy. Unlike Swedish and Norwegian, however, Icelandic and Faroese retained the initial stress, as shown by Árnason (chapter 8.7). Since syllable weight plays no role in *placing* stresses, the stress system is perhaps best described as quantity-insensitive. In the other Nordic languages, quantity still plays a role in localizing stresses (Bruce 1993; Kristoffersen 1990), although this fact is quite concealed because of a number of lexical generalizations (cf. the situation in the modern West Germanic languages).

Comparing the treatment of loans in the West Germanic languages, Swedish appears to have gone the same way as German, i. e., displaying high fidelity to the stress pattern of the source language, unlike English.[35] Swedish loan vocabulary is discussed by Dahlstedt (1962), Ståhle (1962), and Linell (1972). Norwegian behaves much the same as Swedish (Brekke 1881, Kristoffersen p. c.), that is, the position of stress is the same as in the loan language. In Norwegian, as in Swedish, many French words were borrowed via German, a fact that can often be seen in the forms (*sjokoláde* 'chocolate' ultimately from French *chocolat*). Some regions of Norway (East Norwegian and Tröndsk), however, strongly tended to change the stress pattern into initial stress (Kristoffersen p. c.): *káramel* 'caramel', *dírektör* 'director', *bánnan* 'banana'. These words invariably got Accent II.

The similarity between the West Germanic and the North Germanic languages lies in the fact that from a predominantly initial stress pattern, all the Germanic languages (other than Faroese and Icelandic) developed a metrical pattern where the parsing began from the right edge. The trochaic nature of the foot remains for all the languages, but there is a difference in quantity-

sensitivity. Icelandic and Faroese are quantity-insensitive, while the other languages are quantity-sensitive – differences in syllable weight and quantity result from the changes discussed above. The correlation is obvious: for those languages that are no longer quantity-sensitive, the direction of parsing has not changed; the languages that have maintained the quantity-sensitive structure of older Germanic have a different direction of foot parsing. Thus, from a foot type like the resolved moraic trochee as proposed for Common Germanic with parsing from left to right, Germanic languages have moved towards a pattern presented in the table below:

(34) Changes in the metrical pattern in the Germanic languages[36]

	Earlier	Present	
	All Languages	Icelandic & Faroese	All other languages
Foot type:	Resolved moraic trochee	Syllabic trochee	Moraic trochee
Direction of parsing:	left-to-right	left-to-right	right-to-left
Extrametricality:	None	None	(specific to individual lgs.)
End rule:	Left	Left	Right

6.8. Romance

This section discusses the change in the metrical system from Latin through Gallo-Romance to French. As limitations of space prevent us from discussing the entire Romance family, we have restricted ourselves to the evolution from Latin to French (occasionally mentioning the other Romance languages) mainly because French presents the most radical departure from the Latin stress system. Similar to the Germanic languages, the discussion covers changes in quantity and syllable structure along with the evolution of the stress system.

6.8.1. Latin

6.8.1.1. Latin stress and quantity

Scholars generally agree on the position of accent in Latin. Preclassical Latin had a strong stress accent on the initial syllable (cf. among others, Niedermann

1931: 19; Kent 1945: 65; Palmer 1954: 212–213; and Sommer & Pfister 1977: 73), whereas in Classical Latin, stress was on the penultimate syllable if this syllable was heavy, and on the antepenultimate if the penultimate was light. Except in monosyllables, stress never fell on the final syllable.

Kent (1945: 66), following Lindsay (1894: 158–159), accounts for the evolution from Preclassical Latin to Classical Latin by proposing that the classical stress on the penult or antepenult originated as a secondary stress and replaced the initial preclassical main stress. The preclassical main stress, then, remained as a secondary stress in the classical period.

There were a few exceptions to the Latin stress rule. First of all, there were some cases of final stress in polysyllabic words, e. g., adjectives in *-as* (<*atis*), GEN *-atis* like *nostrás* 'a countryman of ours' (compare *nóstras* 'ours, ACC PL F'), contracted verbal forms like *audit* (<*audivit*) 'to hear, 3 SG PF' or *fumát* (<*fumavit*) 'to smoke, 3 SG PF', and words ending in *-c* (e. g., *illúc, istíc* etc.) and *-n* (from enclitic *-ce* and *-ne*). The reader is referred to Lindsay (1894: 163–164) and Sommer & Pfister (1977: 75) for a more detailed discussion.

Furthermore, enclitics like *-ve* 'or', *-ne* (question particle), *-ce* (emphasis), *-met* 'even', and *-que* 'and' always induced stress on the preceding syllable, the penultimate one, regardless of whether that syllable was light or heavy. Hence, we have such forms as *virúmque* (heavy penult) 'and the man' and *musáque* (light penult) 'and the Muse' (cf. Priscian, cited in Keil 1857–1880, Vol. III: 181, henceforth K.; Pompeius, K. Vol. V: 129; Seelmann 1885: 40; Niedermann 1931: 22; Steriade 1988 a; Halle & Kenstowicz 1991; Kenstowicz 1994; and Mester 1994).

Although scholars agree on the position of accent, there is disagreement on the nature of accent in Classical Latin. French linguists (Benloew 1847; Benloew & Weil 1855; Vendryes 1902; Meillet & Vendryes 1924; Bourciez 1967) defended the view that accent in Classical Latin was a (melodic) pitch accent and became a stress accent only in the fourth century AD (cf. Pompeius' description of what a stressed syllable is and where the linguistic relevance of the chanted call is for the first time exploited: *necesse est, ut illa syllaba habeat accentum, quae plus sonat a reliquis, quando clamorem fingimus ... cum coeperis clamare, naturalis ratio exigit ut unam syllabam plus dicas a reliquis illius verbi; et quam videris plus sonare a ceteris, ipsa habet accentum ...* [It is necessary that that syllable is accented which sounds more loudly than the others when we shout. If you start to shout the logic of nature requires that you pronounce one syllable more loudly than the others in that word; and the one that you will have perceived to sound more loudly than the others is the accented one. Translation provided by the authors] (cf. K. 1857–1880, Vol. V: 126–127). According to most German and English linguists (Seelmann 1885; Lindsay 1894; Palmer 1954) accent in Latin always was a stress accent. Although direct testimonies

of grammarians of the classical period point to distinctions of pitch (cf. Quintilian's remarks, cited in chapter 10) rather than stress, it is generally acknowledged that Roman grammarians were heavily influenced by Greek. Lindsay (1894) states that most facts of the language (that is, vowel reduction, syncope, shortening processes)[37] point to a stress accent.[38] The metrical practices in Latin poetry point more clearly to a stress than to a pitch accent. Latin poetry was based on a quantitative rhythm (alternating long and short syllables) and, although in the comedies of Plautus and Terence there was a strong tendency, absent in Greek, to harmonize verse ictus (the strong position in the metrical foot) and word accent (cf. Palmer 1954: 213; Fraenkel 1928; and Drexler 1932), the word accent did not necessarily coincide with the ictus of the verse in the first four feet of the hexameters in dactylic and lyrical poetry. The non-coincidence of word accent and verse ictus is rather uncommon in poetry based on stress rhythm (alternating accented and unaccented syllables) in (stress accent) languages such as Dutch, German, and English (cf. Hayes 1989). Consider, for example, the opening verses of Virgil's Aeneis, where we give the metrical scansions (dactylic hexameter) above the verse lines and indicate both ictus and word stress with an acute accent:

´ ˘ ˘/´ ˘ ˘/´ -/ ´ -/ ´ ˘ ˘/ ´ -

Arma virúmque cáno Tróiae qui prímus ab óris

I sing about the man and his weapons who first from the shores of Troy

´ ˘ ˘/´ -/´ ˘ ˘/´ -/ ´ ˘˘/ ´ -

Itáliam, fáto prófugus, Lavínia vénit

to Italy, driven by fate, and the shores of Lavina came

Líttora [...]

Although a strong stress accent would expectedly lead to a stress rhythm rather than a quantitative rhythm and to a closer coincidence between verse ictus and word accent, the misalignment of accent and ictus in itself does not point to a pitch accent. Sommer & Pfister (1977: 78–79) point out that, if quantitative verse without a stressed ictus is considered, the misalignment of verse ictus and word accent is no problem at all, and that if quantitative verse with a stressed ictus is considered, this only shows that word accent in Latin was realized with less prominence or stress than in German, Dutch, or English. Furthermore, although ictus and accent did not necessarily coincide in the first four feet of the hexameter, there was an almost perfect coincidence of ictus and accent in the last two feet of Ennian (92.8%) and Virgilian (99%) hexameters, as in the verse lines above (cf. Palmer 1954: 213). This metrical practice (which differs from the Greek models imitated by Latin poets) also shows that the Latin

accent was different from the Greek pitch accent, because in Greek poetry no such strong coincidence is attested (for the further development of Latin verse, cf. Sommer & Pfister 1977: 80 and Nicolou 1930). Moreover, in Greek, this coincidence between verse ictus and word accent in the last two feet of hexameters (as in the choliambics of Babrius (cf. Palmer 1954: 214)) occurred later (second–third century AD) precisely when the pitch accent had been replaced by a stress accent.

Classical Latin had contrastive vowel and consonant length. Some minimal pairs are given in (35 a) and (35 b).

(35) a.	fŭror	'fury'	fūror	'I steal'
	pŏpulus	'people'	pōpulus	'poplar'
	mălum	'misfortune'	mālum	'apple'
	lĭber	'book'	līber	'free'
	lĕgo	'I read'	lēgo	'I appoint as delegate'
b.	văccā	'cow, ABL'	văcā	'to be free, IMP'
	ănnŭs	'year'	ănŭs	'old (Adj.)'
	ăgger	'dyke, dam'	ăger	'field'

After having presented the main aspects of Latin stress, let us consider how these facts can be formally described.

Metrical theory is not one, single theory, but rather consists of a number of alternative proposals (cf. chapter 1 for an overview). This means that dependent on the formalism one adopts, the Latin stress facts receive a different formal interpretation. Reasons of space prevent us from providing analyses of Latin stress in all the metrical proposals that have been advanced. We will discuss some of the major proposals below.

In Hayes (1981), Classical Latin is analyzed by using quantity-sensitive left-dominant feet. Since quantity-sensitive left-dominant foot construction never appears to be applied iteratively, the moraic trochee is introduced in Hayes (1987, 1995) to describe the languages that in the theory of (1981) required quantity-sensitive left-dominant feet (cf. chapter 1 for a more detailed account of Hayes 1995). Along the lines of Hayes (1995), Latin stress can be described by a non-iterative moraic trochee construction rule followed by left-to-right assignment of syllabic trochees for secondary stress as in (36).

(36) a. Last syllable is marked as extrametrical (indicated by angled brackets)

b. From right to left construct moraic trochees non-iteratively (i.e., until a stress is assigned)

c. From left to right construct syllabic trochees

The application of (36) produces the metrical representations in (37) for words like *arborem* 'tree', *cameram* 'room', *pedestrem* 'on foot', *voluptatem* 'voluptuousness', and *liberationem* 'delivery'. Main stress is derived by the application of End Rule Right (37 d) and is marked with a capital X.

(37)

	ar	bo	rem		ca	me	ram		pe	des	trem
	σ̄	σ̆	σ̄		σ̆	σ̆	σ̄		σ̆	σ̄	σ̄
a.			<σ>				<σ>				<σ>
b.	(x)				(x	.)				(x)	
c.	vacuous				vacuous				vacuous		
d.	(X		)		(X		)		(	X	)

	vo	lup	tā	tem		lī	be	rā	ti	ō	nem
	σ̆	σ̄	σ̄	σ̄		σ̄	σ̆	σ̄	σ̆	σ̄	σ̄
a.				<σ>							<σ>
b.			(x)							(x)	
c.	(x	.)				(x	.)	(x	.)		
d.	(		X	)		(				X	)

With respect to the rules in (36), two comments are in order. First, the moraic trochee construction rule (36 b) must apply non-iteratively in order to prevent secondary stress on the second (heavy) syllable of, for instance, *voluptatem*. Second, the secondary stress facts of Classical Latin have been accounted for by ordering the left-to-right construction of syllabic trochees (36 c) after the assignment of primary stress (36 b). The left-to-right assignment of syllabic trochees, as in (36 c), instead of right-to-left, allows us to dispense with destressing rules for Classical Latin (cf. Jacobs 1989 for a more detailed account).

According to Halle & Vergnaud's (1987: 55–56) theory, the stress facts of Latin can be analyzed by the algorithm in (38) (where HT stands for Head-Terminal, and BND for Bounded). The reader is referred to chapter 1 for a more detailed account of Halle & Vergnaud's (1987) stress theory.

(38) a. Mark the last syllable as extrametrical

b. Assign a line 1 asterisk to any metrical syllable of the word if it has a branching rhyme

c. Line 0 parameter settings are [+HT, +BND, left, right-to-left]

d. Construct constituent boundaries on line 0

e. Locate the heads of line 0 constituents on line 1

f. Line 1 parameter settings are [+HT, −BND, right]

g. Construct constituent boundaries on line 1

h. Locate the heads of line 1 constituents on line 2

i. Conflate lines 1 and 2

Given that for Latin stress, quantity-sensitivity played a role only in the penultimate syllable, any metrical syllable in (38 b) should be replaced by the penultimate syllable. The operation of the rules (a−h) is illustrated in (39).

(39)

X					X							X								line 2
(x)					(x)						(x	x)								line 1
(x	x)	<x>			(x	x)	<x>				(x)	(x)	<x>							line 0
σ̄	σ̆	σ̄			σ̆	σ̆	σ̄				σ̆	σ̄	σ̄								
ar	bo	rem			ca	me	ram				pe	des	ter								
		X										X								line 2
(x		x)			(x			x				x)								line 1
(x	x)	(x)	<x>		(x		x)	(x		x)	(x)	<x>								line 0
σ̆	σ̄	σ̄	σ̄		σ̄		σ̆	σ̄		σ̆	σ̄	σ̄									
vo	lup	tā	tem		lī		be	rā		ti	ō	nem									

Halle & Vergnaud (1987: 55−56) propose the conflation rule (38 i), which has the effect of preserving a constituent on a lower line (line 1 in 39) only if the head of that constituent is also the head of a constituent on a higher line (line 2 in 39). Therefore, if rule (38 i) applies, all but the last constituent will be suppressed. Given that we will argue below that there is evidence for constituent structure preceding main stress, we assume rule (38 i) not to be operative in Latin.

Without rule (38 i), the constituent structures one ends up with are basically the same as those produced by using a quantity-sensitive left dominant foot (for main stress) and iterative quantity-insensitive left dominant footing (for secondary stress). It should, however, be noticed that after the algorithm in (38) has applied some destressing rules are needed, which will not be discussed here.

6.8.1.2. Latin stress and constituent structure

As mentioned above, Hayes (1995) proposes a non-iterative moraic trochee construction (36) for languages such as Classical Latin.

The constituent structure assigned by a moraic trochee analysis like (36) differs from a previous proposal by Hayes (1981) and from the constituent structure derived by the rules in (38). In Hayes (1981), use is made of a quantity-sensitive left-dominant foot (an uneven trochee) to account for Latin stress. An uneven trochee, starting at the right edge of the word, groups together a sequence of a heavy and a light syllable as well as two light syllables into one constituent. This is in effect similar to the constituent structure derived by the algorithm in (38). It is clear for Latin that a moraic trochee and the former quantity-sensitive left dominant foot or uneven trochee are equally successful when it comes to accounting for the distribution of stress.

For Classical Latin, Mester (1994) argues that a moraic trochee is superior to an uneven trochee if one looks beyond the stress placement facts and takes into account other stress-sensitive processes, such as vowel-shortening and syncope.

Given that we will argue below that an adequate analysis of the evolution from Latin to Gallo-Romance lends itself to an uneven trochee analysis, let us briefly discuss Mester's (1994) main arguments against a trimoraic or uneven trochee analysis of Latin stress.

Mester (1994) starts by discussing two optional shortening processes whose effects can be detected in metrical poetry: Iambic shortening (also known as "Brevis Brevians") and cretic shortening. Both processes had in common that they transformed an iambic sequence of a light and a heavy (LH) syllable into a pyrrhic constituent (LL). Cretic shortening was restricted to word-final cretic (HLH) sequences, whereas iambic shortening applied to word-final LH and also to word-internal LH sequences. Examples from metrical scansions in Plautus (reflecting spoken Latin according to Lindsay 1894 and also Mester 1994, but judged artificial by Palmer 1954: 88) are provided to illustrate these optional shortening processes.[39]

With respect to the shortening that took place in the final syllable, Mester (1994) argues that this crucially did not occur in words ending in a sequence LLH or HH, which could be exhaustively parsed as (LL)(H) and (H)(H) respectively. It only occurred in cretic words which could not be exhaustively parsed and had a so-called "trapped" medial syllable: (H)L(H), as for instance in *dīcĭtō* > *dīcĭtŏ* 'say, IMP FUT', and in iambic words which could only be exhaustively parsed after shortening of the final H: LH > (LL), such as, for example, *vīrī* > *vĭrĭ* 'man, GEN SG/NOM PL'. Mester assumes a moraic trochee (accounting for main stress) followed by subsidiary footing of unparsed material after the stressed syllable and concludes that "When the various shortening processes of Latin are confronted in their totality, a successful prosodic explanation must simultaneously account for shortening in iambic words and in cretic words and

lack of shortening in other cases." In Mester's view, this provides crucial evidence for a bimoraic and against a trimoraic analysis for Latin. A trimoraic analysis could also account for iambic shortening in LH words, but not for cretic shortening, given that HLH can be exhaustively parsed as (HL)(H) under a trimoraic analysis.

A number of remarks are in order. First, iambic shortening also applied in non-final position as in a word-initial sequence LH followed by the stressed foot, such as *vŏlūptates* 'desire, NOM PL' with a second syllable scanned light in Plautinian poetry. In this pre-main stress context, iambic shortening was mainly restricted to closed syllables and did not apply to open syllables with long vowels, which had the same prosodic structure.[40] Mester suggests initial bimoraic trochees, which resulted in creating initially trapped light syllables in the case of pre-stress LH. It should be observed, however, that this was at odds with the stress pattern of the language. Secondary stress was on the initial syllable when more than one syllable preceded the main stress (cf. Lindsay 1894: 158–160, accounted for in (36) above by quantity-insensitive feet assigned from left to right).

Second, there was at least one process in Latin that exactly created the LH sequence which in Mester's analysis is not supposed to be tolerated. Latin had a general rule of prevocalic shortening which according to Mester (1994: 20) followed "a clear rhythmic pattern striving towards optimal footing", such that the distribution of short and long variants of *i* in a verb like *fieri* 'to become' were governed by this principle. As a result, in the form like *fīō* 'to become, 1 SG PRS', the long *ī* was not shortened thus maintaining an HH structure instead of changing to the forbidden LH pattern, but there was a short *i* in *fĭĕrī* since it led to an "optimal footing" of (LL)(H). However, contrary to Mester's claims, several LH sequences arose in other verbs. Compare, for instance, the verb he mentions, viz. *fieri* (sometimes scanned long in Plautus) to *cire* 'to know,' where *i* is short even if a LH sequence arose as in *scĭō* 'to know, 1 SG PRS' (cf. Niedermann 1931: 98). Other examples which crucially go against the central thesis of Mester and create unexpected LH sequences, include cases like *flĕō* 'to weep, 1 SG PRS', *sŭō* 'to sew, 1 SG PRS', *grŭīs* 'crane, GEN', *rĕī* 'thing, GEN', (Niedermann 1931: 97).

Third, Mamilla's law, a process of degemination (cf. Sommer & Pfister 1977: 157 and Niedermann 1931: 164), created an initially trapped syllable in cases such as (**cannalis* >) *cănális* 'pipe, tube', (**mammila*>) *mămílla* 'nipple', (**farr* >) *fărína* 'flour', etc., which is, again, an unexpected result in Mester's analysis.

Fourth, and more importantly, there is no reason whatsoever to believe that shortening only applied to iambic or cretic words and did not affect other

heavy final syllables. Niedermann (1931: 71–72) and Lindsay (1894: 207–208) state that there was a tendency to shorten *every* long vowel in a final syllable.[41] Niedermann (1931: 71–73) provides some crucial examples involving sequences LLH and HH, such as *ănĭmăl* (GEN *animālis*) 'living being', *calcăr* (GEN *calcāris*) 'spur', *lictŏr* (GEN *lictōris*) 'lictor', and light scansions of the final H in the same sequence in examples from Terence and Ennius, such as *mandēbăt* 'to chew, 3 SG IMP', *audīrĕt* 'to hear, 3 SG CONJ', and *cāntŏ* 'to sing, 1 SG PRS' (cf. Lindsay 1894: 207). Benloew (1847: 180) gives some more examples, such as *sērmŏ* 'conversation', *pūlmŏ* 'lung', *ămbŏ* 'both'.

Fifth, the analysis of Mester crucially relies on joining a final syllable into the preceding foot. However, there is strong evidence against exhaustively parsed post-stressed material, or, as Mester calls it, subsidiary footing in Latin. As mentioned above, enclitic *-que* 'and' always induced stress on the syllable immediately preceding it. Kenstowicz (1994: 574–575) analyzes this as follows. Following Steriade (1988 a), stress assignment under enclisis is considered to respect previously established metrical structure and to apply only to free, unparsed material, according to Prince's (1985) Free Element Condition. Following Halle & Kenstowicz (1991), cases such as the Latin enclitics are treated as noncyclic effects. The Latin enclitics, such as *-que*, are marked as [–cyclic] and fail to activate the Stress Erasure Convention, which implies that previously assigned metrical structure is present and must be respected. Now, in order to arrive at prefinal stress in forms such as *musáque* (cf. *músa* 'Muse' HL) 'and the Muse', *liminâque* (cf. *límina* 'thresholds' HLL) 'and the thresholds', and *itâque* (cf. *íta* 'so' LL) 'and so', it is crucial that after primary stress is assigned in the cyclic block, there is no subsidiary footing or expansion of the monosyllabic light foot (in the case of *ita* (LL)) when the enclitic *-que* is added. If this were the case, one would predict the wrong stress contours for words with a LL or HLL base (which are grouped (LL) and (H)(LL) according to Mester) such as $^{+}$*útique* 'and how', $^{+}$*ítaque*,[42] and $^{+}$*limínaque*. Furthermore, as Kenstowicz (1994: 591) argues, if *límina* were grouped (H)L<L>, viz. as a moraic trochee (but without subsidiary footing), the same ill-formed $^{+}$*limínaque* would be predicted. Mester (1994) briefly discusses Latin enclitic accent and points out that the analysis along the lines of Kenstowicz faces a problem when a monosyllabic base is considered to which a bisyllabic clitic is attached, for instance, *ídcirco* 'for this reason'. The syllable *id* has already received metrical structure on the first round of stress assignment which must be respected. Kenstowicz's analysis, which relies on final syllable extrametricality, would wrongly predict $^{+}$*idcírco*.

Mester (1994) proposes that the entire clitic is extrametrical and not just the final syllable. In order not to be forced to accept the uneven trochee (cf. *limi-*

náque), Mester assumes that End Rule Right should apply at the syllable level and not at the foot level (cf. Mester 1994: 53). It is clear why Mester is forced to assume that the End Rule applies at the syllable level and not at the foot level. If it were applied at the foot level, the End Rule could either apply before or after subsidiary footing. If it applied prior to subsidiary footing, the unacceptable unary feet must be allowed after all (cf. *itáque*). If it applied after subsidiary footing, the wrong grid mark would be promoted to give main stress (*+ítaque, +limínaque*). However, the application of the End Rule at the syllable level implies having main stress on different planes of representation and is an unnecessary complication of the stress rules: footing, End Rule Right for main stress, subsidiary footing, and End Rule Right (at the syllable level) for enclitic stress. If an uneven trochee is adopted and clitic extrametricality is assumed, the problems raised by Mester simply disappear and the simplest analysis is obtained.

We conclude, therefore, that there is no compelling evidence based on the various shortening processes against a trimoraic or uneven trochee analysis of Latin stress. An uneven trochee analysis of Latin with a general tendency to shorten final heavy syllables is equally successful when it comes to accounting for the various shortening processes and, in fact, superior given the enclitic stress facts discussed above.

The second main argument against a trimoraic analysis of Latin is based on syncope. According to Mester (1994), basing himself on Lindsay (1894: 173), early syncope (Preclassical and Classical Latin) was restricted to cases where HLH becomes HH. This then is considered another way of resolving a medial trapped syllable. Crucially Mester claims that syncope did not apply to LL feet. Mester (1994: 43) concludes: "as a process predominantly affecting post-tonic light syllables stranded between heavy syllables, it receives a natural interpretation in a strictly bimoraic theory as a way of resolving trapping situations."

Lindsay (1894: 170–173, 178–185), however, offers a more precise description: "it seems to have been the law of Early Latin that *e* and *i* in the syllable after the accent always suffered syncope .... The Early Latin accent fell ... on the first syllable of each word, so that every *i* and *e* in a second syllable not long by position [i.e., not closed, AL, TR & HJ] must have suffered syncope." In other words, syncope applied after the main stressed syllable, but also after the initial secondary stressed syllable. The passage in Lindsay quoted by Mester holds for the period during the Republic and the Early Empire (Classical Latin), but note that the emperor Augustus considered *călĭdus* 'warm, hot' for *caldus* 'affected'.[43]

Examples like *pĕrĭstróma* > *perstroma* 'bedspread', *sŏlĭdus* 'solid' (used in the *Lex Municipalis* by Julius Caesar; cf. Lindsay 1894: 185), *frigdaria* 're-

freshing' beside *frĭgĭdus* 'cold', *caldarius* 'room for hot baths' beside *călĭdus* 'hot, warm,' all from Lucilius (second century BC), and *mĭnĭsterium* > *minsterium, misterium* 'function, task' from Plautus (third/second century BC) show the application of syncope in LL sequences. Niedermann (1931: 47) gives more examples, such as *ăvĭcaps* > *aucaps* 'bird catcher', (but not $^{+}$*opfex* from *ŏpĭfex* 'craftsman'), *bălĭneum* > *balneum* 'bath', and *prŏpĭter* > *propter* 'nearby, because of'.

If we take into account the fact that syncope also applied to LL feet, whether initial or not, then, obviously, it can no longer be explained as "a process predominantly affecting post-tonic light syllables stranded between heavy syllables", and, hence, cannot be adduced as evidence for strict bimoraicity in Latin. Rather, syncope provides evidence for a quantity-insensitive initial foot (as in 36), and for a quantity-sensitive (uneven trochee) main stress foot and can be thought of as a foot-based process able to affect all post-tonic (that is, secondary stressed and main stressed) light syllables.

In sum, we conclude that careful examination of Latin phonology reveals that the evidence for a bimoraic and against a trimoraic trochee analysis of Latin is, to say the least, not so conclusive and straightforward as one is led to believe by Mester's analysis.

Before turning to a detailed account of the evolution from Latin to French, where, as mentioned above, we will provide evidence for an uneven trochee analysis of Latin, let us first briefly discuss the evolution of the Latin stress system into the other Romance languages.

6.8.2. From Latin to Romance

6.8.2.1. Cases of stress shift in Late Latin

In the evolution from Classical Latin to the modern Romance languages, a number of changes occurred, some of which are common to all the Romance languages.

In Late Latin, the location of stress changed in a few well-known and well-discussed cases, the most important of which was the change from antepenultimate to penultimate stress in words of which the last syllable started with a consonant+liquid cluster, for example, *intĕ́grum* < *intĕgrum* 'complete, entirely', *tonĭ́trum* < *tónĭtrum* 'thunder', and *tenĕ́brae* < *ténĕbrae* 'darkness'. For instance, Spanish *tinieblas* 'darkness' (in which diphthongization was conditioned by stress) shows that the penult was stressed in Late Latin.

The other cases of Late Latin changes in the location of stress were shifts of stress from prefix to stem in compound verbs as for example in *demoratur*

> **démŏrat* > *demórat* 'to stay, 3 SG PRS' and *rénĕgat* > *renégat* 'to deny again, 3 SG PRS', and cases where stressed antepenultimate *i* or *e* in hiatus with a short penultimate *e* or *o* consonantalized with concomitant shift of stress to the penultimate syllable. Well-known examples of the latter case are *mulíerem* > *muljérem* 'woman' and *filíolum* > *filjólum* 'son'. The reader may consult Lindsay (1894: 164–165), Kent (1945: 67–68), or Jacobs (1989: 13–14, 18–19). The change from antepenult to penult stress in cases like *íntegrum* 'complete, entirely' will be discussed in more detail in § 6.8.3.

6.8.2.2. Vowel quantity and consonant quantity

There also occurred segmental changes which had repercussions on the stress pattern of the languages. In Late Latin or Proto-Romance (third and fourth century AD) short *i* merged with long *e* into a close vowel *e* [e] and short *u* merged with long *o* into a close vowel *o* [o]. Thus, for instance, the stressed vowels of *vĭdeo* 'to see, 1 SG PRS' and *mē* 'me, ACC/ABL' developed alike into French [wa], *vois* and *moi*. Short *e* and *o* became open *e* [ɛ] and *o* [ɔ] respectively. The replacement of quantity distinctions by quality distinctions among vowels eliminated contrastive vowel quantity in all the Romance languages. In Modern Italian, for instance, vowel length is entirely predictable on the basis of stress (cf. Sluyters 1991).

As far as consonant quantity is concerned the Romance languages differ to the extent that they were affected by lenition processes. Lenition affected most of the western Romance languages and resulted there in the loss of geminates. As a result, the modern Romance languages that are still quantity-sensitive are so to a limited extent, that is only closed syllables play a role (cf. Steriade 1988 b for some discussion). The reader is referred to chapter 10 for a more detailed account of quantity-sensitivity in the Romance languages.

6.8.2.3. Antepenultimate stress and extrametricality

In Latin, stress could (except for monosyllables and a few exceptions mentioned above) never fall on the final syllable (cf. Pompeius, K. Vol. V: 128): *Apud Latinos ultima syllaba accentum non habet: non licet* [In Latin the last syllable does not have an accent: that is not allowed – AL, TR & HJ]. A rule marking all final syllables as extrametrical, as in (36 a) and (38 a), is generally postulated to account for this. The Romance languages show considerable variation in the way in which final syllable extrametricality evolved.

In the Gallo-Romance languages (French, Occitan,[44] and Gascon) antepenultimate stress no longer occurs. Proparoxytones (viz. words with antepenultimate stress) were lost by syncope as in French (see § 6.8.3.2), by stress shift as in Occitan (for example, Clas. Lat. *lácrima* > *lagréma* 'tear' and Clas. Lat. *pérsica* > *perségue* 'peach' (cf. Wheeler 1988)), or by deletion of the final syllable as in Gascon (for example, Clas. Lat. *tépidum* > *tébi* 'lukewarm' and Clas. Lat. *galbinum* > *gáubi* 'yellow' (cf. Rohlfs 1970)).

In the Italo-Romance languages (Italian, Sardinian, and Rhaeto-Romance) as well as the Ibero-Romance languages (Spanish, Portuguese, and Catalan) antepenultimate stress does occur, but has to be idiosyncratically marked. The evolution of the Romance languages thus shows antepenultimate stress or final syllable extrametricality to be a marked state of affairs.

6.8.2.4. The demarcative and morphological function of stress

A final remark on the evolution of the Classical Latin stress system into the modern Romance languages is in order. In Latin, stress did not have a morphological function. Its position was entirely predictable from the phonological shape of the word and independent of how the word was built up morphologically. Stress is generally said to have two functions: a demarcative one (signalling word boundaries) and a morphological one (providing information on the morphological structure of words). Hayes (1995: 25) divides stress systems into two types, the "rhythmic" stress systems and the "morphological" stress systems. In the former type, stress is based on purely phonological factors and in the latter type stress serves to elucidate the morphological structure of a word (cf. chapter 1). The stress system of Classical Latin can be characterized as a rhythmical stress system.

What we observe now in the evolution from Latin to the modern Romance languages is that the modern Romance languages have come to emphasize either one of these two functions.

The Gallo-Romance languages have stress systems that are still essentially in Hayes' terms "rhythmic", since stress mainly serves to indicate word boundaries or as in Modern French phonological phrase boundaries.

In the other Romance languages, the stress system has become to some extent morphologized, often differentiating between nominal and verbal stress, but stress has to be individually marked (see chapter 10 for a more complete review). Portuguese, Spanish, and Italian, for instance, use stress as a tense marker in some forms of the future, the conditional, and the perfect.

In this section, we have very briefly presented the broad lines of evolution of the Classical Latin stress system into the modern Romance languages. A more detailed account of stress in the Romance languages is provided in chapter 10.

6.8.2.5. Loanwords and stress

One of the striking differences between the Romance and Germanic languages is the treatment of loans. Whereas the Germanic languages did in general not adapt the loans to the stress rule of the language, but instead permitted words with a different stress pattern than the native words, the Romance languages, in general, adapted loanwords to the stress rule. In Latin, for instance, Greek polysyllabic words with final stress were adapted to the Latin stress rule, for example *μηχανή* > *máchina* 'work of art, machine' and *τυραννίς* > *tyránnis* 'tyranny'. Also, Greek words with a prefinal heavy syllable and antepenultimate stress were adapted to Latin by stress shift, as in *τύραννος* > *tyránnus* 'tyrant', *Ὄλυμπος* > *Olýmpos* 'Olympus', and *εἴδωλον* > *idōlum* 'statue, ghost'. In these cases in later Classical Latin, the Greek accent was maintained and the word was adapted by quantity changes, such as *εἴδωλον* > *ídŏlum* (hence, OF *idle*) and *σέλινον* > *sélĭnum* 'celery' (cf. Seelmann 1885: 48–49, 54–56; Lindsay 1894: 155–156; Sommer & Pfister 1977: 106–107 for more discussion).

In the history of French, loans were consistently adapted to the stress rule of that particular period of the language. In Old French and Middle French (eleventh to sixteenth centuries), when the stress rule had changed in such a way as to stress every final syllable except schwa (cf. § 6.8.3 below), learned loanwords were adapted to that stress rule. Cases of stress shift include, for example, *frágilis* > *fragíle* 'fragile, delicate'. That we are dealing here with loans can be seen by comparing this form to Lat. *frágilis* > OF *fraile* > Mod. Fr. *frêle* 'frail, weak' which did partake in the normal evolution of the language, that is, stressed *a* in open syllables became *e*, and the unstressed penult syncopated. Another example is *fábrica* > *fabríque* 'manufacturing, religious construction', – compare again to Lat. *faber* (ACC *fabrum*) > OF *fevre* 'worker' where stressed *a* in open syllables became *e* and where *b* became *v* by lenition – and also *dóminum* > *dominúm* 'lord' illustrated by rhymes (cf. Pope 1956: 229–233).

Loans could also be adapted by deletion of the final syllable, as in *imaginem* > OF (eleventh century) *imagene* > (twelfth century) *image* 'image' or *angelum*

> eOF *angele* > *angle, ange* 'angel' (cf. Reinheimer-Rîpeanu 1990 for more discussion). Similarly, English loans in Modern French are consistently stressed on the final syllable, such as *tennís* and *tickét*.

6.8.3. From Latin to French

6.8.3.1. The evolution of metrical structure

In this section, we will describe the evolution of French foot structure. As discussed above in § 6.8.1, the constituent structure assigned by a moraic trochee analysis like (36) differs from previous proposals. Furthermore, we have seen that for Latin no compelling evidence exists excluding a trimoraic or uneven trochee analysis. In this section, we will show that the evolution of metrical structure argues in favour of a trimoraic uneven trochee analysis of Latin, as in (40).

(40) a. Last syllable is marked as extrametrical

b. From right to left construct one single uneven trochee (i.e., non-iteratively until a stress is assigned)

c. From left to right construct syllabic trochees

d. End Rule Right

The application of (40) produces the metrical representations in (41) for the words discussed in § 6.8.1.1.

(41)

	ar	bo	rem		ca	me	ram		pe	des	trem
	σ̄	σ̆	σ̄		σ̆	σ̆	σ̄		σ̆	σ̄	σ̄
a.			<σ>				<σ>				<σ>
b.	(x	.)			(x	.)				(x)	
c.	vacuous				vacuous				vacuous		
d.	(X		)		(X		)		(	X	)

	vo	lup	tā	tem		lī	be	rā	ti	ō	nem
	σ̆	σ̄	σ̄	σ̄		σ̄	σ̆	σ̄	σ̆	σ̄	σ̄
a.				<σ>							<σ>
b.			(x)							(x)	
c.	(x	.)				(x	.)	(x	.)		
d.	(		X	)		(				X	)

In early Gallo-Romance, a stress-sensitive syncope process deleted all unstressed posttonic vowels in proparoxytones, irrespective of whether the antepenultimate syllable was heavy or light. The syncope process consisted of a reduction and a deletion part (cf. Richter 1934: 91). Later on, this process became generalized so as to reduce and delete all non-initial posttonic stressless vowels provided they occurred in an open syllable. If an uneven trochee is used, the reduction part of this process can be described by rule (42 a), and in its generalized form by rule (42 b).[45]

(42) Reduction

a. R
|
V → ə / (x __)F σ #

b. R
|
V → ə / (x __)F

The rules in (42) reduce a vowel dominated by a non-branching rhyme in the weak position of a foot. If a moraic trochee analysis of Classical Latin, as in (36) and illustrated in (37) above, is adopted, the reduction rule would have to be stated in such a way that both a vowel dominated by a dot in (x .) as in, for instance, *cameram* (37 b), and a vowel not dominated by a dot should become reduced, but in the latter case only if preceded by (x) as in, for example, *arborem* (37 a). Not only is it unclear how reference to both the absence and the presence of a dot can be made, but also, the difference in constituent structure between forms like (37 a) and (37 d) does not receive any independent motivation by this stress-sensitive process of reduction. The assumption of an uneven trochee for Classical Latin implies that because Latin is analyzed as involving uneven duration grouping (albeit a marked[46] form of uneven duration grouping), one expects[47] to find rules like (42), that is, segmental rules increasing the durational contrast of feet, at least if similar rules are taken to be characteristic of uneven duration grouping rather than of strict iambic rhythm. In other words, stress-sensitive reduction and gemination rules are now predicted to occur in languages like Classical Latin. As a matter of fact, the existence of similar rules (reduction, diphthongization, etc.) is well-established in the historical phonology of virtually all the Romance languages. Thus, by analyzing Classical Latin by means of an uneven trochee, the claim that rules of this kind are atypical of trochaic, even duration rhythm can be maintained. The syncope process resulted in a new accent rule that became general in Gallo-Romance. Since all vowels in the penultimate syllable of proparoxytones were reduced and deleted, the last two syllables of every word in Gallo-Romance consisted, if the stress rule remained unchanged, of an extrametrical syllable preceded by a monosyllabic stressed foot. Given that on the surface

stress was at this stage always on the penultimate syllable, this is formally indistinguishable from the assignment of a syllabic trochee. The stress rule of Gallo-Romance can therefore be described as the right-to-left assignment of syllabic trochees and the application of the End Rule Right. Some sample derivations are provided in (43).

(43)

sim	li	tud	ne		dorm	tor	ju	
(x	.)	(x	.)		(.)	(x	.)	
(		X	)		(	X	)	
col	pu				vo	lup	ta	te
(x	.)				(x	.)	(x	.)
(X	)				(		X	)

This particular evolution can be described as an evolution from an uneven trochee construction with final syllable extrametricality (Classical Latin) to a syllabic trochee construction without final syllable extrametricality (Gallo-Romance). The further application of reduction (cf. Jacobs 1989) – traditionally referred to as apocope – led ultimately to Old French becoming an oxytonic language, which can be described by End Rule Right only.[48]

Mester (1994: 42–43) argues that, because at this period of the language (that is, early Gallo-Romance) only closed penults counted as heavy, and because in languages that have few and positionally restricted heavy syllables, moraic trochees act largely like syllabic trochees, one might analyze the stress system as follows. Closed syllables counted as heavy in penultimate position, and (formerly long-vowelled) open penults were lexically marked for stress. Final syllable extrametricality and syllabic trochee assignment, then, will yield the same constituent structures as in (41). Mester concludes "We are thus free to adopt Jacobs' (1990) proposal and state Late Latin syncope as targeting weak positions of feet" (1994: 42–43). The main reasons for not adopting Mester's proposal are, one the one hand, that his view implies that all the modern Romance languages (except French) should be analyzed by syllabic trochees given that only closed penults count as heavy (see § 6.8.2.2 above and chapter 10), which is hard to substantiate (cf. also Wetzels 1997: 209). On the other hand, as explained in footnote 47, Hayes' generalization that foot-based reduction is absent from trochaic rhythm can no longer be maintained. Moreover, syncope would (recall the discussion in § 6.8.1.2 above) in Mester's view receive a different interpretation in Classical (resolving "trapping" situations) and Late Latin (targeting weak positions of feet). In our analysis, syncope in Classical Latin and Late Latin was one and the same foot-based process

targeting weak positions of feet. The only difference is that in Late Latin it was no longer hampered by social pressures of a written standard.

The evolution of the metrical structure from Classical Latin to Gallo-Romance can thus be described as an evolution from marked (final syllable extrametrical and uneven trochee) to unmarked (syllabic trochee). As mentioned above, the syncope process consisted of a reduction and a deletion part. The reduction part of this process may be interpreted as serving to increase the durational contrast of the uneven trochee. The deletion part makes it possible to eliminate the markedness of the Classical Latin stress system. By deleting all reduced vowels in proparoxytones, Gallo-Romance became a simple penultimate stress language, in which the Classical Latin stress rule was reinterpreted as unmarked right-to-left syllabic trochee assignment. It is important to see that we are not dealing here with a simple case of restructuring. That is, it is not the case that, after syncope had gone through as a sound change, the data – the last two syllables of every Gallo-Romance word consisted of an extrametrical syllable preceded by a monosyllabic stressed foot – faced by a child acquiring the language were compatible with a simple syllabic trochee analysis. That the causative factor for the deletion part of the syncope process was, in fact, a reduction in the markedness of the stress system can be concluded from words in which a shift of stress from the antepenultimate to the penultimate syllable took place even before the syncope process affected them, for instance *íntegrum* > *intégrum* > *entier* 'complete, entire'. Shift of stress in words of this type (i.e., penult short vowel followed by consonant + liquid cluster) was optional. Some Romance words were derived from a penult stressed Late Latin source, others from an antepenult stressed one. The above-mentioned *integrum* yielded both Old French *entre* (Adj.) 'in good form' from *íntegrum*, and *entier* 'complete' from *intégrum* (cf. Pulgram 1975: 168–170; von Wartburg 1952: 734–735). In these words stress must, prior to syncope, have moved to the penultimate syllable in order for the diphthongization of the vowel in the penultimate syllable to have taken place. Pulgram (1975: 168–171) attributes the stress shift in these cases to a "trend towards paroxytony". We think that this is correct.[49]

Given that, during the period in which the syncope process was operative, the loss of quantity distinctions among vowels rendered the Latin stress rule partly opaque, the following historical scenario must be envisaged. For some period of the language we must posit lexical stress and for that period the rules in (40) must be considered lexical redundancy rules conditioning the application of reduction in (42). Shift of stress in the cases discussed above and the deletion part of the syncope process shared one and the same goal: replacing the marked Latin stress rule in its lexicalized form by an unmarked, predictable, simple Gallo-Romance syllabic trochaic stress rule.

In this section, we have described the evolution of foot structure from Classical Latin to Old French. It has been argued that this evolution can be characterized as an evolution from marked to unmarked. We have seen in the preceding sections that, as far as the word stress is concerned, in the evolution from Preclassical Latin (initial syllable) to Old French (final syllable), the location of stress shifted from the left edge of the word to the right edge. Quite interestingly, a similar shift of stress occurred at the phrasal level. Although phrasal stress for Latin is not often discussed, it seems to have been a strong initial stress and a descending rhythm (cf. Kukenheim 1971 and Ramsden 1963). In later Old French, this changed: rhythm became ascending and phrasal stress final. Adams (1987) informally relates this change to the loss of (phonological) enclisis and the cliticization of subject pronouns. In Jacobs (1993), this is formally captured as a case of parameter resetting (the edge parameter of Selkirk & Shen's (1990) end-based theory of syntax-phonology mapping).

In the next section, we will discuss the evolution of the French syllable structure, because it is intricately linked to the evolution of metrical structure.

6.8.3.2. The evolution of syllable structure

If the syllable structure of Late Latin/early Gallo-Romance is compared with that of Classical Latin, it can be shown (cf. Jacobs 1989) that it was simplified to a considerable extent. In syllable-final position no consonant clusters were allowed to surface and the only consonants that could end a syllable were either sonorant or *s*. The change in syllable structure from Classical Latin to Late Latin/early Gallo-Romance can be considered as part of an evolution from closed to open syllables, that is, as developing towards a preferred CV syllable structure. Whereas one would expect that this evolution would lead to the complete elimination of syllable-final consonants, we are faced with the fact that in Gallo-Romance the syllable structure again became more complex.

In Gallo-Romance, there were no changes in syllable-initial position. With regard to the syllable-final position, however, a number of changes took place which resulted in a rather complicated set of syllable structure conditions.

To see this, let us consider the words in (44), taken from Fouché (1961).

(44)

a.			b.			c.		
drap	[p]	'blanket'	colp	[lp]	'blow'	cent	[nt]	'hundred'
net	[t]	'clear'	folc	[lk]	'people'	blanc	[ŋk]	'white'
sac	[k]	'bag'	alt	[lt]	'high'	champ	[mp]	'field'
dos	[s]	'back'	salf	[lf]	'safe'			

chef	[f]	'head'	[$^{+}$ln, $^{+}$lm]			cresp	[sp]	'crisp'
bel	[l]	'pretty'	corp	[rp]	'body'	basilisc	[sk]	'basilisk'
fer	[r]	'iron'	porc	[rk]	'pig'	tost	[st]	'early'
an	[n]	'year'	part	[rt]	'share'			
faim	[m]	'hunger'	cerf	[rf]	'deer'			
jorn	[rn]	'day'						
ferm	[rm]	'strong'						

In (44 a), the palatal sonorants [ñ] and [λ] which only occurred in word-final position have not been included. The fricative [θ], which also only occurred word-finally as the result of a rule of spirantization, has also been discarded. The forms in (44 a) show that towards the end of the ninth century any consonant could close a syllable in Gallo-Romance.[50]

If one now compares the evolutions sketched in (45 a) with those given in (45 b) (cf. Fouché 1961: 776–777, 825, 828–829) it becomes clear that the consonant clusters allowed word-finally were not permitted in word-internal position in Gallo-Romance.

(45) a.	Clas. Lat.	Late Latin	Gallo-Rom.	Old French	
	dormitorium	>*[dɔrmtorju]	>*[dɔrtojr]	>dortoir	'(bed)room'
	computare	>*[kɔmptarɛ]	>*[kɔmter]	>conter	'to count'
	civitatem	>*[tsivtatɛ]	>*[tsittɛθ]	>citet	'city'
	galbinum	>*[džalbnu]	>*[džalnɛ]	>jalne	'yellow'
	*fortimente	>*[fɔrtmɛntɛ]	>*[fɔrmɛnt]	>forment	'strongly'
	hospitalem	>*[ɔsptalɛ]	>*[ɔstel]	>ostel	'residence'

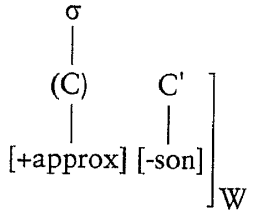
(45) b.	Clas. Lat.	Late Latin	Gallo-Rom.	Old French	
	diurnum	>*[džɔrnu]	>*[džɔrn]	>jor(n)	'day'
	campum	>*[tšampu]	>*[tšamp]	>champ	'field'
	debet	>*[devɛt]	>*[deift]	>deit	'he must'
	colaphum	>*[kɔlpu]	>*[kɔlp]	>colp	'blow'
	partem	>*[partɛ]	>*[part]	>part	'side, share'
	crispum	>*[krespu]	>*[kresp]	>cresp	'frizzy, crisp'

The forms in (45 a) indicate that consonant clusters created inside words (syncope) by the deletion part of rule (42), although similar to word-final ones, were subject to cluster simplification word-internally. On the other hand, as the forms in (45 b) show, the same clusters created word-finally (apocope) by rule (42) were not simplified. The fact that syncope (which was productive between the fourth and the seventh century) chronologically preceded apocope

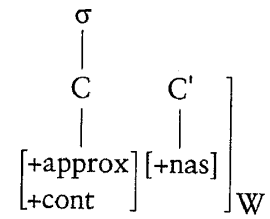
(which was productive between the seventh and the ninth century) follows quite naturally from the analysis presented in § 6.8.2.1. Only after the replacement of the uneven trochee by a syllabic trochee could apocope apply, because only then the last two syllables of a word were grouped together into a single constituent, to which rule (42) could apply. The question whether the consonant clusters created by syncope, like the ones in (45 a), were tolerated for some time in Gallo-Romance, or whether they were simplified immediately, will not be dealt with here.

In order to account for the possible clusters of consonants in word-final position, the rules in (46) are postulated.

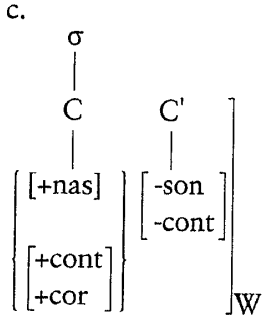
(46) a.



b.



c.



Word-internal cluster simplification can now be described as the automatic consequence of Stray Erasure. In conclusion, then, as far as the word-internal syllable-final position is concerned, the syllable structure of Gallo-Romance at the end of the ninth century can be described by only allowing a sonorant coda. In word-final position, the occurrence of inflectional *t* and *s* can be accounted for by an affiliation rule. However, compared with Late Latin, the three rules in (46) have to be added to describe the permissible word-final Gallo-Romance consonant clusters. So we see that the simplified Late Latin syllable structure was made more complex again – albeit limited to the word-final position – in ninth century Gallo-Romance, since consonant clusters again surfaced. This complicated Gallo-Romance syllable structure became simplified again in its evolution to Old and Middle French. In Middle French, no syllable-final clusters were allowed and the only consonant that occurred in coda position was *r*. Witnessing such an evolution, the question that arises, of course, is why, if languages strive for preferred CV syllables, the reverse occurred in the evolution from Late Latin to Gallo-Romance, that is, why did the syllable structure become complex again in Gallo-Romance? Why did Gallo-Romance interrupt the evolution from Classical Latin to Old and Middle French?

In the first part of this section, we have argued that the deletion of reduced vowels must be interpreted as having paved the way for a change in the stress pattern which evolved from a marked into an unmarked accent system. The syllable final consonant clusters illustrated in (45), of which ninth century Gallo-Romance only permitted those occurring in word-final position (45 b), were brought about by syncope and apocope. Given the representational framework of nonlinear phonology, the manipulation of structure at one prosodic level may take place independently of the other prosodic levels. For the specific case of Gallo-Romance this means that, because syncope and apocope are formulated as the foot-based process (42) they are expected to apply independently of syllable structure. What we observe, then, is that changes occurring at the level of representation where foot structure is expressed and resulting in a simplification of that structure, caused a complication of the rules of syllabification. In other words, the elimination of marked in favour of unmarked foot structure had the side-effect of creating a more marked syllable structure as is obvious from the evolution of the Late Latin syllable structure, which had to be complicated with the adjunction rules in (46). So it can be concluded that two competing tendencies were at work in the historical phonology of French prosodic structure: one was to simplify marked foot structure and the other was to strive for a CV-CV syllable pattern.

6.8.4. Summary and discussion

We have discussed the evolution of the Classical Latin stress system into the modern Romance languages. After a brief overview and discussion of the essential facts of Latin, where special attention has been paid to constituent structure and where it has been shown that an uneven trochee analysis of Latin is superior to other proposals, a summary of the broad lines of evolution from Latin to the modern Romance languages has been provided. After that, the evolution from Latin to French has been studied in more detail.

We have shown that the evolution of the Classical Latin stress system to the Gallo-Romance stress system can be characterized as an evolution from marked to unmarked. This change from marked to unmarked has been shown to have been brought about by a number of factors. First, the loss of quantity distinctions among vowels led to the lexicalization of the Latin stress rules. Second, the marked, lexicalized Latin stress rule (described as an uneven trochee) was transformed into an unmarked Gallo-Romance stress rule (a syllabic trochee) by the combined effects of two processes: the deletion part of the reduction rule (42), that is, syncope and apocope, and the shift of stress from antepenulti-

mate to penultimate syllables in certain words. After that, we discussed the evolution of the syllable structure. It has been shown that the simplified Latin syllable structure became more complex in Gallo-Romance as a consequence of the rules simplifying prosodic structure above the syllable.

6.9. Summary of types of changes in metrical systems

In the concluding section, we provide an overview of the changes across both Germanic and Romance languages. Rather than making an inventory of differences and similarities, we will focus on the overall pattern of changes. At first glance, it might appear that the changes were quite different, but on a closer look, the general direction of change appears to be very much the same. The central components are the changes in quantity leading to a reassessment of syllable weight, readjustments in foot types, and incorporation of loans. And finally, in the light of these changes we will discuss the possibilities of universals with respect to the direction, predictability, and causes of change in word prosody.

6.9.1. Changes in quantity

Although Common Germanic and Latin had parallel quantity systems – vowels and consonants could both be long, and both closed syllables and long vowels contributed to weight – the two language families differ in the way syllable quantity developed. The most striking difference was that Romance underwent vowel length neutralization and Germanic did not. Consonant quantity was retained in Italian but disappeared in French and Spanish due to lenition. Consequently, French has no syllable quantity distinctions except for the contrast between full vowels and schwa. As for the other Romance languages, if syllable weight plays any role at all, it does so only in certain closed syllables – the penult for Italian and Spanish, and the final for Catalan and Gascon. With respect to syllable structure, French probably shows the most radical change from the early stages. Due to syncope, apocope, and lenition, the syllable structure is more complex than in Latin, although the weight distinction was neutralized. Germanic, on the other hand, showed a different pattern of change; consonant quantity and vowel quantity conspired towards achieving bimoraicity of the stressed syllable. This did not go through in English, but in general the West Germanic languages tended to lose the consonant quantity distinction while most of the Scandinavian languages lost the vowel

quantity contrast (see § 6.5 for details). The shared result among the Romance and the Germanic languages is that none of the modern languages have both vowel and consonant quantity.

6.9.2. Foot type and word edge

In our treatment of Latin and Common Germanic stress, we showed that both systems lent themselves to uneven trochaic analyses. Although even trochees have been proposed both on theoretical and empirical grounds, the evidence is not as convincing as for some other languages. The corroborating evidence tips the balance more in favour of an uneven trochee at the oldest stages rather than an even trochee. There is, however, no doubt that in the subsequent stages the metrical foot was always an even trochee: syllabic trochee for French, Faroese, and Icelandic, and moraic trochees for all other languages.

A second difference lies in the direction of parsing or the word edge preferred for stress. Stress in Germanic was predominantly at the left edge, while Latin stress was at the right edge. The modern languages, however, show a predominantly right edge stress because the Romance languages have maintained stress at the right edge, while most of the Germanic languages changed the direction of parsing from left-to-right to right-to-left, with main stress on the right edge. It should be remembered, however, that in Preclassical Latin the main stressed foot was at the left edge of the word, similar to Common Germanic. Thus, Romance also shifted the direction of parsing, only earlier.

6.9.3. Treatment of loans

Loans were common in both the Romance and Germanic language families. Initial borrowings in both language families adapted to native stress. The difference lay in the fact that this tendency continued in Romance, but not in Germanic. Although details differed, Romance loans into Germanic during the late medieval or early modern period were not reanalyzed to fit a Germanic stress pattern. That is not to say that the stress patterns of these words were the same as those of the original language, but they were not altered to be predominantly stem initial.

6.9.4. Why, how, and universals

Why do metrical systems undergo change? It has often been proposed that languages shift from a marked state to an unmarked state. Even if this is indeed

the case, in itself this assumption does not explain why and how such changes take place. Our view is that language acquisition and language change go hand in hand. Metrical change has two aspects: a change in the grammar and a change in the data available for the language learner. We will argue that a change in the grammar – be it from marked to unmarked, or vice versa – is directly the cause of the setting or re-setting of metrical parameters by the language learner. A change in the data is not originally due to the change in parameters, but can change the data available to the language learner which may cause a change in the parameters. As elsewhere in this volume, we have assumed that stress is not to be regarded as merely a feature-marking on a vowel, but rather as a systematically organized rhythmic structure realized by a combination of parameters such as quantity distinctions, syllable structure, foot type, left/right word-edge prominence, the direction of parsing, etc.[51] If each of these parameters has an unmarked and a marked option, and language learners opt for the unmarked option unless provided with evidence to the contrary, it might well be the case that on one level of distinction the language will "simplify" while becoming more "complex" on another level.[52] We will consider each of the parameter shifts in turn.

Why is it that we find a shift from an uneven trochee to a syllabic or a moraic trochee? Uneven trochees are clearly the marked option, but they can exist if there is enough evidence for the language learner to assume such a structure. If the evidence is opaque, as it happened for Germanic, the less marked option is favoured.

Why do we find a shift from left word-edge stress to the right edge between Preclassical Latin and Classical Latin and between Common Germanic and the modern Germanic languages? Typologically we know that weight-sensitive trochaic languages can easily have a three syllable window at the right edge of a word (i. e., stress is final, penultimate, or antepenultimate), but when it comes to the left edge, stress falls either on the first syllable or not at all. There are no languages which have a stress rule like "stress the second syllable if heavy, else the third". However, for quantity-insensitive trochees, the left edge is the default. Thus, if the unmarked trochee is the syllabic trochee, then the default for main stress is the left edge of a word. If the evidence for assigning stress on the left edge is indeterminate, or in other words, unless the evidence is transparent that the stress falls at the left edge, the window will be shifted to the right edge, which is what happened to Latin and the modern Germanic languages. Particularly in Germanic, once the stressed suffixes were incorporated, there was unambiguous evidence for the language learner that stress did not always fall at the left edge. Given that there were already non-initial patterns with certain prefixes and compounds, the shift to the right edge was

simple. Note that although the default setting for the edge parameter is left for quantity-insensitive trochees, this does not imply that there are no quantity-sensitive systems with stress at the left edge – the Germanic system had precisely this. Once the language learner decides that the language is quantity-sensitive, it needs unambiguous evidence to maintain the left-edge setting.

Concomitant to the word-edge parameter is the direction of parsing. As we have seen, both Latin as well as the Germanic languages changed the direction of parsing from left-to-right to right-to-left. Typologically, in weight-sensitive trochaic systems both directions of parsing appear to be equally frequent (cf. Hayes 1995). Thus, even if the edge parameter is set to the right, it need not necessarily be the case that the direction of parsing is simultaneously set to right-to-left. In fact, based on the data in Levins (1570), it is possible that at least for English, the direction of parsing remained left-to-right even after the edge parameter was set to the right. One could hypothesize that the right-edge setting goes together with a right-to-left direction of parsing and vice versa, but we have no clear evidence on this issue. In any event, in our view, the two settings are independent, and the language learner will require clear evidence to change the setting of the direction parameter.

The changes in quantity distinctions also followed the same pattern. If the unmarked option is to have neither vowel nor consonant quantity, and the most marked option is to have both, the language learner will require unambiguous evidence to retain both distinctions. Without transparent evidence, the hierarchy of preference would be either to neutralize quantity distinctions altogether, or to preserve the one that is most salient. The oldest stages of the languages we have discussed had both consonant and vowel quantity systems and only a few North Germanic languages like Nord Gudbrandsdalska, West Nyländska, and Älvadalsmål still maintain the double quantity system. The others have evolved into one indeterminate and two clear patterns of quantity alternations – languages with ambiguous status in quantity (Dutch and German), languages that have lost all (underlying) quantity distinction (Faroese, Icelandic, and French), and the rest which have kept either vowel quantity or consonant quantity. The development of the latter two categories of languages followed the markedness pattern we would predict. The reasons behind this direction of change are obvious: Syncope and apocope led to the opacity of quantity distinctions in the Romance languages; independent processes of consonant gemination (e. g., West Germanic gemination), open syllable lengthening, syncope, and later degemination led to the same lack of clear oppositions in Germanic. There were no clear indications for the language learner to maintain the consonant and vowel quantity distinctions of the older languages.

The indeterminate quantity situation in German and Dutch is more difficult to account for. We believe, that here, it is not only the choice between the

marked or unmarked quantity option that plays a role, but also the interaction with the quantity parameter and weight parameter. For the language learner, these are separate parameters to be set independently, but they inevitable interact. If the evidence is clear for one and not the other, the system can easily become complex. The result is a tenacious retention of vowel quantity along with a bipositional rhyme constraint without either having a transparent relationship to syllable weight. Consequently, the present system is confusing and intricate (cf. § 6.5).

Another complexity that has emerged, this time in Romance, was the shift from an unmarked syllable template to a marked one. Assuming that the core syllable (i. e., a CV syllable) is the least marked option, then any complexity of the coda adds to the level of markedness of a syllable. In late Gallo-Romance, foot-based apocope led to a far more complex coda structure than was available in the earlier stages. One might argue that the language learner would posit abstract final vowels only to preserve the least marked syllable template (see § 6.8.3.2 for a detailed discussion). In addition to valid arguments against assuming unnecessarily abstract representations, this hypothesis is falsified by later changes. Old French and Middle French final coda clusters were drastically simplified. If the language learners continued to postulate final abstract vowels (and hence no complex codas), these final cluster simplifications are hard to explain. Hence, unless there is clear indication to assume the existence of final vowels, the language learner will acquire the marked syllable option with complex codas.

We have all along observed that languages have certain preferred structures and introduce changes which further implement these structures. For example, Common Germanic required that the head of the stressed foot must be bimoraic. Later, there was a strong predilection for a bimoraic constraint on the stressed syllable rather than the head of the foot. However, not all of the Germanic languages finally acquired the bimoraic stressed syllable constraint because other opposing processes intervened (see § 6.5). This pattern of change where there are two conflicting tendencies can also occur during acquisition. For instance, in the development of English, there was a conflict between open syllable lengthening and trisyllabic shortening – the former lengthened the stressed syllable, the latter shortened those that are followed by two syllables. If the data used by the language learner to set the parameter requiring stressed syllables to be bimoraic contains both sets of words, the setting will be negative. In spite of an existing partiality for long vowels in stressed syllables, the language will continue to have monomoraic stressed syllables.

Thus, in our view, the evolution of the metrical systems we have examined results from a network of interacting alterations in parameter settings and is

not simply a matter of isolated changes. We have argued that language learners first use the default marking for each parameter and the marked option is assumed only when there is no doubt.[53] Hence, the nature of the data on which the initial setting of parameters is based is vital since no default setting will be changed unless the evidence is transparent. Any opacity or unclarity in the available data may lead to a change in the setting of a parameter from one stage of a language to another. Therefore, the source of a change from a marked system to an unmarked system is the language learner. A further consequence of this theoretical approach is that changes of this nature are not isolated or idiosyncratic; rather the grammar as a whole constrains possible changes. For instance, once enough words with stress at the right word edge had been absorbed from Romance into Germanic, could English have changed to an iambic system? The answer is no, because it is not only the word edge which determines the foot type in weight-sensitive systems, but other factors as well. English had enough Germanic bisyllabic words with a sequence of two light syllables with initial stress which would be sufficient to point towards a trochaic pattern. In our approach, it could not be otherwise. Thus, although we have only been able to consider Romance and Germanic in detail, we believe that diachronic studies of the metrical systems of other language families would be fruitful following the lines we have indicated. We hope to have shown that without our two principal assumptions – that metrical systems are a complex set of parameters and that acquisition and change are inextricably linked – alterations in word prosodic systems would be inexplicable and mysterious.

Language abbreviations

Clas. Lat.: Classical Latin, Dut.: Dutch, Eng.: English, eOE: early Old English, eOHG: early Old High German, Fr.: French, Gallo-Rom.: Gallo-Romance, Ger.: German, Icel.: Icelandic, Lat.: Latin, lPN: late Proto-Nordic, ME: Middle English, MHG: Middle High German, MNL: Middle Dutch, MSw.: Middle Swedish, NGmc.: North Germanic, Nw.: Norwegian, ODa.: Old Danish, OE: Old English, OF: Old French, OHG: Old High German, OI: Old Icelandic, ONw.: Old Norwegian, OSw.: Old Swedish, PN: Proto-Nordic, SOSw.: Southern Old Swedish, Sw.: Swedish, WGmc.: West Germanic.

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Notes

1. The resolved moraic trochee, as defined by Dresher & Lahiri (1991) and often informally referred to as the Germanic foot, is a special instance of an uneven moraic trochee where the head must include two moras. This foot is motivated not just for stress; it is claimed that a number of different phonological phenomena were sensitive to the same metrical structure. It should also be noted that although Lass (1994: 89–91) claims that the Germanic stress rule was ultimately sensitive to morphology, the implementation of his rule looks very similar to the one proposed above – a binary foot at the left edge of the word with the option of adding another weak syllable.
2. Not all analyses of Dutch assume that the foot is a moraic trochee. Kager (1989, and personal communication) argues that the foot could well be an uneven trochee – the evidence is not entirely clear. Hayes (1995: 200) argues that for German, the main stressed foot is a moraic trochee at the right edge, but a syllabic trochee is needed for secondary stress, direction of parsing being left-to-right.
3. This problematic situation has led some researchers to assume not a quantity distinction but a distinction based on syllable contact (cf. Hayes 1995: 306 for Dutch) or smooth cut syllables vs. abrupt cut syllables (cf. Vennemann 1991 for German).
4. Keyser & O'Neil (1985: 6–11) propose a left headed unbounded foot for stress (cf. chapter 1) but a quantity-sensitive right headed foot for high vowel deletion. See Dresher & Lahiri (1991) for a discussion of this proposal.
5. It has been suggested that synchronic trisyllabic shortening can be analyzed as a closed syllable shortening where the stressed long open syllable becomes closed when the following syllable is short and unstressed (cf. Meyers 1987). This accounts for alternations like *nation – nationality*. However, this cannot be the explanation here because the shortening was independent of the following syllable.
6. Hypothesized stages are always marked with an asterisk. Here, the earlier stage is marked with an asterisk because it is the hypothesized Middle English stage right before trisyllabic shortening following the late Old English period. We are much obliged to René Kager for requesting a much more detailed analysis of the various stages than we had provided originally.
7. Middle English OSL has been claimed to be compensatory lengthening due to the loss of the final schwa (Minkova 1982; Hayes 1989). Minkova (1985: 170–171) proposes a foot based analysis and argues that OSL (after schwa deletion) led to a more preferred foot type. However, at the end of the paper (p. 173–174) it is claimed that words like *ācorn, āmen, prōvost* with short initial vowels in Old English are also accounted for by the foot-based account "since the first foot contains

in (Old English) a non-branching rhyme ... the situation is remedied by vowel lengthening". This suggests that some form of OSL independent of schwa-loss also occurred – similar to Middle Dutch and Middle High German. For a detailed discussion of OSL in West Germanic see Lahiri & Dresher (in press).

8. A possible reason why German always opted for the long vowel could be because there was also a tendency to lengthen vowels before voiced consonants, and most of the intervocalic consonants were voiced obstruents or sonorants. Recall that all the original single voiceless stops became geminate fricatives after the High Germanic consonant shift; the only voiceless stop was [t] which developed later from the voiced dental fricative: English *father*, German *Vater*. Thus, there was a greater predominance of long vowels in the paradigms than short vowels. Reis (1974) also discusses the relationship between West Germanic gemination, High German consonant shift and the various shortening and lengthening processes in the history of German. She concludes that in the earliest stages, primarily gemination led to close or loose contact between vowels and consonants (see footnote 9) such that short vowels had close contact and long vowels had loose contact with the following consonant. With other consonant changes, close vs. loose contact became also a function of the voicing of the following consonant, such that long vowels were predictable before voiced consonants and short vowels before voiceless consonants. In the thirteenth century, due to independent changes, quantity of vowels becomes independent of the voicing of the following consonant and became related to stress and tenseness. However, Reis says nothing explicitly about the interaction of open syllable lengthening and voicing.
9. Vennemann (1991) incorporates Sievers's (1901) terminology of smooth cut versus abrupt cut syllables to account for such properties of German syllable structure. The related terminology of close contact "fester Anschluß" and loose contact "loser Anschluß" is elaborated in Trubetzkoy's (1939) theory of Silbenschnittkorrelation. Vennemann, however, draws a distinction between the two approaches. For a detailed synchronic description, see chapter 8.
10. Vennemann (1991) states that open syllable lengthening and degemination annihilated earlier length contrasts and established new tense/lax contrasts (or syllable cut prosodies). He suggests that Icelandic, German, and English show three stages of the development from length contrasts to tense contrasts via cut prosodies, but provides no detailed arguments why this is so.
11. This is reflected to some extent in late application of syncope in light (CVCV) stems, and in the development towards and through the quantity shift, which comes to a close as late as in the sixteenth century, in the major dialects of Scandinavia, some 300 years later than, e. g., Old English.
12. We have left the processes of *i*-umlaut and breaking out of this section. Both of these rules were in part prosodically conditioned, since they were triggered by an unstressed syllable and targeted a stressed syllable. Neither of them affected the prosodic structure as such. For discussion of the Nordic *i*-umlaut, cf. Kock (1888); Steblin-Kamenskij (1959); Wessén (1968: 15); Seip (1955: 22), and Cathey (1972). Scandinavian breaking is discussed in Hesselman (1945) and Wessén (1968: 25).
13. The plus sign is used to indicate incorrect or ungrammatical forms in contrast to the asterisk which is used in this chapter to mark reconstructed forms; cf. footnote 6.

14. Prokosch's Law has been elaborated as a synchronic condition in the Germanic dialects in various ways (Kiparsky & O'Neil 1976; Dresher & Lahiri 1991; Lahiri & van der Hulst 1988; Riad 1992, among others). It is often construed as a property of the primary stressed foot (or the head of the primary stressed foot) that imposes a two-mora minimum. The reason Prokosch's Law was not always obeyed in older Germanic was due to a conflicting and stronger requirement, prohibiting onsetless syllables (the Onset principle). In the early stages, Prokosch's Law could not induce synchronic vowel lengthening (only compensatory vowel lengthening was known from this period, e. g., **gans* > OSw. *gaas* 'goose', **maþlian* > OSw. *määla* 'to tell'), while in the Modern Scandinavian languages, after the quantity shift, it can.
15. A remaining problem is that a small number of bisyllabic light stems appeared to undergo syncope in the first period. These invariably had the vowel *a* (mostly pure *a*-stems, Iversen 1973: 46; Riad 1992: 122) in the target syllable. In the comparative perspective, one plausible analysis is that syncope of *a* was earlier than syncope of *i* and *u*. This is commonly assumed for Old English, where the discussion of syncope circles around the high vowels exclusively, while low vowel deletion is assumed to be much older. Nevertheless, final unsyncopated *a* in a metrically weak position is attested in early runic inscriptions (*raunijaz*, Øvre Stabu, second century, *holtijaz*, Gallehus horn, ca. 400, *hrazaz*, Rö, ca. 400), bearing witness to the fact that *a*-syncope was a historical rule in North Germanic.
16. We assume that forms consisting of one light and one heavy syllable, e. g., **gé.ßoo* 'gift, NOM SG' are resolved structures, which underwent vowel shortening as a rhythmic adjustment to the bimoraic canon (cf. processes like Latin brevis brevians *egoo* > *ego*, *modoo* > *modo*, Prince 1990; Mester 1994).
17. The vowel *oo* was raised to *u* in West and North Germanic (in absolute finality) but lowered to *a* in Gothic. In closed syllables, *oo* remained in Gothic, and was lowered to *a* in West and North Germanic. Long *ee* was raised to *i* in North Germanic.
18. In Gothic the situation was a little different, as simplex forms like **wúr.ðòo* 'words' showed up shortened, *worda*. Medial syncope was not extensive in Gothic (*haubida* 'heads'), and long vowels did show up in some final syllables (*herdiis* 'shepherd').
19. A similar Modern English coalescence rule, where the vowel yields to a syllabic sonorant, is discussed in Liberman & Prince (1977) and in Kager (1989: 166).
20. Cf. Luick (1964: 296); Krahe & Meid (1969: 118); Szemerényi (1980: 231, 290–291); Riad (1992: 126–127).
21. A distinction could be made between true overlength in which a long vowel was followed by a geminate consonant (which is necessarily moraic), and false overlength in which the long vowel was followed by a consonant cluster. True overlength was rare in Germanic (cf. (1)), and in North Germanic occurred exclusively with geminate *t* (Sturtevant 1932; Andersen 1960; Riad 1992: 245; cf. § 6.2). As for false overlength, there is no evidence in North Germanic that the post-vocalic consonant was moraic, i. e., provided a third mora to the syllable. While later vowel shortening rules applied in words of both types, some true overlong syllables retained the long vowel, and shortened the consonant (OSw. *dootter* > MSw. *dotter*).
22. Roughly according to segmental generalizations: (a) If the root vowel was *a* or *ä*, the vowel lengthens, (b) if the root vowel was *i*, *y*, *u*, or *o*, the vowel lengthened, unless it was followed by a voiceless stop or *s* (or *r*, to some extent; cf. Pihlström 1981), (c) following *i*, *y*, *u*, *o*, the consonants *p*, *t*, *k*, and *s* (and sometimes *r*) lengthened (Hesselman 1901, 1902).

23. As suggested in Árnason (1978) the complementarity helps to signal the phonological contrast.
24. This discussion is based on the assumption that the modern West Germanic languages all have a long and short vowel distinction rather than tense and lax. See chapter 8 for a discussion of the individual languages.
25. Some Scandinavian dialects developed so-called level stress (jämviktsaccent) around the time of the quantity shift, and in several dialects this prosody is still retained (e. g. Nord Gudbrandsdalska, Älvdalska). Level stress refers to the characteristic stress pattern found in light stems, where the stress appears to be equally distributed over the two light syllables. In addition to the prosody, there are vowel patterns, known as vowel balance and vowel levelling (vowel harmony), that clearly relate to the prosody. There are different views on the source for this pattern, the critical issue being whether level stress is tonal (Kristoffersen 1990, 1991; Nyström 1991) or stress based (Riad 1992; Bye 1994). The reason to mention level stress in the present context is that, under one view, it constituted a diachronic stage between the old double quantity stage and the quantity shift. We will not discuss the topic further here, however.
26. The discussion concerning an accent distinction in Icelandic is reviewed in Liberman (1982: 39); Ottossón (1986) and also in Árnason (1993). A phonetic interpretation of hypothesis A (cf. below) occurs in Öhmann (1967).
27. The direct source for the accent curve could be edge-tones (Oftedal 1952) or secondary stress (Kock 1878), perhaps in clash with primary stress (Riad 1988).
28. In the latter case, of course, the accents could be much older.
29. Original bisyllables that lost the final vowel do not cast light on the origin of accent since they became monosyllables. Oftedal does not discuss original trisyllables which lost a final vowel. These, however, generally ended up with Accent II, and should be accounted for (examples are *katilaz*>OSw. *kìtill* 'kettle', *herðijaz*>OSw. *hìrði* 'shepherd', and so on).
30. Oftedal also evaluates the likelihood of analogy as an explanation for the deviant (under hypothesis B) Accent II forms (syncopated preterites: *dòm-Ø-di* 'judged', *tàl-Ø-di* 'counted' vs. non-syncopated preterites: *òrti* 'he wrought', in particular), by counting the number of forms in Haugen's (1942) corpus. Numerically, the syncopated forms occurred in a higher number than the non-syncopated forms, which together with other factors (e. g. frequency in stressed position) makes it unlikely that analogical pressure caused a wholesale shift from putative Accent I to Accent II in the modern dialects.
31. This is true of the lexical distribution of accents. The manifestation of accent varies with syllable weight, in dialects that have a contrast in stressed syllables (level stress dialects, Kristoffersen 1990).
32. Salmons (1992: 131–132), however, argues that preaspiration was probably an older feature than stød, because of the relic-like geographical distribution of preaspiration and the innovation-like distribution of stød.
33. We are deeply indebted to Peter van der Vliet and Carlos Gussenhoven for providing us with the factual details, analyses, and comments concerning the diachronic development of tones in the West Germanic languages.
34. Vennemann (1991) analyses the quantity shift in terms of a different theory of syllable structure than the one used here (syllable cut), with more radical typological results.

35. This has left traces in the discussion of the synchronic analysis of stress as well as morphological generalizations in the Swedish vocabulary. It has been suggested that the Latinate and Germanic vocabularies should be kept apart (Linell 1972), since they appear to fall under different sets of stress generalizations.
36. As we mentioned in footnote 1, not all analyses assume moraic trochees for modern Dutch and German.
37. Lindsay (1894) and Niedermann (1931) provide a good overview of the different stress-sensitive processes in the historical phonology of Latin.
38. The reader is referred to Sommer & Pfister (1977) (mainly a recapitulation of Lindsay 1894) for an overview of the different arguments that have been put forward, and to Salmons (1992: 54–55) for a possible sociolinguistic account based on Kent (1945: 66), according to whom the Greek teachers of the Roman youth set a fashion of speaking Latin with a pitch accent, which was retained by the educated classes and disappeared with them in the third century AD.
39. That Plautus' scansions are to some extent artificial is shown most clearly by his avoidance to shorten LH words like *ăgrī* 'field, GEN SG/NOM PL' but not LH ones like *ăbī* 'go away, IMP'. This can be explained by the fact that in *ăgrī*, the first syllable is allowed to be metrically scanned long (long by position). In spoken Latin, however, the first syllable in words like *ăgrī* was always short (cf. Sommer & Pfister 1977: 209 and Lindsay 1894: 130).
40. Cases like *ămīcitiam* 'friendship, ACC SG' where in the second syllable the long vowel is scanned short thus constitute exceptions rather than the general rule (cf. Mester 1994: 18, fn. 22).
41. Lindsay (1894: 207) states: "From the earliest period of Latin literature we find a tendency to shorten every final long vowel", and Niedermann (1931: 71) observes: "Dans les mots de plus d'une syllabe, toute voyelle longue en syllabe fermée s'abrégeait devant consonne finale autre que *s*, sauf le cas où elle portait l'accent."
42. To be precise, *ítaque* and *útique* do exist as independent adverbs (cf. Priscian, K. Vol. V: 64 and Benloew 1847: 179: "Mais aussitôt que l'enclitique se fondait avec le mot pour ne former avec lui qu'un tout et une seule idée, l'accent suivait les règles générales.") with different meanings, 'therefore' and 'certainly, in reality' respectively.
43. Sed Augustus quoque in epistolis ad C. Caesarem scriptis emendat, quod is *calidum* dicere quam *caldum* malit, non quia id non sit Latinum sed quia sit odiosum et ut ipse Graeco verbo significavit periergon (cf. Quintilian (*Institutio Oratoria* I, 6: 19–20)) [But Augustus in his letters to C. Caesar reproached him that he preferred to say *calidum* rather than *caldum*, not that this were not Latin, but that this is ugly and as he himself in Greek has put it: affected-translation provided, AL, TR & HJ].
44. Except for Nice and Italian varieties. Some examples are: *diménegue* 'Sunday' and *ánima* 'soul' (cf. Wheeler 1988).
45. Final vowels in proparoxytones and paroxytones are extrametrical and incorporated as weak members into the "word tree" constituent (41 d), which renders them immune to the reduction rules in (42) (cf. Jacobs 1990 for a more detailed description).
46. For a formal account of the markedness of the uneven trochee, the reader may consult Jacobs (1990), where the uneven trochee is termed "reversed iamb". Uneven trochees have been proposed by Jacobs (1990), Dresher & Lahiri (1991), Rice (1993), and Hermans (1994).

47. According to Hayes (1995) iambic rhythm implies uneven duration grouping with longer and more prominent elements last, whereas trochaic rhythm implies even duration grouping with more intense and more prominent elements first. However, an iambic stress rule may also group two light syllables into one constituent, resulting in a foot of even duration. Therefore, as Hayes states, languages which have an iambic stress rule often have segmental rules serving to increase the durational contrast of a foot, such as, for instance, rules lengthening short stressed vowels and reducing stressless vowels. Hayes claims that these rules are absent from trochaic languages since they would annihilate the even duration which is characteristic of trochaic rhythm. It is for this reason that, if Latin stress were described using a moraic trochee, reduction would not be expected to occur at all.
48. Oxytonic languages without syllable weight distinctions are predicted (according to Kiparsky 1991 and Kager 1993) to involve final syllable catalexis. For further discussion of the relevance of catalexis in the Romance languages, cf. Jacobs (1994).
49. Other explanations involve the assumption of an epenthetic vowel (cf. Richter 1934) or the gemination of the plosive before the liquid (cf. Fouché 1958). Steriade (1988 b) shows that the latter proposal is inconsistent with the fact that the stressed vowels before the consonant+liquid clusters diphthongized, a process which was restricted to open syllables.
50. To account for the Gallo-Romance clusters of three consonants which only occurred in word-final position and of which the last consonant was always the inflectional ending *t* or *s*, an affiliation rule, which we will not discuss here, must be posited. Clusters of three consonants can be found in words like *corps* 'body, NOM SG/ACC PL', *cerfs* 'deer, NOM SG/ACC PL', and *colps* 'blow with the fist, NOM SG/ACC PL'. More examples can be found in Fouché (1961: 777).
51. Our discussion is based on parametric models of acquisition and stress. See chapter § 1.4.3.4 on constraint based models.
52. Fikkert (1994) argues convincingly that Dutch children acquire prosodic structures by initially assuming default parameter values. An adult representation is attained by sequentially setting appropriate values independently to each parameter. For instance, a default bisyllabic quantity-insensitive trochaic foot template is assumed initially and at least four stages can be identified as parameters get set gradually to achieve the adult representation.
53. There are also claims that initial hypotheses are made on the basis of a universally specified subset of the data (cf. Levelt 1994; Lahiri 1982; Lahiri & Dresher 1983). It is also argued that these initial assumptions are vital with respect to the direction of change.

References

Aasen, Ivar
1848 *Det norske folkesprogs grammatik*. Christiania: Werner & Co.

Adams, Marianne
1987 Old French, null subjects, and verb second phenomena. [Ph. D. dissertation, UCLA, Los Angeles.]

Allen, W. Sidney
1973 *Accent and rhythm. Prosodic features of Latin and Greek: A study in theory and reconstruction.* Cambridge: Cambridge University Press.
Andersen, Harry
1960 "Om tiden for assimilationen af ht til tt", *Arkiv för nordisk filologi* 75: 247–258.
Andersen, Henning (ed.)
1986 *Sandhi phenomena in the languages of Europe.* The Hague: Mouton.
Árnason, Kristján
1978 "Quantity, stress and the syllable in Icelandic: Formal vs. functional arguments", in: Gårding et al. (eds.), 137–142.
1980 *Quantity in historical phonology. Icelandic and related cases.* Cambridge: Cambridge University Press.
1993 "Málfræðihygmyndir Sturlunga", *Íslenskt mál* 15: 173–206.
Ashby, William J., Marianne Mithun, Giorgio Perissinotto & Eduardo Raposo (eds.)
1993 *Linguistic perspectives on the Romance languages.* Amsterdam/Philadelphia: John Benjamins.
Bailey, Leslie
1990 *A feature-based analysis of Swedish pitch accent and intonation.* Ph. D. dissertation, University of Delaware.
Benloew, Louis
1847 *De l'accentuation dans les langues indo-européennes tant anciennes que modernes.* Paris: Hachette.
Benloew, Louis & Henri Weil
1855 *Théorie générale de l'accentuation latine.* Paris: Durand.
Bergman, Gösta
1962 "Om främmande ord och deras anpassning", in: Dahlstedt et al. (eds.), 32–47.
1968 *Kortfattad svensk språkhistoria.* Stockholm: Prisma.
Bertinetto, Pier Marco, Michael Kenstowicz & Michele Loporcaro (eds.)
1991 *Certamen phonologicum* II. Torino: Rosenberg & Sellier.
Birdsong, David & Jean-Pierre Montrueil (eds.)
1988 *Advances in Romance linguistics.* Dordrecht: Foris.
Bourciez, Jean
1967 *Phonétique française.* Paris: Klincksieck.
Braune, Wilhelm & Walther Mitzka
1967 *Althochdeutsche Grammatik.* Tübingen: Max Niemeyer Verlag.
Brekke, Knud
1881 *Bidrag til dansk-norskens lydlære.* Kristiania. Reprinted in: Jahr & Lorentz (eds.), 1981, 17–78.
Bruce, Gösta
1993 "On Swedish lexical stress patterns", *Reports from the department of phonetics, University of Umeå, PHONUM* 2: 41–50.
Bye, Patrik
1994 Balance and optimality (with special reference to the Swedish dialect of Älvdalen). [Unpublished Ms., University of Tromsø.]
Calabrese, Andrea
1994 "Sievers' law in Gothic: A synchronic analysis with some notes on its diachronic development", *The Linguistic Review* 11: 149–194.

Campbell, A.
1959 *Old English grammar.* Oxford: Clarendon Press.
Cathey, James
1972 "Syncopation, i-mutation, and short stem forms in Old Icelandic", *Arkiv för nordisk filologi* 87: 33–55.
Cluzel, Irene & Francois Pirot (eds.)
1971 *Festschrift Jean Boutière.* Liège, Soledi.
Colman, Fran (ed.)
1992 *Evidence for Old English. Material and theoretical bases for reconstruction.* Edinburgh: John Donald Publishers Ltd.
Dahlstedt, Karl-Hampus
1962 "Vad är främmande ord?", in: Dahlstedt et al. (eds.), 1–31.
Dahlstedt, Karl-Hampus, Gösta Bergman & Carl Ivar Ståhle (eds.)
1962 *Främmande ord i nusvenskan.* (Verdandis skriftserie 17.) Stockholm: Svenska bokförlaget, Bonniers.
Dresher, B. Elan & Aditi Lahiri
1991 "The Germanic foot: Metrical coherence in Old English", *Linguistic Inquiry* 22: 251–286.
Drexler, Hans
1932 *Plautinische Akzentstudien.* 2 vols. Hildesheim: Olms.
Eaton, Roger, Olga Fischer, Willem Koopman & Frederike van der Leek (eds.)
1985 *Papers from the fourth international conference on English Historical Linguistics. (Current Issues in Linguistic Theory 41.)* Amsterdam/Philadelphia: John Benjamins.
Elert, Claes-Christian
1964 *Phonologic studies of quantity in Swedish.* Uppsala: Almqvist & Wiksell.
1972 "Tonality in Swedish: Rules and a list of minimal pairs", in: Firchow et al. (eds.), 151–173.
Eliasson, Stig
1978 "Swedish quantity revisited", in: Gårding et al. (eds.), 111–122.
1986 "Sandhi in Peninsular Scandinavian", in: Andersen (ed.), 271–300.
Elstad, Kåre
1980 "Some remarks on Scandinavian tonogenesis", Nordlyd. *Tromsø University working papers on language & linguistics* 3: 61–77. Reprinted in: Jahr & Lorentz (eds.) 1983, 388–397.
Fikkert, Paula
1994 *On the acquisition of prosodic structure.* Ph. D. dissertation, University of Leiden. Leiden: Holland Institute of Generative Linguistics.
Firchow, Evelyn S., Kaaren Grimstad, Nils Hasselmo & Wayne A. O'Neil (eds.)
1972 *Studies for Einar Haugen.* The Hague: Mouton.
Fouché, Pierre
1958 *Phonétique historique du français, vol. 2: Les voyelles.* Paris: Klincksieck.
1961 *Phonétique historique du français, vol. 3: Les consonnes.* Paris: Klincksieck.
Fraenkel, Eduard
1928 *Iktus und Akzent im lateinischen Sprechvers.* Berlin: Weidmannsche Buchhandlung.

Gårding, Eva
1977 *The Scandinavian word accents.* (Travaux de l'institut de linguistique de Lund 11.) Lund: CWK Gleerup.
Gårding, Eva, Gösta Bruce & Robert Bannert (eds.)
1978 *Nordic prosody.* Papers from a symposium (Travaux de l'Institut de Linguistique de Lund 13.).
Giegerich, Heinz J.
1985 *Metrical phonology and phonological structure. German and English.* Cambridge: Cambridge University Press.
Goldsmith, John A.
1995 *The handbook of phonological theory.* Oxford: Basil Blackwell Ltd.
Göschel, Joachim & Werner H. Veith (eds.)
1975 *Neuere Forschungen in Linguistik und Philologie. Aus dem Kreise seiner Schüler Ludwig Erich Schmitt zum 65. Geburtstag gewidmet.* Wiesbaden: Steiner.
Gussenhoven, Carlos & Peter van der Vliet
1995 The phonology of tone and intonation in the Dutch dialect of Venlo. [Unpublished Ms., University of Nijmegen.]
Halle, Morris & Samuel Jay Keyser
1971 *English Stress. Its form, its growth, and its role in verse.* New York: Harper & Row.
Halle, Morris & Jean-Roger Vergnaud
1987 *An essay on stress.* Cambridge, MA: MIT Press.
Halle, Morris & Michael Kenstowicz
1991 "The Free Element Condition and cyclic versus noncyclic stress", *Linguistic Inquiry* 22: 457–501.
Hammerich, Louis L.
1921–1922 *Zur deutschen Akzentuation.* (Det kgl. danske Videnskabernes Selskab, Historisk-filologiske Meddelelser 7.1.) København: Bianco Luno.
Hanson, Kristin
1991 *Resolution in modern meters.* Ph. D. dissertation, Stanford University.
Hanson, Kristin & Paul Kiparsky
1996 "A parametric theory of poetic meter", *Language* 72: 287–335.
Harris, Martin & Nigel Vincent (eds.)
1998 *The Romance Languages.* London: Routledge.
Haugen, Einar
1942 Norwegian word studies. [Unpublished Ms., Madison, Wisconsin.]
1967 "On the rules of Norwegian tonality", *Language* 43: 185–202.
1976 *The Scandinavian languages. An introduction to their history.* London: Faber & Faber.
Hayes, Bruce
1981 A metrical theory of stress rules. [Ph. D. dissertation, MIT. Revised version distributed by IULC and published by Garland Press, New York, 1985.]
1987 "A revised parametric metrical theory", *Proceedings of the North Eastern Linguistic Society* 17: 274–289.
1989 "The prosodic hierarchy in meter", in: Kiparsky & Youmans (eds.), 201–260.

1995 *Metrical stress theory: Principles and case studies.* Chicago: Chicago University Press.

Hermans, Ben
1994 The composite nature of accent. [Unpublished Ph. D. dissertation, Free University Amsterdam.]

Hesselman, Bengt
1901 "Skiss öfver nysvensk kvantitetsutveckling", *Språk och stil* 1: 10–25.
1902 *Stafvelseförlängning och vokalkvalitet. Undersökningar i nordisk ljudhistoria, part 1.* Uppsala: Uppsala Nya Tidnings AB.
1945 *Omljud och brytning i de nordiska språken.* Stockholm: Hugo Geber.

Hogg, Richard M.
1992 *A grammar of Old English, Vol. 1: Phonology.* Oxford & Cambridge: Blackwell Publishers.

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

Inkelas, Sharon & Draga Zec (eds.)
1990 *The phonology-syntax connection.* Chicago: Chicago University Press.

Iversen, Ragnvald
1973 *Norrøn grammatikk.* Oslo: Aschehoug & Co.

Jacobs, Haike
1989 Nonlinear studies in the historical phonology of French. [Unpublished Ph. D. dissertation, University of Nijmegen.]
1990 "On markedness and bounded stress systems", *The Linguistic Review* 7: 81–119.
1993 "The phonology of enclisis and proclisis in Gallo-Romance and Old French", in: Ashby et al. (eds.), 149–163.
1994 "Catalexis and stress in Romance", in: Mazzola (ed.), 49–65.

Jahr, Ernst Håkon & Ove Lorentz (eds.)
1981 *Fonologi/Phonology.* Studies in Norwegian Linguistics 1. Oslo: Novus.
1983 *Prosodi/Prosody.* Studies in Norwegian Linguistics 2. Oslo: Novus.

Jordan, Richard
1934 *Handbuch der mittelenglischen Grammatik. I: Lautlehre*, revised by H. Ch. Matthes. Heidelberg: Carl Winter's.

Kager, René
1989 *A metrical theory of stress and destressing in English and Dutch.* Dordrecht: Foris.
1993 "Consequences of catalexis", HILP1 Proceedings.

Keil, Heinrich
1857–1880 *Grammatici latini.* Vols. 1–7. Leipzig: Teubner.

Kenstowicz, Michael
1994 *Phonology in generative grammar.* Cambridge, MA/Oxford UK: Basil Blackwell.

Kent, Roland
1945 The sounds of Latin. *LSA publication*, Language Monographs 12.

Keyser, Samuel J. & Wayne O'Neil
1985 *Rule generalization and optionality in language change.* Dordrecht: Foris.

Kiparsky, Paul
1991 Catalexis. [Unpublished Ms., Stanford University and Wissenschaftskolleg Berlin.]

Kiparsky, Paul & Wayne O'Neil
1976 "The phonology of old English inflections", *Linguistic Inquiry* 7: 527–557.
Kiparsky, Paul & Gilbert Youmans (eds.)
1989 *Rhythm and meter.* San Diego: Academic Press.
Kluge, Friedrich
1891 "Vorgeschichte der altgermanischen Dialekte", in: Paul (ed.) 300–406.
Kock, Axel
1878, 1884–85 *Språkhistoriska undersökningar om svensk akcent.* Vols. I–II. Lund: Gleerup.
1888 "I-omljudet och den samnordiska förlusten af ändelsevokaler", *Arkiv för nordisk filologi* 4: 141–162.
Krahe, Hans & Wolfgang Meid
1969 *Germanische Sprachwissenschaft.* Berlin: Walter de Gruyter & Co.
Kristoffersen, Gjert
1990 East Norwegian prosody and the level stress problem. [Unpublished Ms., University of Tromsø.]
1991 "Nord-Gudbrandsdalsk jamvekt i lys av segmentdurasjon, stavelsesstruktur og tonegang", *Danske folkemål* 33: 203–214.
Kuhn, Adalbert
1863 "Review of C. W. M. Grein: Ablaut, reduplication and sekundäre Wurzeln der starken Verba dôn und iddja", *Zeitschrift für vergleichende Sprachforschung* 12: 142–145.
Kukenheim, Louis
1971 "Rôle de la prosodie dans l'histoire de la langue française", in: Cluzel & Pirot (eds.), 317–331.
Lachmann, Karl
1831–1834 "Über althochdeutsche Betonung und Verskunst", *Kleinere Schriften* 1, 358–406.
Lahiri, Aditi
1982 Theoretical implications of analogical change: Evidence from Germanic languages. [Unpublished Ph. D. dissertation, Brown University.]
Lahiri, Aditi & B. Elan Dresher
1983 "Diachronic and synchronic implications of declension shifts", *The Linguistic Review* 3: 141–163.
in press "Open Syllable Lengthening in West Germanic", *Language.*
Lahiri, Aditi & Harry van der Hulst
1988 "On foot typology", *Proceedings of the North Eastern Linguistic Society* 18, vol. 2: 286–299.
Lahiri, Aditi & Jacques Koreman
1988 "Syllable weight and quantity in Dutch", *Proceedings of the West Coast Conference on Formal Linguistics VII*: 217–228.
Lass, Roger
1994 *Old English. A historical linguistic companion.* Cambridge: Cambridge University Press.
Levelt, Clara C.
1994 *On the acquisition of place.* Ph. D. dissertation, University of Leiden. Leiden: Holland Institute of Generative Linguistics.

Levins, Peter
1570 (1969) *Manipulus Vocabulorum.* Menston, England: Scolar Press.
Liberman, Anatoly
1982 *Germanic accentology. Vol. 1: The Scandinavian languages.* Minneapolis: University of Minnesota Press.
Liberman, Mark & Alan Prince
1977 "On stress and linguistic rhythm", *Linguistic Inquiry* 8: 249–336.
Lindsay, Wallace
1894 (1963) *The Latin language.* (2nd edition.) New York/London: Hafner.
Linell, Per
1972 "Remarks on Swedish morphology", *Reports from Uppsala University Department of Linguistics* 1.
Luick, Karl
1964 *Historische Grammatik der Englischen Sprache.* Erster Band, I Abteilung. Fotomechanischer Nachdruck der ersten Auflage 1914. Tauchnitz: Leipzig.
Mazzola, Michael L. (ed.)
1994 *Issues and theory in Romance linguistics.* Washington: Georgetown University Press.
McCarthy, John & Alan Prince
1986 Prosodic morphology. [Unpublished Ms., University of Massachusetts at Amherst and Brandeis University.]
1993 Prosodic morphology I. Constraint interaction and satisfaction. [Unpublished Ms., University of Massachusetts, Amherst and Rutgers University.]
1995 "Prosodic morphology", in: Goldsmith (ed.), 318–366.
McCully, Christopher B.
1992 "The phonology of resolution in Old English word-stress and metre", in: Colman (Ed.), 117–141.
McCully, Christopher B. & Richard M. Hogg
1990 "An account of Old English stress", *Journal of Linguistics* 26: 315–339.
Meillet, Antoine & Joseph Vendryes
1924 *Traité de grammaire comparée des langues classiques.* Paris: Champion.
Mester, R. Armin
1994 "The Quantitative Trochee in Latin", *Natural Language and Linguistic Theory* 12: 1–61.
Meyers, Scott
1987 "Vowel shortening in English", *Natural Language and Linguistic Theory* 5: 485–518.
Minkova, Donka
1982 "The environment for open syllable lengthening in Middle English", *Folia Linguistica Historia* III/1: 29–58.
1985 "Of rhyme and reason: Some foot-governed quantity changes in English", in: Eaton et al. (eds.), 163–178.
Minkova, Donka & Robert Stockwell
1994 "Syllable weight, prosody, and meter in Old English", *Diachronica* 11.1: 35–64.
Moberg, Lena
1989 *Lågtyskt och svenskt i Stockholms medeltida tänkeböcker.* Uppsala: Almqvist & Wiksell international.

Murray, Robert W. & Theo Vennemann
1983 "Sound Change and syllable structure in Germanic phonology", *Language* 59: 514–528.
Nespor, Marina & Irene Vogel
1989 "On clashes and lapses", *Phonology* 6: 69–116.
Nicolau, Mathieu
1930 *L'origine du "cursus" rythmique et les débuts de l'accent d'intensité en latin*. Paris: Société d'édition "Les belles lettres".
Niedermann, Max
1931 *Phonétique historique du latin*. (Second edition.) Paris: Klincksieck.
Noreen, Adolf
1904 *Altschwedische Grammatik mit Einschluß des Altgutnischen (Altnordische Grammatik II)*. Halle: Max Niemeyer.
1923 *Altisländische und Altnorwegische Grammatik. (Laut- und Flexionslehre) unter Berücksichtigung des Urnordischen (Altnordische Grammatik I)*. Halle: Max Niemeyer.
Nyström, Gunnar
1991 "Om jämviktsaccent och accent 2 i svenska mål, särskilt dalmål", *Danske folkemål* 33: 227–237.
Oftedal, Magne
1952 "On the origin of the Scandinavian tone distinction", *Norsk tidsskrift for sprogvidenskap* 16: 201–225.
Öhman, Sven
1967 "Word and sentence intonation: a quantitative model", *Speech Transmission Laboratory Quarterly Progress and Status Report* (STL-QPSR) 2–3: 20–54.
Ottossón, Kjartan
1986 "Indicier på tonaccentsdistinktion i äldre isländska", *Íslenskt mál* 8: 183–190.
Palmer, Leonard Robert
1954 (1974) *The Latin language*. (7th edition.) London: Faber and Faber.
Paul, Hermann
1891 *Grundriss der Germanischen Philologie*. Band I. Strassburg: Karl J. Trübner.
Paul, Hermann & Walther Mitzka
1959 *Mittelhochdeutsche Grammatik*. Tübingen: Max Niemeyer Verlag.
Peterson, Lena
1983 "Om s.k. palatalt r i fornsvenskan", *Arkiv för nordisk filologi* 98: 202–220.
Pihlström, Sven
1981 *Kortstavighet och stavelseförlängning. Hur några av de gamla kortstaviga orden erhållit sin form i svenskt rikksspråk*. Uppsala: Almqvist & Wiksell international.
Pope, Mildred
1956 *From Latin to Modern French*. Manchester: Manchester University Press.
Prince, Alan
1985 "Improving tree theory", *Proceedings of the Eleventh Annual Meeting of the Berkeley Linguistics Society*, 471–490.

1990 "Quantitative consequences of rhythmic organization", in: Ziolkowski et al. (eds.), 355–398.

Prince, Alan & Paul Smolensky
1993 Optimality Theory: constraint interaction in generative grammar. [Technical Report 2, Rutgers University.]

Prokosch, Eduard
1939 *A comparative Germanic grammar.* Linguistic Society of America, University of Pennsylvania, Philadelphia.

Pulgram, Ernst
1975 *Latin-Romance phonology: Prosodics and metrics.* München: Wilhelm Fink Verlag.

Ralph, Bo
1975 *Phonological differentiation. Studies in Nordic language history.* Göteborg: Acta Universitatis Gothoburgensis.

Ramsden, Herbert
1963 *Weak-pronoun position in the early Romance languages.* Manchester: Manchester University Press.

Reis, Marga
1974 *Lauttheorie und Lautgeschichte: Untersuchung am Beispiel der Dehnungs- und Kürzungsvorgänge im Deutschen.* München: Wilhelm Fink.

Rheinheimer-Rîpeanu, Sanda
1990 "Sur l'adaptaton phonétique des emprunts latins en français", *Revue de Linguistique Romane* 54: 77–91.

Riad, Tomas
1988 "Tracing the foot. A metrical analysis of change in Nordic languages", *Arkiv för nordisk filologi* 103: 1–35.
1992 Structures in Germanic prosody. A diachronic study with special reference to the Nordic languages. [Unpublished Ph. D. dissertation, Department of Scandinavian languages, Stockholm University.]
1995 "The quantity shift in Germanic. A typology." *Amsterdamer Beiträge zur älteren Germanistik*, 42. Greifswalder Symposium zu Fragen der Germanischen Quantitätsverschiebung und Metrik im Mittelalter.

Rice, Curtis
1993 Metrical Coherence in Chugach. [Unpublished Ms., University of Trondheim.]

Richter, Elise
1934 "Chronologische Phonetik des Französischen bis zum Ende des 8. Jahrhunderts", *Beihefte zur Zeitschrift für Romanische Philologie*, Heft 82. Halle: Max Niemeyer Verlag.

Rohlfs, Gerhard
1970 "Le gascon: Etudes de philologie pyrénéenne", *Beihefte zur Zeitschrift für Romanische Philologie*, Heft 85. Halle: Max Niemeyer Verlag.

Salmons, Joe
1992 *Accentual change and language contact.* London: Routledge.

Scherer, Wilhelm
1878 *Zur Geschichte der deutschen Sprache.* Berlin: Weidmannsche Buchhandlung.

Schmidt, Jürgen E.
1986 *Die mittelfränkischen Tonakzente*. Stuttgart: Franz Steiner Verlag Wiesbaden.
Seelmann, Emil
1885 *Die Aussprache des Latein nach physiologisch-historischen Grundsätzen*. Heilbronn: Gebr. Henninger Verlag.
Seip, Didrik Arup
1955 *Norsk Språkhistorie til omkring 1370*. (2nd edition.) Oslo: Aschehoug & Co.
Seip, Didrik Arup & Laurits Saltveit
1971 *Norwegische Sprachgeschichte (Grundriss der germanischen Philologie 19)*. Berlin: Walter de Gruyter & Co.
Selkirk Elisabeth & Tong Shen
1990 "Prosodic domains in Shanghai Chinese", in: Inkelas & Zec (eds.), 313–337.
Sievers, Eduard
1877 "Zur Accent- und Lautlehre der germanischen Sprachen", *Beiträge zur Geschichte der deutschen Sprache und Literatur* IV: 522–539.
1893 *Altgermanische Metrik*. Halle: Niemeyer.
1901 (1976) *Grundzüge der Phonetik*. Wiesbaden: Breitkopf & Härtel. [1976 reprint, Hildesheim: Georg Olms.]
Sigurd, Bengt
1962 "The code shift in Old Norse", *Studia Linguistica* 15: 10–21.
Sluyters, Willebrord
1991 "Length and stress revisited. A metrical account of diphthongization, vowel-lengthening, consonant gemination and word-final epenthesis in Modern Italian", *Probus* 2: 65–102.
Sommer, Ferdinand & Raimund Pfister
1977 (1914) *Handbuch der lateinischen Laut- und Formenlehre*. (4th edition.) Heidelberg: Carl Winter.
Ståhle, Carl Ivar
1962 "De främmande orden och den svenska ordbildningen", in: Dahlstedt et al. (eds.), 48–73.
Steblin-Kamenskij, M. I.
1959 "Concerning the three periods in the Scandinavian i-Umlaut", *Arkiv för nordisk filologi* 74: 105–111.
Steriade, Donca
1988a "Gemination and the Proto-Romance syllable shift", in: Birdsong & Montrueil (eds.), 371–409.
1988b "Greek accent: A case for preserving structure", *Linguistic Inquiry* 19: 271–314.
Streitberg, Wilhelm, Victor Michels & Max Hermann Jellinek
1936 *Geschichte der indogermanischen Sprachwissenschaft, Teil II: Die Erforschung der indogermanischen Sprachen: Germanisch*. Berlin: Walter de Gruyter.
Sturtevant, Albert Morey
1932 "The lengthening of vowels before -tt from *-xt in Old Norse", *Language* 8: 215–216.

Szemerényi, Oswald
1980 *Einführung in die vergleichende Sprachwissenschaft.* Darmstadt: Wissenschaftliche Buchgesellschaft.

Tjäder, Börje
1961 *Behandlingen av palatalt r i substantivens pluralformer under fornsvensk och nysvensk tid.* Uppsala: Almqvist & Wiksell.

Trubetzkoy, Nikolaj S.
1939 *Grundzüge der Phonologie.* Göttingen: Vandenhoek & Ruprecht.

Vendryes, Joseph
1902 *Recherches sur l'histoire et les effets de l'intensité initiale en latin.* Paris: Klincksieck.

Vennemann, Theo
1988 *Preference laws for syllable structure and the explanation of sound change.* Berlin: Mouton de Gruyter.
1991 "Syllable structure and syllable cut prosodies in Modern Standard German", in: Bertinetto et al. (eds.), 211–243.

Vliet, Peter van der
1993 Lexical tone and pitch accent in the dialect of Venlo. [Unpublished MA Thesis, Department of English, University of Nijmegen.]

Wartburg, Walther von
1952 *Französisches etymologisches Wörterbuch*, Band 4. Basel: Helbing und Lichtenhahn.

Weijnen, Antonius A.
1991 *Vergelijkende klankleer der Nederlandse dialecten.* The Hague: SDU Uitgeverij.

Weinhold, Karl, Gustav Ehrismann & Hugo Moser
1968 *Kleine mittelhochdeutsche Grammatik.* (15. verb. Aufl.) Wien: Wilhelm Braumüller Universitäts-Verlagsbuchhandlung, Ges.m.b.H.

Wessén, Elias
1968 *Svensk språkhistoria, Band 1: Ljudlära och ordböjningslära.* (8th edition.) Stockholm: Almqvist & Wiksell.
1970 *Schwedische Sprachgeschichte. Band 1. Laut- und Flexionslehre.* Berlin: Walter de Gruyter & Co.

Wetzels, Leo
1997 "The lexical representation of nasality in Brazilian Portuguese", *Probus* 9.2: 203–232.

Wheeler, Max
1988 "Occitan", in: Harris & Vincent (eds.), 246–278.

Wiesinger, Peter
1975 "Strukturgeographische und strukturhistorische Untersuchungen zur Stellung der bergischen Mundart zwischen Ripuarisch, Niederfränkisch und Westfälisch", in: Göschel & Veith (eds.), 17–82.

Wilkinson, Karina
1988 "Prosodic structure and Lardil phonology", *Linguistic Inquiry* 19: 325–334.

Williams, Henrik
1990 *Åsrunan. Användning och ljudvärde i runsvenska steninskrifter.* (Runrön 3.) Uppsala: Institutionen för nordiska språk, Uppsala universitet.

Wright, Joseph
1906 *An Old High German primer.* (Second Edition.) Oxford: Oxford University Press.
Wright, Joseph & Elizabeth Mary Wright
1925 *Old English grammar.* (Third Edition.) Oxford: Oxford University Press.
1928 *An elementary Middle English grammar.* (Second Edition.) London: Humphrey Milford Oxford University Press.
Ziolkowski, Michael, Manuela Noske & Karen Deaton (eds.)
1990 *Parasession on the syllable in phonetics and phonology.* Proceedings of the Chicago Linguistics Society 26, vol. 2.