is an allophonic variation between tense (closed) vowels and lax (open) vowels that is determined by syllable structure. The former occur in open syllables, the latter in closed syllables. The important observation is that the lax vowels appear not only in syllables that are clearly closed, but also in those cases where they are followed by an l that is ambisyllabic according to the rule just mentioned. From this we may conclude that the ambisyllabicity is independently motivated.

It is of course not possible to conclude that the syllable-based approach to the type of data discussed in this section has been validated in general. The previous example does suggest, however, that such an approach has some credibility, and is certainly not less likely than the foot-based analysis.

I conclude that standard metrical foot structure, to the extent that it differs from the kind of foot structure that is assumed in the theory proposed in the previous sections, has no strong motivation apart from its primary motivation, which is to characterize alternating stress patterns. We have seen that alternating stress patterns can be characterized in terms of a rhythmic melody that does not impose a constituent structure on strings of syllables. Hence standard metrical foot structure can be eliminated from the theory.

4.5. Conclusions

In this chapter I have discussed several issues concerning the representation and analysis of stress. We compared in detail two current theories referred to as the grid-only and tree-only theory and concluded that there are no significant differences between these two theories, apart from the fact that in the latter we assign a detailed tree structure to the text. I then argued in favor of a compromise regarding the prosodic constituent structure. This compromise tied in well with the point of view, adopted in section 4.3.2., that main stress assignment should be separated from assignment of rhythmic structure. The former can be formalized in terms of the tree format, the latter in terms of an autosegmental theory. In the final section of this chapter it has been shown that argumentation in favor of standard metrical foot structure is inconclusive.

Chapter 5

Dutch Stress

5.1. Introduction

In this chapter the focus is on Dutch stress and its relation to syllable structure. In section 5.2. I offer a discussion of the various ways in which stress assignment is sensitive to syllable structure. In section 5.3. an analysis is presented of the stress pattern of Dutch, focussing on monomorphemic words. I will offer two analyses that differ crucially with respect to the type of foot that is chosen. The first analysis is carried out within the standard metrical (arboreal) theory and the second within the tree-cum-grid theory that has been proposed in the previous chapter. I will argue in favor of the latter analysis.

5.2. Stress and syllable weight in Dutch

In section 3.4. I briefly discussed two cases in which there is a clear correlation between syllable structure and stress in Dutch. Simplex (i.e. morphologically unstructured) words with a final syllable of the shape (C)VVC (and to a lesser extent (C)VCC) are stressed on the final syllable almost without exception:

(1)

pistool	legioen	anakoloet
konijn	kapitaal	calamiteit
banaan	fenomeen	salamandrijn
konvooi	ceramiek	locomotief
kameel	avontuur	karikatuur
fontein	tamboerijn	valeriaan
juweel	pelikaan	capaciteit

In terms of the mora theory discussed in chapters 2 and 3, we can correlate this with the fact that such syllables are superheavy, consisting of three morae.

An even more compelling generalization that was mentioned in connection with the issue of representing syllables with a schwa is the fact that syllables with a schwa cannot bear main stress. In van der Hulst & Moortgat (1981) the distinction between syllables with a schwa and syllables with a full vowel with respect to stress placement was treated as an instance of the syllable weight distinction. The analysis of syllable structure in Dutch that I offered in chapter 3 showed that syllables with schwa can be analyzed as non-branching (i.e. having one mora), and syllables with a full vowel as branching (i.e. having two morae).

The two ways in which syllable structure influences stress placement both fall within the mora theory under a single geometrical property of syllables, viz. the number of morae that a syllable contains.

A third property of syllables that has been claimed to be of relevance is the distinction between syllables of the type VC and of the type VV (most explicitly in Kager & Visch 1983). The relevance of this distinction is much less clear, because a generalization based on this distinction faces many exceptions, but the claim is that VC syllables count as heavier than VV syllables. At first sight one might be inclined to think that the distinction between VC syllables and VV syllables is also of a geometrical nature involving a distinction between branching versus non-branching of some syllabic node, e.g. the rhyme. Yet I will argue that this is not the case. The main reason is that such a geometrical interpretation is at odds with my analysis of the Dutch syllable. The decision to analyze the open-closed distinction in non-geometrical terms is backed up by cross-linguistic observations concerning the marginal role played by this distinction in stress systems. I will argue that the third distinction involves greater heaviness of **closed** as opposed to **open** syllables, where **closed** will be defined as "ending in a consonant" and furthermore that the distinction plays a marginal role in the stress system.

Before I analyze the stress pattern of monomorphemic Dutch words in detail I will discuss some ideas concerning the representation of syllable weight that appear in the literature.

The factors that are claimed to determine "syllable weight" in Dutch do not exhaust the list of possible relevant factors in other languages. There are other factors that may play a role and for these it is quite certain that no plausible geometrical interpretation can be given. Given then that syllable weight is determined both by geometrical and non-geometrical

properties of syllables, my decision to interpret the open-closed distinction in non-geometrical terms does not involve an ad hoc move.

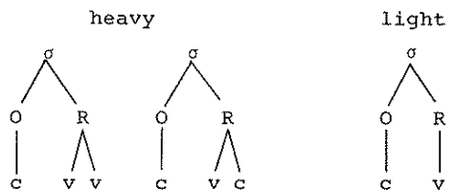
Newman (1972) is one of the first to point out the relevance of the dichotomy heavy-light as distinct from the more familiar dichotomy open-closed. The cases of syllable weight that he mentions all involve the following opposition:

(2) heavy: VV, VC light: V

Interestingly, Newman adds that there may be circumstances in which one wants to distinguish between VV and VC in terms of the open-closed distinction, but he does not mention such a case. The distinction given in (2) occurs in Dutch with the extra condition that the light syllable must contain a schwa and if the distinction VV/VC is relevant Dutch would also be an example where heavy syllables fall in two classes.

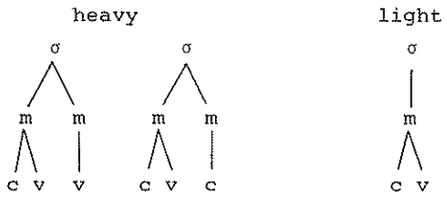
Hayes (1981), in his discussion of syllable weight, starts out by discussing the opposition between VV, VC versus V, i.e. the instantiation that Newman deals with. In the theory that Hayes adopts the distinction is represented as follows:

(3)



Small c's and v's represent segments, rather than slots here. Hayes adds: "It is interesting that virtually no rules of tree construction are sensitive to the structure (or even presence) of the syllable onset. To account for this, I will assume that all unmarked stress rules apply on the rime projection." (p. 41). In terms of the mora theory of syllable structure that I have adopted in chapters 2 and 3 this type of distinction is represented as follows:

(4)

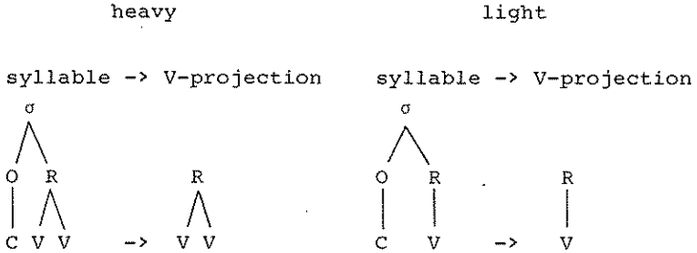


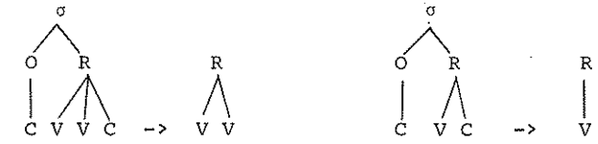
The sonority threshold for morahood is such that any segment is allowed to occur as a second mora.

I have shown in chapters 2 and 3 that the mora representation of syllable structure is adequate to deal with the facts that have been considered in these chapters, but I also pointed out that the same is true for a different type of representation which is in line with another more common view on syllable structure, involving subsyllabic categories such as onset, nucleus, coda and, perhaps, rhyme. I referred to this second approach as the metrical theory of the syllable. In this chapter I will further explore the type of representation involving the category mora, but I add that by making use of the category nucleus, in the way suggested in chapters 2 and 3, we can also make the distinctions among syllable types that are relevant in Dutch (cf. 22a below). At the relevant places I will refer to the possible alternatives in this version of the metrical theory.

The second common type of weight distinction involves the opposition between long and short vowels, disregarding the presence or absence of postvocalic consonants. Newman does not discuss this type, but Hyman (1977, 75) mentions the fact that "many languages have stress-placement rules which refer to the distinction between long and short vowels." As Hayes observes, "the proper representation of this opposition is not agreed on in the literature." (Hayes 1981, 41). The solution that Hayes adopts involves the notion of projection. We are allowed to project segments that share a certain feature. Hence we can project from the complete sequence of segments the substrings consisting of vowels:

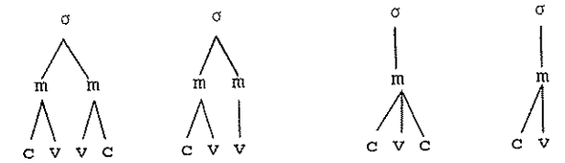
(5)





Under the mora theory the distinction is represented again in terms of branching versus non-branching syllables:

(6)



In this theory the distinction falls out by saying that the sonority threshold is such that only vowels can be a second mora. I refer the reader to chapter 2, sect. 2.2.4. for a discussion of the use of the mora threshold.

The two types discussed so far are unified in Hayes' metrical account in terms of the category rhyme. In the metrical approach that I advocated, both are unified in terms of the category nucleus. In the mora account, finally, both types are unified under the heading of branching versus non-branching **syllables** and there is no need for the projection device, let alone to project different levels.

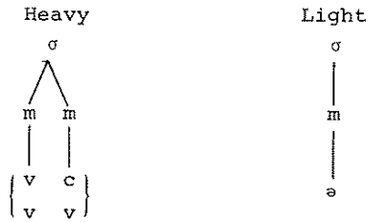
Another instantiation of the weight distinction that Hayes discusses is the opposition between syllables with a full and syllables with a reduced vowel (Hayes 1981, 57):

> I assume that this distinction is underlyingly one of vowel length, i.e. of gemination . This assumption can be motivated in two ways: first, the full vowels are phonetically longer than the reduced ones; and second, there are apparently no languages having an underlying three-way distinction of the type reduced : full short vowel : full long vowel. This would follow automatically from the assumption that both the full-reduced and the long-short distinction must be represented underlyingly as gemination.

The situation in Dutch, where the full/reduced contrast plays a crucial role, is perhaps not exactly of the type that Hayes has in mind, because Dutch has a contrast between full long and full short vowels. It is the case, however, that full short vowels and full long vowels share the property that

they must all occur in a branching (i.e. heavy) syllable. Hence with respect to stress assignment all full vowels function as a natural class as opposed to the reduced vowel, i.e. the schwa:

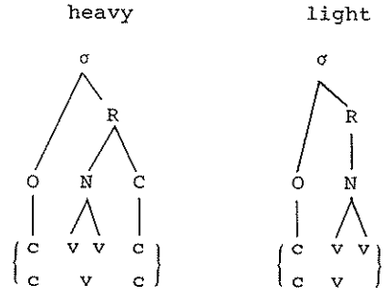
(7)



Hayes continues to discuss a "motley group of rarer distinctions of prominence which stress rules appear to treat in essentially the same manner." (p. 43). The first is **diacritically marked** prominence. This involves cases where certain syllables behave as if they were heavy, i.e. they attract stress, although they do not show a syllabic structure that makes them distinct from light syllables. Hayes proposes to mark such syllables with a diacritic. A second type involves a distinction between syllables with a high tone versus syllables with a low tone, where the former function as heavy. Hayes offers no attempt to reduce these two instantiations of the weight difference to a distinction in branching. I refer to Anderson (1983), however, for an argument in favor of representing diacritic marking in terms of branching. So vowels that bear lexical stress are marked as "branching". In this way Anderson attempts to explain an observation made by Jakobson that languages having lexical stress cannot have distinctive vowel length. I will not criticize Anderson's proposal here, but it will be clear that his line of thought is incompatible with the one that I have adopted.

Finally Hayes mentions yet another weight distinction, viz. the one between closed and open syllables. He knows of two cases where this opposition appears to play a role: **Tiberian Hebrew** (as described in McCarthy 1979) and **Seneca** (as described by Stowell 1979). The treatment that Hayes proposes for such cases is to say that in such languages syllables contain a constituent called the nucleus which may only contain vowels:

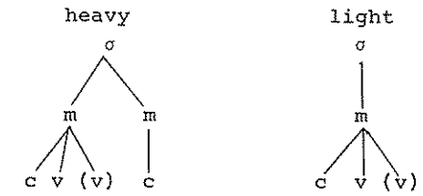
(8)



Hence the open-closed dichotomy is reduced to a distinction in branchingness.

Within the mora framework that I have adopted it is not possible to represent the distinction between open and closed syllables in geometrical terms. It goes against the logic of this theory to say that postvocalic consonants can count as a second mora, whereas the second part of a long vowel or diphthong, which is more sonorous, cannot. Hence we cannot create structures as in (9):

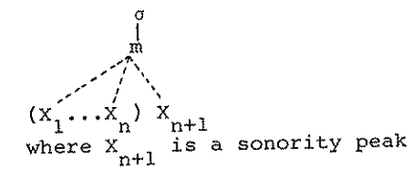
(9)



Turning to Dutch for a moment, it can be shown that structures as in (9) cannot represent the correct way of representing the weight distinction between closed and open syllables. The structures in (9) embody the claim that syllables with long vowels or diphthongs count as light, whereas I have argued that syllables of this type are branching, just like VC syllables (cf. 7).

I have shown in chapter 3 that the rule creating the first mora in Dutch is the one repeated here in (10):

(10)



In this way a distinction was created between branching and non-branching syllables, where VV and VC both came out as branching. Hence I cannot at the same time propose that they differ among each other in precisely the same way that they differ, as a pair, from syllables with a schwa, which are non-branching. This does not mean that the distinction between closed and open syllables (if proved useful) cannot be characterized formally. The distinction between VV and VC syllables can be characterized non-geometrically as follows:

(11)

Heavy	Light
$(...C)_\sigma$	$(...V)_\sigma$

A final way in which syllables may be of different weight involves the sonority of its segments. Prince (1983) speculates on the existence of stress systems in which syllables with low vowels count as heavier than syllables with non-low vowels. In the next section I will suggest that in Dutch the long and short vowels differ with respect to stress assignment in the sense that long vowels, apparently, count as heavier than short vowels. I know of no other good examples but, if found, they would give additional support to the idea that there are several different ways in which syllable weight can be manifested.

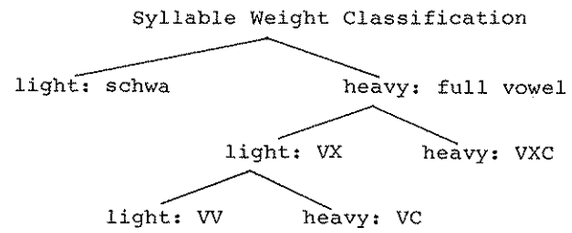
To summarize, I give in (12) the instantiations of syllable weight that we have discussed:

(12)

	Heavy	Light
a.	i. VV or VC	V
	ii. VV	V or VC
b.	closed syllable	open syllable
c.	marked [+F]	unmarked
d.	high tone	low tone
e.	i. tense V	lax V
	ii. low V	high V
	iii. ...	

Returning to Dutch, I will now discuss the following problem. As we have seen already, in the Dutch stress system the syllable weight distinction does not lead to a simple dichotomy. On the assumption that the VV/VC distinction is relevant, there are at least three dichotomies (ignoring for the moment my remark concerning long and short vowels):

(13)



The question that must be answered is how this classification of syllables must be incorporated into the formal analysis of the stress placement rule.

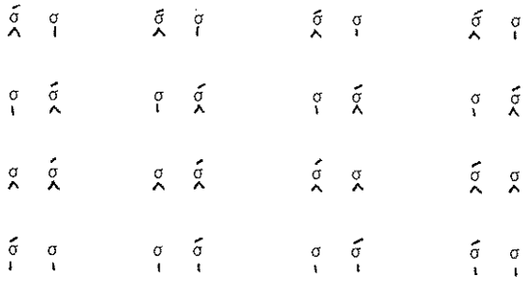
In the first analysis of Dutch stress that I will propose in the next section I will make use of a **syllable weight scale** for the purpose of foot assignment, i.e. I will adopt the proposal put forward by various Dutch phonologists to rank syllables on a scale on the basis of their propensity to be stressed, much as segments can be ranked on a scale in terms of their sonority. Indeed Dijkstra (1982) and Van Nes (1982) refer to the scale as a "sonority scale". The idea of such a scale is also employed in Kager and Visch (1983). Rather than speaking of a sonority scale I will speak of a **weight scale**. At the two poles of the syllable weight scale we find syllables with a schwa (having the lowest propensity to receive stress) and the superheavy syllables, VVC and VCC (having the highest propensity to be stressed and appearing in that order). In between we find the heavy syllables (VV, VC), of which the latter type is claimed to have a greater propensity to receive stress. As an initial hypothesis we might adopt therefore the following scale:

(14)

```
|----|----|----|----|
ə   VV   VC   VCC  VVC
---increasing weight--->
```

Let us now investigate how, in the publications just mentioned, the weight scale is used in a theory of stress assignment that employs feet. In chapter 4 I distinguished the following types of limited quantity sensitive systems:

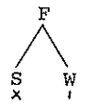
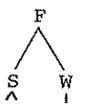
(15)

Latin	Yapese	Aklan	?
			

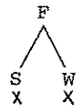
There exists general agreement on the claim that Dutch stress is of the limited Q-sensitive type. This is based on the observation that stress occurs on one of the final three syllables in monomorphemic words, predominantly on the penultimate syllable.

Although they show no awareness of this fact Dijkstra (1982) and Kager & Visch (1983) analyze the Dutch stress system as if it constitutes a fourth type, given in (15) in the fourth column. This fourth type may perhaps be expected to exist, given that it fills a gap in a classification that is based on the surface stress patterns, rather than on the way in which these systems can be analyzed within the metrical framework. One of the purposes of this section is to find out whether this is indeed the proper way to handle the Dutch stress system.

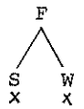
The analyses proposed by Dijkstra (1982) and Kager & Visch (1983) imply the claim that if stress is located on one of the final two syllables stress goes to the heavier of these two (this is no different from the other types), but they also claim that stress goes to the penultimate syllable if both syllables are equally heavy. This is only a rough statement and we will go into more detail below. Let me focus here on the consequences of such a state of affairs. The type of foot that is needed must surely be quantity sensitive. As I argued in chapter 4, section 4.3.1.5., standard metrical theory employs three types of QS feet:

(16) a.  b.  c.  (+LCPR)

None of these three foot types can be used for Dutch, since these feet give us the first three systems in (15), leaving the fourth one unaccounted for. We need a new type of QS foot:

(17) 

This foot type must be interpreted as follows. Both the left and the right node may dominate any type of syllable, but it may not be the case that the syllable which is dominated by S is placed lower on the weight scale than the syllable which is dominated by W. Let us refer to the configuration that is ruled out as a **mismatch**. The condition for successful foot-assignment can be stated as follows:

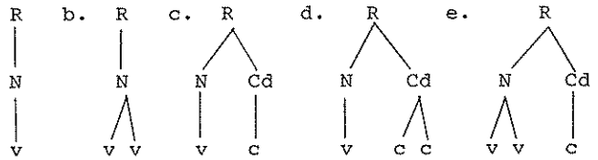
(18) 

Mismatch Condition: $\sigma_s \geq \sigma_w$

The mere fact that an analysis of Dutch along the lines discussed here requires a new foot type is of course not an argument against such an analysis. It does make one wonder, however, whether the analysis is in fact adequate. This is one of the reasons for considering an analysis that does not make use of this type of foot in section 5.3.1.5.

Returning to the weight scale on which this type of foot-assignment is crucially based I want to answer the question whether, and if so, how a relation is established between a scale on which syllables are ranked, and properties of the syllables themselves. In the proposal advanced by Van Nes the scale is primitive in the sense that it is simply postulated. Dijkstra (1982) and Kager & Visch (1983), however, argue that the ranking of syllables can be derived from geometrical properties of syllables. These authors assume the following types of syllable structure for Dutch:

(19) a. b. c. d. e.



This is essentially the analysis that is proposed by Trommelen (1983). In chapter 3, section 3.5.1. we have seen that the decision to assign vowels to the nucleus node and consonants to the coda node consistently necessitates the adoption of a special convention to explain that a branching coda is allowed after a non-branching nucleus only. In short, the structures in (19) make it impossible to designate one constituent as the obligatory part of the syllable. I also argued that the need to adopt such a convention points to the missing of a generalization, rather than the making of one. However, ignoring that point, we can say that the scaling of syllables can be derived from the geometrical properties of syllables if we adopt the following principles:

(2Ø) a. A branching node attributes more to heaviness than a non-branching node

b. A branching rhyme attributes more to heaviness than a branching nucleus and a branching nucleus attributes more to heaviness than a branching coda

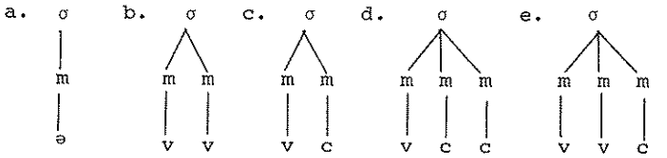
Given these principles we derive the weight scale adopted above, repeated here for convenience:

(21) |----|----|----|----|
ə VV VC VCC VVC

Let us now see how a scaling of syllables can be derived from the syllable structure analysis, giving here both the mora analysis and the corresponding metrical analysis:

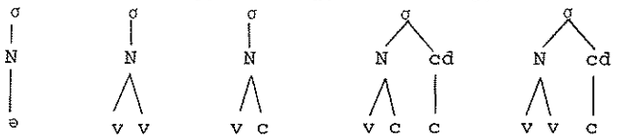
(22) i. **Mora theory**

a. b. c. d. e.



ii. **Metrical theory**

a. b. c. d. e.



In my account there is, in both analyses, no structural difference between b and c, nor between d and e. On the assumption that we want to make the five-way distinction that is embodied in (21), I have no choice but to say that next to geometrical properties there are also other properties that determine the ranking of syllables. The other relevant factors are **syllable closure** and **vowel quality**. Hence a scale can be derived if we adopt the following principles:

(23) a. Syllables are ranked according to the number of morae that they contain

b. Closed syllables count as heavier than open syllables

c. Syllables with long vowels count as heavier than syllables with short vowels

Apparently principle b takes precedence over c where a conflict arises. This is the case with respect to VV and VC syllables.

We must conclude that by adopting the syllable structure analysis that I have proposed we cannot reduce the weight scale to a single property of syllables. I do not consider this to be a disadvantage for two reasons. Firstly, as I have argued above, there are other examples where a weight difference cannot be related to geometrical properties of syllables. The second reason is that by "factoring out" syllable closure as a separate factor we explain why it is possible that this factor (as well as the factor vowel quality) is much less important than the factor that involves the

number of morae (see Hyman 1977). For these reasons I maintain that the syllable structure analysis that I have proposed provides an adequate basis for approaching stress assignment in Dutch.

Before I proceed with the analysis of Dutch stress I will make a brief remark about the device of extrametricality. If we limit this device to phonological units, as is proposed in Selkirk (1984), it allows us to downgrade final syllables on the weight scale or to disregard them altogether, i.e. we may mark extrametrical a final mora or a final syllable. Observe that by adopting the mora-theory we can limit the extrametricality device to stress-bearing units.

It is argued in the literature that units are marked as extrametrical either by rule or on an item-to-item basis, i.e. lexically. In the latter case extrametricality is a straightforward exception device, to be interpreted on a par with the diacritic [+F] which is assigned to syllables that receive primary stress contrary to rule.

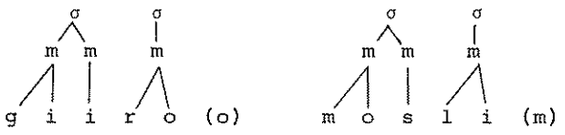
Analyzing a language like Dutch, for which certain generalizations concerning stress placement face a considerable number of exceptions, we have to answer the question when a generalization concerning the stress pattern of monomorphemic words is significant and when not. The availability of the extrametricality device and the diacritic [+F] do not make it easy to reject a rule as invalid. Quite generally speaking anything is allowed to occur. Consider the following example. Suppose we want to establish what happens when the two peripheral syllables in Dutch are of equal weight. Words consisting of two superheavy syllables are very rare, so in order to have sufficient data on which to base our choice, we must look at sequences of the type VV-VV and VC-VC. Strictly speaking, disyllabic words with initial stress tell us nothing:

(24)

giro	moslim
baboe	atlas

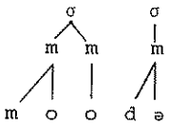
These words have initial stress. Yet this may be because their final syllable or final segment is extrametrical. In the former case these words would be like monosyllables and in the latter case (illustrated below) like words having a second syllable with a schwa:

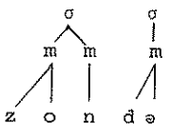
(25)



(o)

(m)





On the other hand bisyllabic words of this type with final stress are equally unrevealing:

(26)

kado	kordon
idee	kristal

In those cases the final syllable may be specified as [+F]. Given that both extrametricality and [+F] are exception devices the mildest position is to claim that a stress rule is less likely to express a significant generalization if the number of exceptions is greater than the number of regular cases, whether exceptionality is encoded in terms of extrametricality (to handle negative exceptions) or in terms of a diacritic mark (to handle positive exceptions). This is the position that I will adopt here. This implies that I will in principle propose a stress rule that accounts for the patterns that are in the majority, the **dominant patterns**. I realize that this position perhaps implies a simplification of the issues that are involved. Firstly, it may happen that a particular "dominant pattern" can only be captured by adding ad hoc devices to the theory, in which case one might want to refrain from accounting for this pattern as following from the rule. Secondly, we cannot be sure, that patterns which are in the majority, in fact represent what native speakers regard as rule governed patterns. There are several ways to check whether this is the case or not. One might investigate "wrong pronunciations" of foreign words or historical stress shifts as is done in Van Marle (1980). Another route is taken by Kager & Visch (1983), who claim that synchronic shifts (due to stress clash) are more likely to occur if the resulting stress pattern is predicted by the analysis. Finally, in Van der Hulst & Langeweg (forthc.) results will be reported from an experiment in which speakers of Dutch have been asked to pronounce nonsense words. As far as I have been able to judge from the results obtained, most of the patterns that are in the majority in the vocabulary of Dutch, are also chosen in pronouncing nonsense words.

The analysis that is offered in the next section is based on a corpus that contains the vast majority of Dutch monomorphemic nouns, adjectives and verbs, excluding highly specialized vocabulary and words that are clearly felt as foreign by native speakers of Dutch. Of course, monosyllabic words

and all polysyllabic words in which only one syllable contains a full vowel have been excluded. It goes without saying that it is impossible to gather a "complete list", among other things because it is not possible to draw a sharp line between foreign and non-foreign words or specialized and non-specialized words. I claim, however, that the collection (comprising about 3500 items) on which I base my analysis is representative and that the conclusions concerning the **dominant** patterns will not be affected by possible oversights on my part. In van der Hulst and Langeweg (forthc.) "complete" lists will be made available. Here I limit myself to giving incomplete lists that serve an illustrative purpose. Because the borders of the corpus are to some extent "fuzzy" I will also speak here in terms of rough totals when comparing the various subsets of data.

5.3. The stress pattern of Dutch monomorphemic words

5.3.1. Nouns

5.3.1.1. Bisyllabic nouns

Limiting ourselves to bisyllabic words for the moment let us first look at cases with a final syllable of the structure VVC and VCC, i.e. with a final syllable that contains a long vowel or diphthong followed by one consonant, or a short vowel followed by two consonants. For a discussion of the Dutch vowel system I refer to chapter 3, section 3.3.3.

There are about 450 cases with finally stressed VVC (the first syllable being either VC or VV) and only about 25 cases with stress on the first syllable:

(27)

VV-VVC				
paraaf	tarief	olijf	lawaai	pleidooi
paniek	muziek	kanaal	metaal	kameel
juweel	profiel	idool	viool	probleem
atoom	banaan	stramien	mihoen	citroen
domein	aluin	konijn	ravijn	patroon
siroop	sigaar	poelier	papier	figuur
paleis	anijs	matroos	klimaat	dieet
limiet	kajuit	piloot	debuut	minuut

(28)

VC-VVC				
octaaf	archief	octrooi	portiek	sandaal
garnaal	penseel	kasteel	reptiel	pistool
embleem	kostuum	vulkaan	orkaan	sardien
kalkoen	fontein	fortuin	dolfijn	persoon
tartaar	scharnier	tamboer	cultuur	markies
fornuis	applaus	soldaat	atleet	bandiet
parkiet	marmiet	bandiet	despoot	dispuut

(29) EXCEPTIONS

VV-VVC		**VC-VVC**	
sieraad	deemoed	potlood	arbeid
weemoed	kleinood	blocnote	minstreel
kalief	koekoek	lichaam	altaar
kroepoek	wierook	vampier	mammoet
wierook	zwaluw	arthur	cocktail
zenuw			

Turning to VCC cases we find a less clear picture, i.e. there are relatively more exceptions than in the previous case (regular: 110, exceptional:70):

(30)

VV-VCC				
smaragd	triomf	spelonk	augurk	kiosk
alarm	katern	balans	eclips	traject
relict	basalt	tumult	gigant	fazant
client	talent	adept	protest	reflex

(31) EXCEPTIONS

vijand	eland	eiland	avond	agens
biceps	bruiloft	kobalt	climax	codex

(32)

VC-VCC				
miljard	concern	impuls	forens	respons
ellips	karwats	contract	aspect	district
insekt	consult	pendant	fondant	fragment
segment	concept	biljart	concert	rapport
contrast	orkest	arrest	attest	compost

(33) EXCEPTIONS

herberg	nonsens	ambacht	asfalt	yoghurt

albast ballast asbest index affix

Many of the initially stressed words end in /ks/ (written <x>) while this cluster occurs only a few times in the finally stressed cases. Facts like these can be expressed in subrules that express subregularities. As we go on I will mention other subregularities of this type, but I will not attempt to formulate explicit rules. In all cases such rules would tell us that the fact that a syllable is either marked [+F] or marked as extrametrical is regarded as "expected" given the segmental make-up of these syllables. I have not been able to find clear phonological grounds for the fact that certain endings deviate from the dominant patterns.

In this type of case we find a fair number of exceptions to the generalization that final superheavy syllables are stressed. To illustrate the point that not all exceptions can be predicted consider the following pairs, which have similar endings:

(34)

miljard	oswald
tendens	nonsens
sarcast	albast
orkest	asbest
alarm	napalm
gigant	vijand
basalt	kobalt
eclips	biceps
spelonk	avond
fazant	eland

Let us now turn to the stress pattern of bisyllabic nouns that end in VC and VV. We may distinguish four types:

(35)

	INITIAL	FINAL
VC-VC	140	90
VV-VV	170	60
VC-VV	170	30
VV-VC	190	120

On the basis of these totals one would be tempted to say that stress is predominantly initial (or prefinal) and hence that bisyllabic words show no evidence for a significant weight difference between VC and VV.

Let us first take a close look at the bisyllables in which both syllables

have the same skeletal structure:

(36) **VC-VC: INITIAL STRESS**

plastic	mustang	diftong	hertog	perzik
sambal	consul	tangram	wigwam	moslim
pelgrim	album	balkan	sultan	kremlin
molton	nectar	condor	mentor	atlas
harnas	kermis	kosmos	circus	cursus
cactus	sabbat	sorbet	sowjet	cockpit

(37) **VC-VC: FINAL STRESS**

kornak	kristal	appel	kartel	ampul
bonbon	kordon	balkon	chanson	karkas
kompas	succes	bordes	kompres	pincet
portret	trompet	kwartet	servet	komplot

The clearest tendency is for words in <et> to receive final stress (I use "<>" to indicate spelling). There are only a few exceptions to that generalization. I give here what seem to be other generalizations ("computed" on the complete corpus):

(38)

FINAL	INITIAL
30 x <et> (4 exc.)	14 x V+<ng>
5 x <el>	19 x V+<r>
6 x <es> (2 exc.)	9 x <is> (1 exc.)
2 x <ot> (1 exc.)	20 x <us> (1 exc.)
16 x <on> (6 exc.)	10 x <um> (1 exc.)
3 x (1 exc.)	7 x <a>+[+nas]

There are no words ending in <en>, so if we regard the only two ending in <os>, both having initial stress, as exceptions one might say that a sequence of a mid short [αback, αround] vowel and a dental consonant attracts final stress, thereby "disturbing" the predominant initial or prefinal pattern. The phonological status of this generalization is suspect, however.

The prefinal pattern surfaces even clearer in the case of VV-VV bisyllables:

(39) **VV-VV : INITIAL STRESS**

tuba	yuca	sofa	noga	trema

specie	olie	linie	motie	ruzie
baboe	goeroe	bami	nazi	dodo
kilo	kano	provo	toto	baby

(40) **VV-VV : FINAL STRESS**

idee	taugee	magie	kopie	taboe
revue	galei	livrei	etui	kopij
depot	kado	buro	recu	bijou

In the following table we see the correlation between the nature of the final vowel and stress placement. I have added the score for VC-VV bisyllables (to be discussed hereafter) for comparison (again these numbers refer to the complete corpus):

(41)

	VV-VV		VC-VV	
	INITIAL	FINAL	INITIAL	FINAL
/ā/	71	5	66	-
/ē/	2	13	2	10
/ō/	41	12	36	1
/ø̄/	-	-	-	-
/ȳ/	2	2	1	-
/ī/	48	11	63	5
/ū/	6	3	8	-
/ei/	-	6	-	12
/ou/	1	-	2	-
/ui/	-	-	-	-

By using the notation /v̄/, I neglect here the autosegmental representation of length. The notation of diphthongs is also informal. For an analysis of the Dutch vowel system I refer to Chapter 3, section 3.3.3. Clearly the "disturbing" factors are the diphthong /ei/ and the mid unrounded vowel /ē/. The same two endings account for the great majority of finally stressed VV-VV and VC-VV words:

(42) **VC-VV : INITIAL STRESS**

pinda	wodka	dogma	firma	junta
versie	fractie	kwestie	bamboe	armoe
tosti	kombo	saldo	shampoo	salvo
accu	moskou	whisky	dummy	panty

(43) **VC-VV : FINAL STRESS**

toffee	trofee	moskee	pygmee	elpee
vallei	pastei	karwei	abdij	soldij
kandij	partij	circuit	bordeaux	essay

The facts considered so far lend support to the idea that stress is predominantly prefinal if the final syllable is not superheavy and that the difference between VC and VV syllables is of little significance. The crucial case is going to be the VV-VC type. If VC is heavier than VV then we expect to find here a predominant final pattern, but in fact we do not, as the table in (35) has already revealed:

(44) **VV-VC : INITIAL STRESS**

wajang	pisang	klewang	viking	smoking
reling	honing	koning	sarong	eunuch
goelasj	kajak	bivak	havik	sesam
slalom	forum	datum	satan	rotan
divan	neon	python	nylon	bizon
ozon	radar	sonar	humor	motor
fluor	pias	sinas	lavas	polis
crisis	chaos	bios	kokos	epos
rebus	kubus	fiat	kievit	robot

(45) **VV-VC : FINAL STRESS**

karaf	giraf	tabak	barak	kozak
barok	vazal	tabel	libel	hotel
bacil	pupil	katrol	program	kolom
roman	tiran	flacon	wagon	spion
japon	baron	gazon	galop	decor
moeras	matras	proces	adres	kolos
debat	fregat	patat	raket	boeket
tablet	floret	rozet	fagot	cachot

The majority of the finally stressed cases end in the sequences that we mentioned above as attracting stress in the VC-VC cases. The picture is less neat, however, and in some classes there are more exceptions than regular cases.

(46)
31 x <et> (1 exc.)
12 x <el>
2 x <es> (3 exc.)

6 x <ot> (1 exc.)
6 x
2 x <os> (6 exc.)
20 x <on> (22 exc.)

5 x <il>
5 x <at> (1 exc.)

This concludes our discussion of the bisyllabic nouns. So far the safest generalization is that the penultimate syllable is stressed, unless the final syllable is superheavy; in that case we find final stress. The number of exceptions is large, however, and although a significant subclass can be identified on the basis of the segmental make-up of the final syllable the conclusion is inevitable that stress in Dutch is lexical. By this I mean that whatever stress rule we propose it makes more sense to interpret this rule as a lexical redundancy rule than as a rule that actually applies to items that have not been specified for stress.

Before proposing an analysis I will first go through the trisyllabic nouns (not containing a syllable with schwa). Here we will find some evidence for the claim that the VV/VC difference is relevant for the purpose of stress placement.

5.3.1.2. Trisyllabic nouns

The generalization that final superheavy syllables are stressed is not refuted by trisyllabic words. The following list is overwhelming, compared to the almost total absence of exceptions.

(47) **X-X-VVC : FINAL**

parachute	paragraaf	negatief	sarcofaag	mozaiek
kannibaal	kapitaal	ritueel	gladiool	diadeem
idioom	vaticaan	pelikaan	fenomeen	legioen
paviljoen	kapitein	karabijn	epigoon	kaviaar
atmosfeer	formulier	meteoor	amateur	avontuur
speculaas	paradijs	abrikoos	apparaat	dynamiet
parasiet	kwaliteit	kosmonaut	farmaceut	instituut

(48) **X-X-VCC : FINAL**

dividend	arabesk	ordonnans	dialect	architect
adjudant	foliant	ledikant	diamant	dissident
perkament	testament	hyacint	labyrint	cineast

Turning then to trisyllabic nouns consisting of VC and VV syllables we can have the following logically possible types. After each type the number of cases that occur in the corpus has been indicated:

(49)

	INITIAL	PREFINAL	FINAL
a.	VC-VC-VC (-)	VC-VC-VC (12)	VC-VC-VC (3)
b.	VC-VC-VV (-)	VC-VC-VV (22)	VC-VC-VV (6)
c.	VC-VV-VV (21)	VC-VV-VV (43)	VC-VV-VV (8)
d.	VV-VV-VV (59)	VV-VV-VV (80)	VV-VV-VV (43)
e.	VV-VV-VC (60)	VV-VV-VC (20)	VV-VV-VC (35)
f.	VV-VC-VC (-)	VV-VC-VC (14)	VV-VC-VC (5)
g.	VV-VC-VV (-)	VV-VC-VV (45)	VV-VC-VV (9)
h.	VC-VV-VC (40)	VC-VV-VC (9)	VC-VV-VC (17)

In six out of eight cases the prefinal pattern is dominant. The two exceptional cases involve a sequence of VV-VC#, but contrary to what one might perhaps expect we find as dominant initial stress and not final stress in these cases.

To study the cases more closely let us look at the relevant examples. For the first two types we find no examples with initial stress:

Type a: VC-VC-VC

(50) **VC-VC-VC : PREFINAL**

abstractum	perfectum	badminton	transistor	atlantis
syntaxis	wilhelmus	consensus	prospectus	

(51) **VC-VC-VC : FINAL**

postiljon	compagnon	castagnet

Type b: VC-VC-VV

(52) **VC-VC-VV : PREFINAL**

walhalla	chinchilla	gorilla	vendetta	confessie

commissie	percussie	attractie	infectie	confectie
injectie	restrictie	inductie	instructie	confetti
spaghetti	parlando	commando	embargo	espresso

(53) **VC-VC-VV : FINAL**

chimpansee	employee	compagnie	industrie	bellettrie
amnestie				

Proceeding on the assumption that prefinal stress is regular, we mark the words with final stress as exceptional (i.e. [+F]). Observe that these words have the same endings that we also found among the bisyllabic exceptional words, i.e. <on>, <et> and <ee> (cf. 38, 41 and 46). The remaining cases end in <ie>. Among the bisyllabic words too words ending in <ie> constitute a relatively large group of exceptions (see the table in (41), entry /ī/).

Type c: VC-VV-VV

For the third class we find the three logical possibilities, although prefinal stress is dominant.

(54) **VC-VV-VV : INITIAL**

formica	marcia	maffia	raffia	dahlia
hernia	fuchsia	razzia	tombola	pergola
hospita	belgrado	indigo	piccolo	eskimo
embryo	bungalow			

It seems that prefinal <i> (/ī/) is easily "neglected", a fact that has been noticed by several students of Dutch stress. It is possible to suggest that an <i> in prefinal position gives rise to a **mismatch** when placed in S position. Kager & Visch (1983) suggest that we acknowledge the fact that segment sonority in general is relevant for stress assignment, but the data indicate that the only convincing instance involves prefinal <i>. This does not warrant such a general claim. I therefore prefer to regard the stress-rejecting behavior of prefinal <i> as an arbitrary property of this segment.

In the next set of examples we see that there are in addition a few exceptions to this subregularity:

(55) **VC-VV-VV : PREFINAL**

alpaca	armada	collega	nirvana	passiva

concilie	communie	bombarie	bacterie	mysterie
victorie	historie	invasie	adhesie	diffusie
illusie	inflatie	ambitie	conditie	andijvie
alkali	tornado	torpedo	meccano	albino
bambino	alpino	gestapo	sombrero	allegro

(56) **VC-VV-VV : FINAL**

orchidee	attaché	amfibie	farmacie	rapsodie
harmonie	fantasie			

The cases with final stress again have typical stress-attracting endings, viz. <ee> or <é> (both stand for /ē/) and <ie>.

Type d: VV-VV-VV

The fourth class is the largest one. Stress is predominantly on the penultimate syllable. In the majority of cases with initial stress we find the "unstressable" <i> and most finally stressed words end in one of the stress-attracting sequences <ee>, <ie> or <ei>.

(57) **VV-VV-VV : INITIAL**

canada	papoea	omega	aria	paria
varia	gloria	fresia	cavia	paprika
primula	pagina	platina	opera	dominee
kolibrie	maraboe	alibi	farao	risico
mikado	video	stereo	radio	studio
regio	folio	polio	patio	ratio
animo	domino	rotary		

(58) **VV-VV-VV : PREFINAL**

spirea	bodega	maria	judoka	koala
akela	pyjama	diploma	aroma	arena
hyena	maizena	angina	mascara	sahara
angora	natura	mimosa	valeta	peseta
valuta	jehova	fiducie	tragedie	remedie
komedie	religie	familie	opinie	mahonie
kolonie	kanarie	materie	memorie	cohesie
precisie	provisie	erosie	legatie	negatie
editie	militie	politie	munitie	positie
notitie	emotie	promotie	devotie	solutie

spinazie	salami	bikini	okapi	maori
rodeo	imago	dynamo	piano	casino
kimono	bolero	firato		

(59) **VV-VV-VV : FINAL**

chocola	procedé	scarabee	coryfee	matinee
diarree	protegé	melodie	parodie	prosodie
strategie	litanie	reunie	therapie	theorie
calorie	afasie	relikwie	jaloezie	poezie
defilé	canapé	comité	cichorei	specerij
negorij	curacao	residu	paraplu	

Type e: VV-VV-VC

This class requires our special attention.

(60) **VV-VV-VC :INITIAL**

cineac	decibel	abraham	requiem	unicum
stadium	medium	odium	jodium	podium
valium	helium	opium	natrium	vacuum
ramadan	rataplan	specimen	colofon	odeon
marathon	stadion	orion	salomon	libanon
bariton	horizon	jaguar	lucifer	jupiter
senior	junior	monitor	ananas	litotes
socrates	syfilis	nucleus	genius	tetanus
lazarus	habitus	horizon		

(61) **VV-VV-VC : PREFINAL**

museum	supinum	decorum	futurum	pronomen
senator	curator	pluralis	dualis	adonis
vicaris	salaris	notaris	clematis	pleuritis

(62) **VV-VV-VC : FINAL**

maniak	frikadel	citadel	karamel	kolonel
aquarel	bagatel	krokodil	protocol	parasol
diagram	colofon	capuchon	picador	etiket
violet	amulet	kabinet	klarinet	bajonet
cabaret	sigaret	menuet	patriot	

This type is interesting because here the dominant pattern is not to have stress on the penultimate syllable, but rather on the antepenultimate, i.e.

initial syllable. With respect to trisyllabic words having initial stress we have observed above that in most cases the prefinal syllable contains <i>. In this class a significant number of words with initial stress do not fall under the generalization that a prefinal <i> is skipped:

(63)

vacuum	ramadan	rataplan
odeon	colofon	oregon
marathon	salomon	jaguar
libanon	oberon	equator
ananas	litotes	nucleus
modulus	tetanus	lazarus

The stress rule that I want to formulate must account for the fact that trisyllabic words of this type have predominantly initial stress. At this point we can conclude for the first time that a rule that assigns penultimate stress in all cases (unless the final syllable is superheavy) is not going to be successful in accounting for all the dominant patterns. Admittedly, my definition of the notion 'dominant pattern' (involving the definiens 'majority') must be followed to the letter, because we are dealing with small numbers of words here. But I see no reason so far to think that we are on the wrong track. For completeness let us observe that the cases with final stress typically end in a stress-attracting sequence (cf. the table in 38).

Type f: VV-VC-VC

In this class and the following one as well, we find predominantly prefinal stress and most cases with final stress end in a stress-attracting syllable.

(64) **VV-VC-VC : PREFINAL**

pacific	kanunnik	elektron	professor	reactor
reflector	detector	synopsis	hibiscus	meniscus
alumnus	olympus	abortus	augustus	

(65) **VV-VC-VC : FINAL**

apostrof	parallel	tarantel

Type g: VV-VC-VV

(66) **VV-VC-VV : PREFINAL**

waranda	agenda	mazurka	programma	dilemma
havanna	madonna	elektra	placenta	aorta
siesta	provincie	parochie	emulsie	defensie
processie	professie	emissie	redactie	retractie
kwitantie	licentie	proportie	chianti	fiasco
flamingo	stiletto	libretto	risotto	

(67) **VV-VC-VV : FINAL**

odyssee	neuralgie	autopsie	travestie	sacristie
demasqué	fricandeau			

As in class a and b, these two classes lack cases with initial stress. We can make an interesting generalization here: in all types with a penultimate VC syllable initial stress is lacking.

Type h: VC-VV-VC

Like type e, this type shows a majority of words having initial stress:

(68) **VC-VV-VC : INITIAL**

almanak	tomahawk	carnaval	archipel	alcohol
practicum	calcium	cadmium	maximum	astrakan
charlatan	mocassin	lexicon	pantheon	pentagon
epsilon	handicap	zanzibar	pancreas	hercules
albatros	syllabus	omnibus	exodus	nuntius
dactylus	terminus	octopus	alfabet	

(69) **VC-VV-VC : PREFINAL**

erratum	passivum	dictator	messias	brandaris
enclisis				

(70) **VC-VV-VC : FINAL**

salmiak	fontanel	carrousel	lampion	pension
pantalon	matador	sjibbolet	pistolet	silhouet

Observe that this type shares a structural property with type e. Both end in the sequence VV-VC#. Filtering out the cases where we find a prefinal <i> we are left with the following set of words:

(71)

almanak	tomahawk	carnaval
alcohol	astrakan	charlatan
mocassin	pantheon	pentagon
pancreas	hercules	albatros
syllabus	exodus	octopus
alfabet		

We have now gathered sufficient data to turn to the formal analysis.

5.3.1.3. A metrical analysis

In the previous two sections I have discussed bi- and trisyllabic words that consist of syllables without a schwa. We saw that an initial hypothesis saying that prefinal stress is predominant in all cases meets with the problem that words ending in the sequence VV-VC# have initial stress as the predominant pattern. In this section I will propose an analysis that explains the occurrence of all the patterns that were found to be dominant. This analysis will then be confronted with a wider range of data, including trisyllabic words with a schwa and words consisting of four syllables.

The first analysis is embodied in the following stress rule:

(72) **Dutch stress**

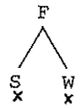
a. Assign feet from right to left that are
   -binary
   -Q-sensitive
   -labelled SW

b. Assign a word tree that is
   -right branching
   -labelled by the LCPR

c. LCPR
   In the configuration [AB] B is Strong iff
   i. it branches
   ii. it dominates a superheavy syllable
   iii. it dominates a marked syllable ([+F])

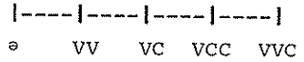
The type of foot on which this analysis is based has been discussed above:

(73)



Mismatch Condition: $\sigma_s > \sigma_w$
(i.e. σ_s is not lower on the weight scale than σ_w)

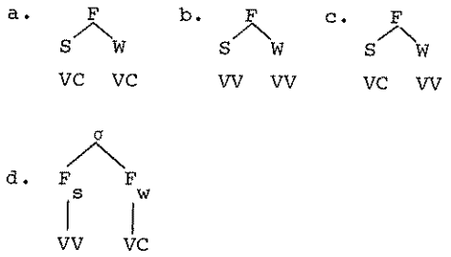
(74)



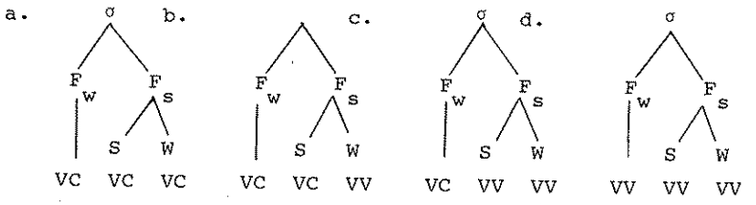
An extra stipulation must be made for words with exceptional final stress. We must prevent a syllable marked as [+F] from becoming the weak syllable in a foot. To achieve this we might give such syllables a place on the scale as high as superheavy syllables.

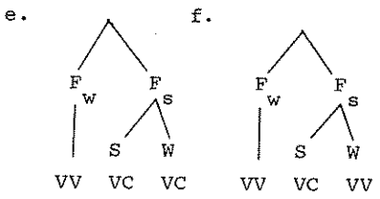
For bi- and trisyllabic words the analysis predicts the following metrical structures:

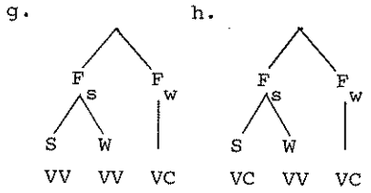
(75) **Bisyllabic words**



(76) **Trisyllabic words**

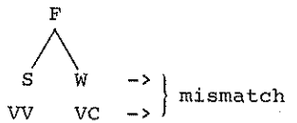






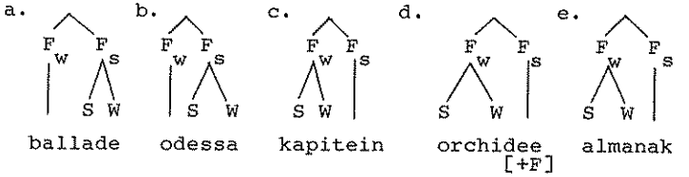
The interesting aspect of this analysis is that the unexpected behaviour of three types of words (VV-VC in 75d, VV-VV-VC and VC-VV-VC in 76g and 76h respectively) all ending in the same sequence VV-VC# is straightforwardly explained. The crucial point is that a sequence VV-VC# cannot be combined into a single foot, since that would violate the constraint that syllabic weight differences cannot be contradicted by the S/W labelling:

(77) *



To illustrate the working of the LCPR compare the following examples:

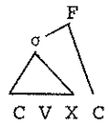
(78)



Given the formulation of the LCPR, words with final superheavy or marked syllables always receive final stress. The special merits of this labelling rule become clear in example (78e) where it predicts antepenultimate stress, whereas a "simple" WS labelling would give final stress.

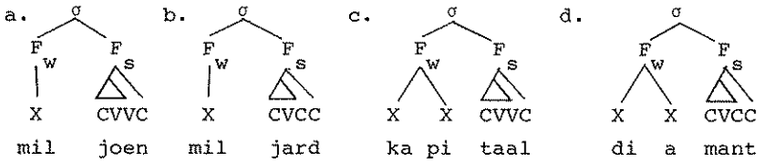
As was mentioned in chapter 3, some find it attractive to argue that superheavy syllables are in fact branching feet themselves:

(79)



The identical behavior of superheavy syllables and branching feet would then be explained and clause ii of the LCPR could be eliminated. Proposals along these lines can be found in McCarthy's analysis of stress in Arabic dialects (McCarthy 1979). In the following figures "X" stands for either VV or VC syllables:

(80)

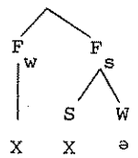


I will not adopt this point of view, however. In the next section I will discuss a method of explaining the equivalence of a superheavy syllable and a "real" branching foot that is not based on questionable assumptions concerning constituent structure.

5.3.1.4. Extension of the data base

The next type of case that I will consider are words with schwa. The present analysis predicts that if a schwa occurs in the final syllable, stress will be on the penultimate syllable.

(81)



Because syllables with a schwa are lower on the scale than any other type of syllable they can be combined into a foot with the preceding syllable. The

LCPR labels the final foot with S. The number of exceptions that I know of is small, compared to the list of regular cases.

(82) **X-X-ə : PREFINAL**

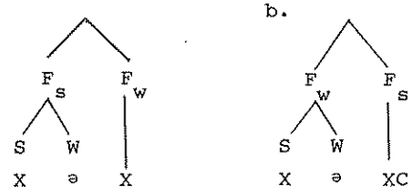
allure	amandel	antenne	apache	asperge
bagage	ballade	benzine	brigade	capsule
cassette	cilinder	colonne	commode	computer
controle	corsage	diaken	discipel	douane
egypte	eksamen	ellende	enquete	eskader
etage	etappe	examen	extase	fanfare
formule	horloge	hypnose	jenever	kabouter
kadaver	kalender	kaliber	kamille	karakter
kastanje	kazerne	kazuifel	komkommer	lavendel
lawine	legende	machine	malaise	manoeuvre
maquette	marine	mascotte	methode	mirakel
molukken	morfine	narcose	notulen	novelle
november	nuance	oase	obstakel	oktober
orakel	oranje	pantoffel	papaver	parabel
parade	parterre	plantage	principe	prognose
psychose	rabarber	rancune	ravage	rotonde
routine	salade	satire	seconde	suede
taverne	tentakel	tentamen	theater	tirade
trapeze	tribune	vedette	vehikel	visite
vitrage	vitrine	volume	zigeuner	

(83) **X-X-ə : EXCEPTIONS**

manchester	oorkonde
armoede	betuwe
nijmegen	veluwe
weduwe	

The analysis proposed in the preceding section predicts that if the schwa is in second position and a full vowel in final position we will find initial stress. This is so because it is not possible to assign a foot to the last two syllables in those cases: the final syllable is heavier than the penultimate syllable and a mismatch would be the result. However, if the final syllable is superheavy we predict final stress:

(84) a. b.



Both predictions are borne out by the facts, but there are a number of exceptions:

(85)

X-ə-X : INITIAL		**X-ə-VXC : FINAL**	
charleston	hottentot	intellect	parlement
interim	interval	anjelier	appelsien
kakkerlak	rammenas	arsenaal	atletiek
ukkepuk	zeppelin	harlekijn	hermelijn
algebra	selderie	kanselier	kastelein
aceton	bruidegom	porselein	schorseneer
krakeling	oelewap	element	luitenant
ulevel	zwezerik	souvenir	pierement
camera	cholera	anemoon	generaal
cinema	kaketoe	molecuul	papegaai

(86) EXCEPTIONS

X-ə-X : FINAL		**X-ə-VXC : INITIAL**	
banderol	bataljon	asterisk	habbekrats
carillon	envelop	interest	bellefleur
jarretel	musketon	elzevier	lessenaar
atelier	parvenu	marsepein	ooievaar
hagedis	kotelet		
omelet	paperas		
energie			

We see that the number of exceptions is rather high and one might want to question the significance of the generalization that I make here. It cannot be denied, however, that the stress rule that has been established above, makes the correct prediction, assuming, as I have done all along, that the dominant patterns must be treated as regular. As long as the alternative is to treat all words of the type considered here as having unpredictable stress, I see no reason to abandon the present analysis.

In the next section I will return to the prosodic characteristics of

syllables with a schwa, but first I will discuss the stress pattern of words consisting of four syllables. Our stress rule makes the following predictions:

(87)
1. no initial stress
2. final stress if the final syllable is superheavy
3. antepenultimate stress if the final syllable is heavier than the penultimate syllable (VV-VC# and ə-VX#)
4. penultimate stress in the remaining cases

As for the first prediction it can be said that the number of words with initial stress is limited to two types of cases. First there are a few grammatical terms like **ínfinitief, áccusatief, nóminatief** and secondly there are place names like **Schéveningen, Ámerongen** with schwa in the second and fourth syllable. Both categories must be marked as exceptions.

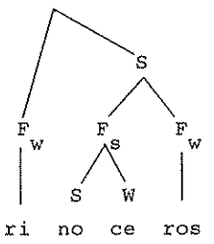
Proceeding with the second prediction, I have not found any exception:

(88) **X-X-X-VVC/VCC : FINAL**

affiniteit	alexandrijn	anakoloet	aperitief	apocalyps
capaciteit	cinemascoop	coëfficiënt	deodorant	egelantier
experiment	idiolect	ingrediënt	initiaal	karikatuur
literatuur	locomotief	materiaal	meridiaan	prerogatief
rozemarijn	salamandrijn			

The third prediction is borne out, although there are exceptions. Let us first consider the regular cases. Clearly if the third syllable has a schwa and the fourth a full vowel we cannot construct a foot over the last two syllables because this would result in a mismatch:

(89)



There are not many examples of this type:

(90) rinoceros
epitheton
asyndeton

More frequent is the type where the final syllable is closed and the penultimate open. In those cases it is also impossible to combine the final sequence VV-VC into one foot, because of the mismatch condition. Such words have the same structure as the one assigned to **rinoceros**:

(91) **X-X-VV-VC : ANTEPENULTIMATE**

accordeon	acrostichon	adagium	adverbium	alluvium
ammonium	anonymus	aquarium	arsenicum	basilicum
catalogus	colloquium	compendium	compositum	criterium
decennium	delirium	emeritus	geranium	gymnasium
harmonium	hospitium	imperium	jeruzalem	magnesium
millennium	napoleon	plutonium	politicus	stipendium
symposion				

But there are quite a few exceptions:

(92) **X-X-VV-VC : PREFINAL**

alligator	archivaris	curiosum	indicator
irrealis	jubileum	mausoleum	navigator
oerangoetan	radiator	relativum	

In addition there are also words having antepenultimate stress that do not conform to the generalization that in such cases the prefinal syllable has less weight than the final syllable:

(93) **X-X-X-X : ANTEPENULTIMATE**

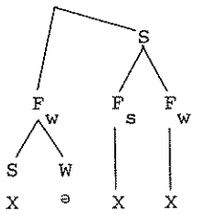
acasia	adagio	alinea	ammonia	apocope
azalea	batavia	begonia	deposito	facsimile
forsythia	gardenia	grammatika	harmonika	magnolia
majolica	malaria	penelope	petunia	scenario
utopia				

We should not fail to observe, however, that nearly all of them show a prefinal <i>, a vowel that, as we have seen before, usually rejects stress.

A small but interesting group involves words that have a schwa in the second syllable and a final sequence VV-VC#. Above we saw that such words

get antepenultimate stress if the second syllable has a full vowel. Our rule predicts the following structure for such words:

(94)



And indeed words of this type have penultimate stress:

(95) difteritis
atheneum
dromedaris
elevator
pikketanis

For the remaining group of words ending in two heavy syllables our stress rule predicts penultimate stress.

(96) **X-X-X-X : PREFINAL**

academie	allegretto	alliantie	apriori	audientie
axioma	caballero	catharina	desperado	diabolo
diafragma	domicilie	eldorado	esperanto	eucalyptus
evangelie	exercitie	februari	hacienda	harakiri
influenza	intermezzo	januari	leontina	macaroni
maharadja	monopolie	niagara	oppositie	palestina
panorama	paradigma	paranoia	pianola	piccalilli
referendum	repercussie	rhododendron	seminarie	theorema

The following words have exceptional final stress:

(97) **X-X-X-X : FINAL**

allegorie	ammoniak	anatomie	cabriolet	categorie
cavalerie	ceremonie	epidemie	epilepsie	eucharistie
filosofie	hegemonie	individu	marionet	ontogenie
portemonnee	toreador	varieté		

Note that some of them end in <et>, some in <ee> and some in <ie>. We have seen before that these endings receive "irregular stress".

The final group of words with four syllables to be considered are those with a schwa in the final syllable. Here the rule predicts penultimate stress and there are, as far as I know, no exceptions:

(98) **X-X-X-ə: PREFINAL**

accolade	amazone	ambassade	ambulance	anecdote
balustrade	barricade	camouflage	catastrofe	cellulose
chocolade	discipline	entourage	episode	garderobe
grenadine	helikopter	heroine	hypothese	karbonade
limonade	limousine	logaritme	margarine	marmelade
mayonaise	nicotine	pantomime	periode	piramide
pirouette	polonaise	polyester	privilege	procedure
salamander	serenade	serpentine	synagoge	tamarinde
terpentine	vacature	vaseline	vestibule	vitamine

This completes our overview of the facts concerning monomorphemic nouns. An analysis has been presented that makes the correct predictions with respect to the occurrence of dominant patterns. It has been pointed out that many of the exceptions fall under a relatively small set of subregularities that all refer to the segmental make-up of the final syllable, and, in one case (involving <i>), to the segmental make-up of the prefinal syllable.

The reader may have noted that I have not discussed bi- or trisyllabic words having superheavy syllables in non-final position. One can think of many logically possible combinations of heavy and superheavy syllables, and make interesting predictions with regard to the stress pattern of such words. Unfortunately, the number of monomorphemic words having superheavy syllables in non-final position is too small to test the predictions that follow from the analysis that was proposed here.

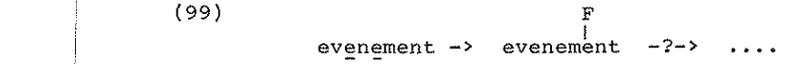
5.3.1.5. Syllables with a schwa and an alternative analysis

In this section I will start by pointing out that the previous analysis is inadequate in one respect and that precisely on this point a more adequate analysis is conceivable. I will investigate the consequences of adopting the alternative analysis, taking into account what was proposed in the previous chapter, and show that it compares favorably to the analysis that has been presented first.

There are two facts involving the schwa that the preceding analysis does

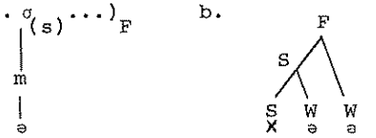
not explain. Firstly, schwas can **never** bear main stress. There are no exceptions to this generalization. This is in sharp contrast to the influence of all other syllable types on stress placement, where we find some or many exceptions in each case, as we have seen in the previous sections. Secondly, because schwas are absolutely unstressable and the foot type used in the metrical analysis is bounded, we cannot assign prosodic structure in those cases where two schwas occur in a sequence:

(99)



It would seem that we must add a constraint to the preceding analysis (as in 100a), saying that a schwa may not appear in a strong or only syllable of a foot, and, in addition, a special foot type as in (100b), that is assigned to a word if two schwas occur in a row:

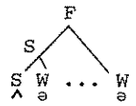
(100) a. * (... σ (s) ...)F b.



In van der Hulst and Moortgat (1981) an analysis of Dutch stress was proposed that was designed to capture these two facts more straightforwardly.

The type of foot that is adopted in van der Hulst and Moortgat (henceforth HM) is **quantity determined, left dominant** and **unbounded.** The foot type is called "determined", because the head of the foot is required to dominate a full vowel. This property, and the property of unboundedness, was invoked to explain the fact that syllables with a schwa can **never** bear stress. Identifying the notion "head of foot" with "stress" we explain straightforwardly that syllables with schwa may **never** be stressed since the type of foot that is chosen requires schwas to occur in W positions of the foot and a full vowel in S position:

(101)



Stated in full the stress rule on which this second analysis is based looks as follows. Differences with respect to the preceding analysis have been marked with a star:

(102) **Dutch stress**

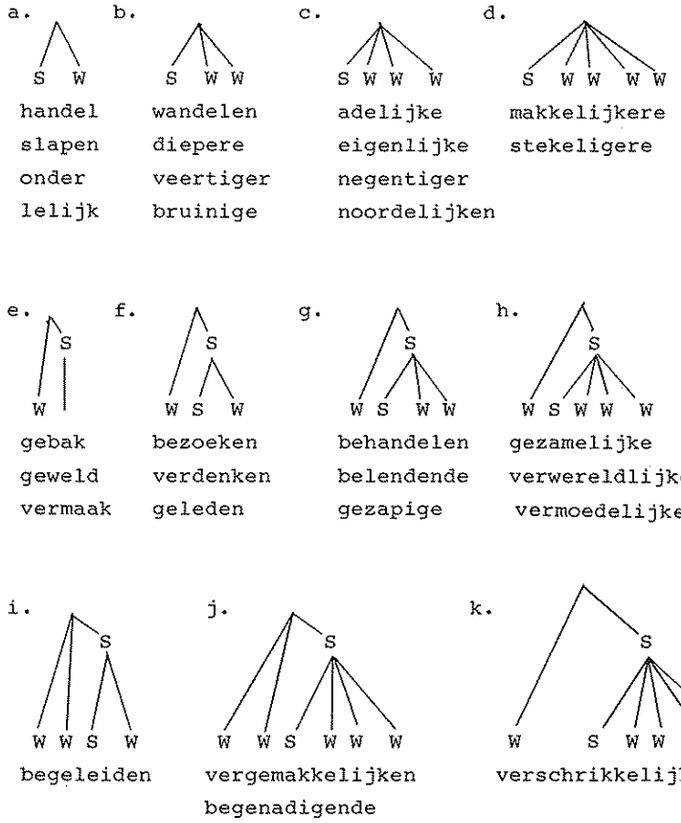
a. Assign feet that are
*-unbounded
*-quantity-determined
-labelled SW

b. Assign a word tree that is
-right branching
-labelled by the LCPR

c. LCPR
In the configuration [AB] B is Strong iff
i. it branches
ii. it dominates a superheavy syllable
iii. it dominates a marked syllable ([+F])

A minor point is that to assign unbounded feet it is unnecessary to specify a direction. Given this alternative analysis, Dutch no longer presents evidence for the "fourth foot type". What we have used here is the unbounded counterpart of the second type in (16). Another consequence of this proposal is that the analysis can quite easily be extended to the derived vocabulary since suffixes (both derivational and inflectional) with schwas are numerous in Dutch. In (103) I give some examples of both derived and simple words. In giving these examples, I introduce another difference with respect to the preceding analysis. In line with the proposals advanced in the previous chapter, I will no longer assume that metrical structure is binary branching:

(103)



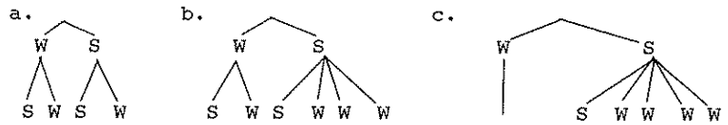
In those cases where more than two schwas occur in a row it is possible to apply several rules that delete certain schwas. For example **gezamelijke** can easily be pronounced as **gezamØlijke**. In the case of **verschrikkelijkere** we find an alternative form **verschrikkØlijkerØ**. I have not investigated rules of schwa deletion systematically, but the facts just mentioned suggest that a foot comprising three syllables, of which there are two with a schwa, constitutes an upper limit.

Apart from suffixes with a schwa, Dutch has many suffixes with the syllabic structure VVC or VCC. It is clear that words that are derived with these suffixes are equally well accounted for in both this and the preceding analysis. It is not my intention to discuss the stress pattern of complex words in detail here, so I will not discuss these cases any further.

The second and the third row of examples in (103) show schwas that precede the main stress. Following Rischel (1982), I assumed in chapter 4

that such syllables are adjoined to the stress foot by means of a **stray syllable convention**. I also argued in chapter 4 that, instead of the structure that I proposed for these words in (103), it is possible to say that syllables that precede the stress foot are grouped into a second foot that is adjoined to the stress foot by means of the convention just mentioned (see 80 and 81 in chapter 4):

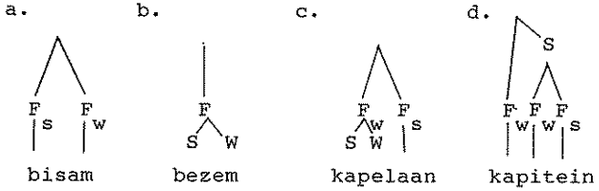
(104)



Structures of this type, I argued, might be used to characterize an antipole stress, i.e. a secondary stress which is located on the syllable that is furthest away from the syllable that has main stress. It is true that syllables with schwas in initial position, separated by one syllable from the syllable that has main stress, are relatively prominent. In terms of rhythm, I feel no difference between **begeleiden** (with an initial schwa) and **fenomenen** (with full vowels in every syllable, except the last). On the other hand, it is traditionally claimed that syllables with a schwa are not suitable locations to anchor a pitch accent (ignoring emphatic speech). If this is so, it would be undesirable that a syllable with a schwa is the head of the antipole stress foot. When the syllables that precede the main stressed syllable contain full vowels, however, there is no objection against grouping these syllables into a second foot, of which the leftmost daughter is labelled S.

Let us now investigate the further consequences of adopting the HM analysis. The choice of a quantity determined unbounded foot entails that each full vowel requires a separate foot. This also leads to a significant difference between this analysis and the preceding one. Consider the following examples:

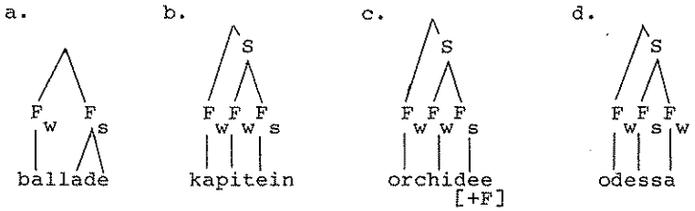
(105)



In the previous analysis each pair will be assigned the same prosodic structure (i.e. that of **bezem** and **kapelaan**).

The following examples seem to suggest that the LCPR does relevant work in this analysis too:

(106)



With respect to bisyllabic words we predict in all cases the structure that was assigned to **bisam** (in 105a), i.e. two monosyllabic feet, labelled SW by the LCPR.

A tacid assumption on which this alternative analysis is based, is the following. To account for words like **odessa**, with penultimate stress, foot assignment must be iterative, i.e. it is crucial that, after assigning a foot to the final syllable, preceding syllables with a full vowel are assigned a foot as well. This implies that the alternative analysis does not conform to the theory proposed in chapter 4, because I argued there that foot assignment need not be an iterative rule in that theory. However, if we apply foot assignment non-iteratively, we arrive at the following structure for a word like **odessa**:

(107)

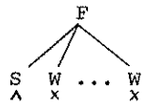
I.e. the stress rule, if applied non-iteratively, assigns a stress foot to the final syllable and the preceding syllables are grouped into an antipole stress foot, according to the procedure discussed above (and in chapter 4 in more detail).

I will now suggest a revision of the HM analysis that will allow me to maintain the claim that stress rules apply non-iteratively. Let us recall that the type of foot employed by HM differs in two ways from the type of foot that was employed in the first analysis:

(108) 1st analysis 2nd analysis

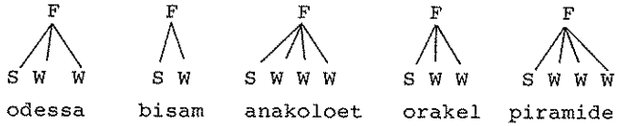
The first difference involves the number of syllables that may be grouped into one foot and the second difference involves the type of syllable that is allowed to occur in weak position, i.e. in the HM type of foot the syllables that occupy the weak position must be light (i.e. contain a schwa), whereas in the other foot type both light and heavy syllables are allowed to occur in weak position. It is possible then to distinguish still another foot type, i.e. one that differs in one respect only from the foot type used in the first analysis:

(110)



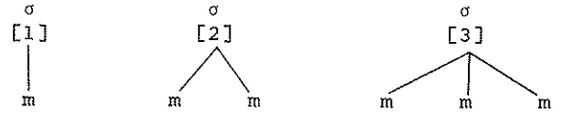
I.e. a foot type that is unbounded and that allows only heavy syllables in strong position and both heavy and light syllables in weak position. With the analysis proposed in the previous section, this revised HM proposal shares the fact that we adopt a foot type that does not occur in the standard inventory. Without further adjustments, this foot type is not going to be useful, however, because it predicts that stress will fall on the first syllable of the word that contains a full vowel:

(111)



There is a very simple way to formulate a condition that prevents too many syllables with full vowels to be grouped into one foot. Suppose we take the idea of "syllable weight" seriously and say that each prosodic category is assigned an index that specifies its weight. We might say that the weight index can be derived compositionally from the number of morae that a syllable contains:

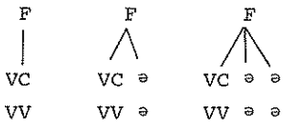
(112)



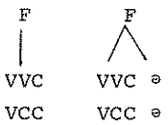
Assuming the mora theory, the scaling of syllables can thus be derived and need not be stipulated by means of an independent weight scale. Let us furthermore assume that the compositional computation of weight values is carried through above the syllable level, which means that feet will be assigned values as well.

It is now possible to say that feet have an upper weight limit, being [4]. In this way we "lose" the possibility to make full use of the fact that the foot is unbounded. There can be at most two schwas following a full vowel (2+1+1=4), but this may not be a bad result because, as I showed above, sequences of more than two schwas are subject to various deletion processes. We only allow the following feet:

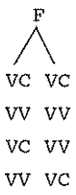
(113) a.



b.

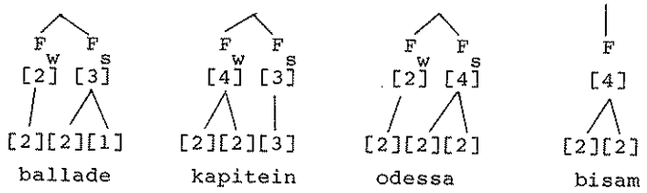


c.



In (114) it is demonstrated what structures we now assign to the various classes of words:

(114)

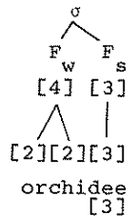


The final two syllables of **ballade** can be combined into one foot, but it would not be possible to include the first syllable as well. In the case of **kapitein**, ending in a superheavy syllable, the foot can only comprise the final syllable. In the case of **odessa** and **bisam** it is possible to combine the two final syllables into one foot, and this is where the difference with respect to the HM analysis is revealed.

Making use of weight indices and the notion of an upper weight limit for feet allows me to retain the idea that foot-assignment is non-iterative. In addition, weight indices have another advantage. In section 5.3.1.3. I promised to come back to the (unexplained) fact that superheavy syllables (i.e. VXC) behave just like branching feet. In that section I rejected the "easy way out" of simply labelling such syllables with a node label F. Observe now that within the present analysis the equivalence of superheavy syllables and branching feet has been explained without questionable assumptions about constituent structure. A superheavy syllable acts like a foot, because its weight index is almost the same as that of a maximal foot.

With respect to words like **orchidee**, with exceptional final stress, I will assume that the final syllable is lexically assigned a weight index [3], thus accounting for the fact that these syllables cannot be combined into a foot with the preceding syllable:

(115)

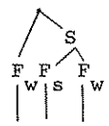


Alternatively, we might say that such words are stored in the lexicon with a final monosyllabic foot.

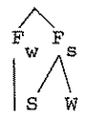
Another consequence of the present analysis is that the LCPR becomes virtually superfluous. In the original HM analysis, this labelling rule is

crucially invoked to handle words like **odessa**,which are assigned three monosyllabic feet, of which the final two must be labelled SW (see 116a). In the present analysis this is no longer necessary, since the final two syllables are grouped into a single foot, labelled SW (cf. 116b):

(116) a.

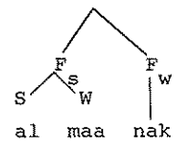


b.

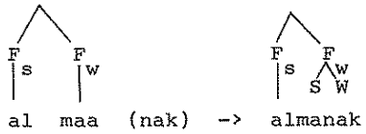


It is not the case, however, that the analysis that was presented in section 5.3.1.3. and the HM analysis, both in its original and in its revised form, have the same descriptive coverage. A notable difference between the two analyses involves the VV/VC distinction. The reader will have noticed that this distinction is ignored in the analyses that have been presented in this section. Within the original HM analysis, this follows from the fact that each syllable with a full vowel constitutes a foot. It is therefore not possible to arrive at a mismatch (i.e. VV-VC), because we cannot combine a VV syllable and a VC syllable into one foot in the first place, even in the order VC-VV. A direct consequence of this difference is that a certain class of words having antepenultimate stress moves from the class of "regular" cases to the class of "exceptions". Recall that the first analysis correctly predicts that we find initial stress in trisyllabic words ending in the sequence VV-VC#. In the original HM analysis we can only account for antepenultimate stress by saying that the final syllable is extrametrical:

(117) First analysis



Second analysis



To capture the fact that a certain generalization can be made with respect to words ending in the sequence VV-VC, we might formulate a redundancy rule saying that a final VC is extrametrical if it is preceded by a VV syllable. This move, however, involves the claim that extrametricality rules can be context-sensitive, and thus increases the power of this device considerably.

In the revised HM analysis two syllables with a full vowel can be combined into one foot, but since both VV and VC syllables have the same weight index, we do not block the possibility of a foot in which a VV and a VC syllable cooccur:

(118)

Let us investigate the "damage" by making precise here what was gained by treating VV and VC as being of different weight. The class of cases with antepenultimate stress was split up into a class of real exceptions (for which we invoke extrametricality) and a class of words that is "revealed" as regular. However the generalization that words ending in VV-VC# receive antepenultimate stress faces a class of exceptions containing words of this type that bear penultimate stress. The number of exceptions of this type must be subtracted from the number of words that have moved into the class of regular cases. Performing the required calculation leads to the conclusion that the first analysis has slightly fewer exceptions than the second analysis. All things being equal one might therefore hold the opinion that there must be a weak preference for acknowledging the VV/VC distinction and hence for the first analysis.

The price we pay if we neglect the VV/VC distinction is that words of the type **almanak** with initial stress must be stored with an extrametrical final syllable. I mention here a general consideration which suggests that we gain a more constrained theory of stress assignment, if we are prepared to neglect the VV/VC distinction. In chapter 4 we discussed all types of stress systems that are known to exist. Two large classes were distinguished. In one type of system main stress could be located anywhere in the word (the unbounded type), whereas in the other type of system main stress was assigned to one of the two or three peripheral syllables. The first analysis that was offered suggests that the three peripheral syllables are relevant, but there is a wrinkle. In the cases where stress is on one of the three peripheral syllables (e.g. the **Latin** system) it is always the case that the final syllable is "invisible". This explains why its composition is of no relevance. In the analysis, presented in section 5.3.1.3. however, we crucially must know how the final syllable is composed. This suggests that this analysis is on the wrong track.

A second consideration that is in favor of the alternative analysis, in

which we ignore the VV/VC distinction, is that the LCPR is no longer necessary. The labelling of word trees is always WS, and this, as I argued above, follows from the fact that syllables preceding the stress foot, whether or not they are combined into a second foot themselves, are adjoined to the stress foot by means of a general convention.

A third advantage of the alternative analysis involves the use of a weight scale. A positive consequence of ignoring the VV/VC distinction is that the use of a weight scale becomes unnecessary. The weight differences of light, heavy and superheavy syllables can be derived compositionally from their internal make-up, i.e. from the number of morae that they contain. In this respect the alternative analysis is more economical since no use is made of an **ad hoc** device (a weight scale), invented to explain the facts of Dutch stress.

On the basis of these considerations I believe that the revised HM analysis represents an improvement of the analysis that was presented in the previous section. The former analysis gives a more principled account of the prosodic behavior of syllables with a schwa and makes no use of an independently stated weight scale. All this compensates for the fact that this analysis misses what seems to be a rather marginal generalization.

5.3.2. Extension of the analysis to adjectives and verbs

The stress pattern of adjectives and verbs is not different from what we have found for nouns, although verbs are not very interesting because Dutch has only a handful of underived verbs with more than one full vowel. Adjectives that have more than one full vowel end in practically all cases in a superheavy syllable. These adjectives have final stress. The few remaining cases have final stress as well. Consider the following data:

(119)

abrupt	absurd	acuut
affreus	apart	apert
banaal	bankroet	brutaal
clandestien	compleet	copieus
curieus	decent	delicieus
direct	divers	dociel
egaal	enorm	exact
extern	extreem	fameus
feodaal	feudaal	fideel

frivool	funest	futiel
genereus	immuun	inert
infaam	intens	intern
intiem	jaloers	joviaal
kaduuk	kardinaal	kordaat
labiel	lateraal	legaal
lucratief	markant	massief
melaats	miniem	minuscuul
mobiel	modern	naief
obsceen	obscuur	opaak
oraal	ovaal	paraat
parmant	permanent	pervers
pikant	pittoresk	pompeus
precair	precies	profaan
recent	reciprok	riant
robuust	scabreus	secuur
seniel	sereen	serieus
sonoor	spontaan	stabiel
steriel	subiet	subliem
subtiel	uniek	vicieus
viriel	virtueel	

Adjectives ending in a sequence full vowel-schwa also conform to the analysis. They have penultimate stress:

(120)	formidabel	illuster	integer
	macaber	liquide	luguber
	morbide	sinister	

I know of only three adjectives ending in VC (all having final stress) and no examples ending in VV:

(121)	bizar	kapot	koket

There is no objection then to saying that the analysis motivated on the basis of a corpus of underived nouns is valid for the whole underived vocabulary.

5.4. Conclusions

In this chapter I have compared several analyses of Dutch stress, and finally argued in favor of an analysis that conforms to the proposals that were advanced in chapter 4. It has been shown that stress placement is sensitive to syllable structure, and in particular to the number of morae that a syllable may contain. The particular proposals with respect to syllable structure in Dutch that were advanced in chapter 3 are also supported then by the analysis of stress in Dutch monomorphemic words.

The present analysis is incomplete in the sense that I have said little about the placement of stress in the derived vocabulary. This is of course an important issue but I believe a proper treatment requires a separate monograph.