

The Phonological Word in Tilburg Dutch

Government Phonology and a city dialect of Dutch

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The Phonological Word in Tilburg Dutch

Government Phonology and a city dialect of Dutch

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Faculteit der Geesteswetenschappen

for my father († 1997)

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I regret that my parents are not with us anymore. They both would have been happy for me – maybe most of all my father, who always wanted to write his Ph.D. but who was so busy with this family, his work and politics that he never got round to doing it. I dedicate this book to him.

1 Introduction

The phonological word constitutes a domain within which certain phonological regularities apply. In this book I explore some topics specifically related to the domain of the phonological word in the dialect of Tilburg Dutch. These topics include the representation of laxness and its relation to word structure, the analysis of monophthongs and diphthongs specifically in relation to demands on word-final structures and the phonological word in relation to morphology.

In all of these cases, it appears that, on the one hand, close observation of the data stimulates progress in the theory while, on the other hand, the theory itself stimulates the understanding and analysis of the data. The conclusion I draw is that, if a theory and linguistic data are in conflict, as Government Phonology (GP) and Tilburg Dutch seem to be in some of these cases, it is worthwhile to investigate these confrontations and not to simply let go of the theory. In other words, the fact that a theory imposes limitations on possible analyses is an advantage one should not hesitate to make use of. One such confrontation between framework and data concerns the representation of the Tilburg vowel system. It appears that the GP view of laxness does not agree with a certain representation of the vowel system. Interestingly, the direction in which GP forces us, leads to interesting conclusions. On the other hand, Tilburg data indicate that topics such as the requirement of words to end in consonants still have to receive an analysis in GP. In such a case, the confrontation between the framework and the data demonstrates the need for supplementation of the theory.

GP forms the theoretical basis of this dissertation. In Chapter 2, a presentation of the most relevant parts of the theory is given. GP is an explicitly formulated and restrictive phonological theory with a certain focus on phonotactics. In Government Phonology a segment's position within the phonological structure is connected with the phonological phenomena it can undergo. A phonological domain (e.g. a word, a foot or a rhyme) is considered to be principally asymmetric in character: some positions within a domain are stronger and can therefore allow for, or license more segmental material than other positions. Phonologically dependent or weak positions, on the other hand, have to be licensed by strong or head positions and consequently prefer not to contain too much segmental material.¹ An example of a strong position is the accented nucleus in a word whereas the unaccented nucleus

¹ GP was not the first to make use of important notions such as head, dependents, licensing etc. in phonology. Harris (1994) refers to various authors who refer to licensing relations internal to the prosodic hierarchy. These include Anderson & Jones (1977) and Anderson & Ewen (1987) (licensing expressed in terms of dependency), Liberman & Prince (1977) and Kiparsky (1979) (licensing in terms of strong/weak labelling of metrical and syllabic structure).

is a weak position. Accordingly, we expect to find vowels such as /o/ or /e/ in the head nucleus and almost empty vowels such as schwa in the dependent one.²

There are several versions of GP theory. I base myself on Kaye (1990), Kaye et al. (1990) and, most of all, on Harris (1994, 1997). GP is basically a theory concerned with general phonological principles shared by languages. Phenomena are accounted for through the use of representations and the licensing relations these contain. This is the central part of the theory. With respect to variation between languages, this is traditionally treated by parameters. These two parts are independent to a large extent. It has been argued that instead of parameters one can use OT constraints with the same ease and the same results (see for instance the discussion of Polgárdi (1998) and Rowicka (1999) in Chapter 2, section 2.5). Parameters and constraint ranking perform the same function, that is, the function of capturing language variation. Therefore, besides the GP theory on representations I will sometimes make use of Optimality Theory.

The GP way of looking at phonological phenomena has proven insightful, for instance for English (cf. Harris 1994) and French (cf. Charette 1991). I will argue that it is also valid for Tilburg Dutch, the dialect from which the data for this dissertation are taken.³ My own roots are not in Tilburg - [tɪlbyrəx] when pronounced by dialect speakers themselves - and not even in the province of Noord-Brabant. My interest in this dialect originally was accidental but grew when I started to study the dialect more closely and from a GP-background. The fact that I do not originate from Tilburg brings along some limitations: I am a speaker of Standard Dutch and my intuitions on Tilburg Dutch are nil. Furthermore, my concentration on the mutual influence of the study of dialect data and that of theory, made me decide not to collect any data myself. Instead, my information comes mainly from a phonological description of this dialect by Dirk Boutkan and Maarten Kossmann from 1996. The authors both were linguists⁴ and their descriptive phonology of this dialect has been the basis of this dissertation, as far as the data are concerned. The description of Tilburg Dutch by Boutkan & Kossmann in turn was based mainly on the dialect as it was spoken by Dirk Boutkan, who was a native speaker of Tilburg Dutch. I will generally restrict myself to his version of the dialect. In Boutkan & Kossmann (1996:i) the authors note that his dialect shows little influence from Standard Dutch and that Dirk Boutkan's intuitions were regularly checked with other speakers of the dialect. Besides the more descriptive study by Boutkan and Kossmann (1996), Van Oostendorp (2000), who proposes a recent analysis of some aspects of the Tilburg phonological system, is also referred to intensively. A useful

² Vowels such as /o/ and /e/ are considered to be complex in GP because they consist of more than one element. Elements are the ingredients of which a segment is made up: /e/ is represented by the elements I and A.

³ Comparisons are often made with Standard Dutch as well as sometimes with other Germanic languages or dialects.

⁴ Both authors *were* linguists: I regret very much to say that Dirk Boutkan died in January 2002. I am grateful for his helpful and stimulating comments in the earlier stages of my research.

dictionary of Tilburg Dutch was published in 1993 (Van Rijen 1993) and has been used besides Boutkan & Kossmann.

Looking at the map of the Netherlands, we see Tilburg more or less in the middle of the province of Noord-Brabant, which itself is in the south of the country. According to Weijnen (1987), we can divide the area of Noord-Brabant into two main dialect parts: Eastern and Western, with a transitory area in the middle (belonging more to the East than to the West). Tilburg belongs to this middle/eastern dialect group.

Map 1: the Dutch language area



Maybe one of the most striking features of the Tilburg Dutch phonological system is the fact that it has long lax vowels, whereas in the standard dialect these are restricted to loanwords. These long lax vowels are discussed at length in the chapter on the vowel system, Chapter 4. As far as the consonants are concerned, there is very little difference between them and those found within Standard Dutch. The stress systems are similar, basically trochaic, as well.

Below I will briefly sketch a case in which the theory, by its very restrictiveness encourages further understanding of a certain phonological topic. This concerns the problematic representation of word-final syllables with lax heads. It is demonstrated that GP offers interesting ways of looking at this dilemma.

1.1. Word-final ambisyllabicity

This subsection highlights a dilemma: the usual analysis of certain data is not feasible in the framework used. It concerns the representation of syllabic structure. Tilburg Dutch not only has the opposition between long or tense vowels on the one

hand and short, lax vowels on the other (as is commonly found in Germanic) but also one between short, lax vowels and long, lax vowels. A representation (in terms of features) of the vowel system as presented in Van Oostendorp (2000) can be found in (1).

(1) The Tilburg Dutch vowel system

	Tense	Short lax	Long lax
High	i y u		
Mid	e ø o	ɪ ʏ ɔ	ɪː ʏː ɔː
Low		ɛ œ ɒ	ɛː œː ɒː

(Van Oostendorp 2000:120, with adaptations)

The long, lax and the tense vowels behave in a similar fashion as far as phonotactics is concerned. Whereas long, lax and tense vowels can occur in syllable-final position, short, lax vowels cannot. Short, lax vowels always have to be followed by a tautosyllabic consonant. For Standard Dutch, some examples are given in (2).

- (2) *hɪ.at but hɪ̣.at ‘hiatus’
 *ɫɑ but ɫɑ̣ ‘drawer’

(Van der Hulst 1985:105, in my transcription)

Partly because of linguistic facts, partly because of theory-internal considerations, GP assumes that a phonetically word-final consonant is in an onset structurally followed by an empty nucleus. By way of illustration, we take some phonetically monosyllabic words such as Standard Dutch *meet* /met/ ‘measure (1 s.)’. In GP such a word is bisyllabic, the phonetically final consonant being in the onset of the second syllable, followed by an empty vowel in the nucleus:

- (3) a. me.t0 *meet* ‘measure (1 s.)’
 la.t0 *laat* ‘late’
- (3) b. mɛ.t0 *met* ‘with’
 lɑ.t0 *lat* ‘slat, strip’

For words such as those shown in (3a), that is, words ending on a tense/long vowel and a consonant, this premise has gained the acceptance of many (for Dutch for instance Zonneveld 1993 and Van Oostendorp 2000). For words ending in a lax/short vowel and a consonant this analysis is more controversial because it would imply that such words should end in an ambisyllabic consonant. That is, considering the fact that a short lax vowel needs to be followed by a consonant in the same syllable (cf. */hɪ.at/, */lɑ/ in above) and considering the fact that in GP a phonetically word-final consonant occurs structurally in the onset of a following empty nucleus, a (phonetically) CV_{lax/short}C word actually *must* be a CV_{lax/short}CC0

word phonologically.⁵ If such a word does not end in an ambisyllabic consonant, either the phonetically word-final consonant cannot be in the onset of an empty syllable or the short, lax vowel is not followed by a consonant in the same syllable. In other words, the theory dictates a CV_{lax/short}CC0 structure (a bisyllabic structure, with an empty second syllable) for any simple Dutch monosyllabic, lax-vowel word. This is demonstrated in (4).

- | | | | |
|-----|--------|------------|----------|
| (4) | met.t0 | <i>met</i> | ‘with’ |
| | lat.t0 | <i>lat</i> | ‘slat’ |
| | rot.t0 | <i>rot</i> | ‘rotten’ |
| | pit.t0 | <i>pit</i> | ‘seed’ |

I will argue that a rejection of the theory is not the way the problem must be solved. On the contrary, in Chapter 6, I provide arguments for an ambisyllabic representation of word final consonants.

1.2. Organisation of the thesis

The main line of argument is as follows. In Chapter 2, the framework used in this thesis is set out. In the first place I discuss the phonological elements used in the representation of vowels and of consonants. The subject of laxness is briefly introduced; it is studied more thoroughly in Chapter 4 because the way laxness is represented in GP has far-reaching consequences for the analysis of the vowel system in this dialect and consequently needs arguments in defence of this view. Furthermore, the representation of word-final consonants in GP is considered, as well as that of empty nuclei. These aspects are reviewed in depth, because of the effects of these representations for the analysis of word-final consonants, following lax vowels.

In Chapter 3 the constraint FINAL-C (McCarthy 1993) is discussed. This constraint requires words to end in a consonant and it is defined in such a way that it refers to horizontal, sequential segmental material and to vertical constituent structure. This view of the constraint in question – a view in which explicit reference is made to structural relations – is the outcome of a discussion of French loans in Tilburg Dutch and the related question of whether we need to refer to structural relations at all. FINAL-C also has strong connections with the concept of sonority, a notion discussed in section 3.5.4. French loans might possibly be considered to be exceptions to FINAL-C as well as function words and exclamations. It will however be argued in this chapter that, whereas the group of French loanwords are exceptions, function words and exclamations are not. The fact that these latter words often end in vowels can be understood if one realizes that FINAL-C refers to

⁵ Piggott (1999) assumes that there are languages in which words end in codas as well as languages in which words always end in onsets, when phonetically consonant-final. Note, however, that according to his criteria Dutch would be a language which ends in onsets.

phonological words, whereas function words are not parsed as such. Exclamations cross-linguistically behave oddly, in the sense that they do not behave like phonological words either. Because /au/ behaves somewhat differently from other vocoid sequences, Tilburg Dutch /au/ as well as the Standard Dutch one are discussed here as well. My conclusion is among other things that /au/ in Standard Dutch should not be considered to be a diphthong at all but a vowel+glide sequence, contrary to the true diphthongs /ei/ and /œy/ in Standard Dutch. Since FINAL-C is a controversial constraint, attention is paid to supporting evidence from Tilburg Dutch itself as well as from other languages: from English, Dutch dialects and other non-European languages. FINAL-C is, in some ways, still a kind of descriptive label for a phenomenon which is observable in many languages. The discussion in this chapter is partly meant to provide a deeper understanding of the phenomenon, so that eventually it can be included in an insightful manner in GP theory.

Chapter 4 deals with the Tilburg Dutch vowel system. Special attention is directed towards the representation of the lax vowels /ɪ, ʏ, u/. Two competing views regarding the representation of these vowels are presented, a Mid-Vowel analysis in which these vowels are considered to be of the same height as mid, tense /e, ø, o/, and in the second place a High-Vowel analysis which considers these vowels to be of the same height as the high, tense vowels /i, y, u/. In section 4.3 I discuss the special status of laxness in GP. The problem, which this view creates for a Mid-Vowel analysis of the vowel system is demonstrated in 4.4. I will show in 4.5 that a High-Vowel analysis gives a more adequate analysis of the Tilburg vowel system within GP. Arguments for both analyses are reviewed. The conclusion will be that no clear empirical evidence can be found for one of the two hypotheses but that GP forces us to adopt the High-Vowel analysis. It is shown that this High-Vowel analysis does indeed account for the data in question, specifically for the tense-lax vowel alternations in Tilburg Dutch. The High-Vowel analysis, which is the one adopted in this thesis, can be subdivided into two separate analyses. These will be examined in 4.8.

Chapter 5 deals with the way morphology is represented in phonology. The working of FINAL-C is a clear indication of the existence of analytic domains or internal word-domains in Tilburg Dutch. FINAL-C is parameterised for the internal word domain, the word without inflectional affixes. Inflectional affixes affect vowel length; this can be seen as the result of the fact that whereas empty nuclei at the end of the external, largest word-domain are licensed in Tilburg Dutch, this is not the case for internal word-domain-final nuclei. Because of this such nuclei have to be licensed by the head of their domain through Trochaic Licensing. However, without vowel shortening this nuclear head would have to license the empty nucleus in the internal word-final position and the dependent position within the nucleus itself (because in a long vowel, the first position licenses the second, dependent one). This is impossible because one position cannot license two positions at the same time. Vowel shortening in Tilburg Dutch thus results from the lack of parametrical licensing of internal word-final, empty nuclei in combination with the working of Trochaic Licensing. It does not result from Closed Syllable Shortness. Vowel shortening with derivational suffixes is also considered: we find variation here

because lexicalisation is a gradual process. When derivational forms and compounds are lexicalised, we generally find short vowels and when they are not, the vowels remain long.

The subject of word-final ambisyllabicity is discussed in Chapter 6. The proposal that words which end in a short lax vowel and a consonant structurally end in an ambisyllabic, phonetically short consonant is a result of two other proposals, found in this thesis. The first is the GP proposal that final consonants are onsets and not codas. The second one is the observation that short, lax vowels have to be followed by tautosyllabic consonants. These two demands cannot be combined in a satisfactory fashion, unless we assume that such words with lax final vowels end in ambisyllabic consonants. In order to be able to consider such a proposal, the notion of ambisyllabicity in general has to be accepted. In 6.3 arguments in favour of an analysis of a certain class of Dutch words based on ambisyllabicity are reviewed, followed by arguments against the notion of ambisyllabicity, mainly by Harris (1999). The conclusion is that there appear to be no reasons not to accept ambisyllabicity since it does not result in a weakening of the theory (nor does it appear to be unnecessary). It is demonstrated that part of the problem might be caused by the fact that ambisyllabicity is unjustly and unnecessarily used for the analysis of English. In 6.4 word-final ambisyllabicity is dealt with, with special attention to the topics of Final Devoicing and stress. Both of these are argued to be unconvincing counter-arguments against word-final ambisyllabicity.

2 Theoretical background

2.1. Introduction

The main part of this chapter is dedicated to a discussion of Government Phonology topics which are most relevant to this thesis. Optimality Theory (OT) plays a less fundamental role in the present work. It will only play a major role in the chapters on diphthongs and morphophonology. As will become clear below, contrary to GP, OT is not very concerned with representational issues – both theories can therefore be combined without objection. The GP view on segmental representation is discussed in 2.2, with special attention to the representation of laxness. Section 2.3 is concerned with constituent structure. In 2.4 the morphology-phonology interface is discussed, while in 2.5 I consider the possibilities of combining the theories of GP and OT.

Optimality Theory has been developed in the 1990s as a theory that considers Universal Grammar to be a set of constraints on representational well-formedness (Prince & Smolensky 1991). It is neither necessary nor possible for a grammar of a language to satisfy all constraints since constraints are often conflicting. To solve these conflicts, constraints are ranked in a dominance hierarchy: the candidate output-form that satisfies the highest-ranking constraints is the optimal form — the fact that lower-ranked constraints are violated does not matter. Grammars of languages and dialects differ in the ranking of these constraints. An (imaginary) example is the case of two languages, which differ among other things as to whether words have to begin with a consonant or whether such an onset consonant is not obligatory. In this imaginary mini-grammar, two constraints are involved. One is ONSET and the other is FAITH. ONSET penalizes words which do not begin with an (onset) consonant but with a vowel and FAITH penalizes all changes (by way of deletion or epenthesis) of an output form as compared to the input. Thus, the difference between these two languages does not lie in a difference of constraints, but in a difference of ranking. In language X, ONSET is ranked highest in the hierarchy, implying that for this language it is important to have all its words beginning with a consonant, even if this means that an epenthetic consonant is added (or a vowel is deleted). In language Y, the hierarchy is the other way around: in this language it is apparently more important that the output is the same as the input, without any deletion or epenthesis, even if this is at the cost of having a word start with a vowel. The two columns below the input give possible candidate output forms. The relevant constraints are given on the top-row of each column. A * marks a violation of a constraint while an exclamation mark indicates the fatal character of a violation. For instance, even if in the form VC in (1a) FAITH is satisfied, the violation of the highest ranked constraint is fatal. The pointed hand indicates which form is the actual output. In (1a) the mini-grammar of language X is shown: this language does not allow for onset-less words – it would probably insert [ʔ] or some other (almost) empty epenthetic consonant, represented by a bold-face C.

(1) a.

Input: VC	ONSET	FAITH
☛ CVC		*
VC	*!	

Language Y does not require its words to begin with a consonant as much as it penalizes any change - be it epenthesis or deletion - to the input.

(1) b.

Input: VC	FAITH	ONSET
CVC	*!	
☛ VC		*

Whereas OT is pre-eminently a theory dealing with the interaction of constraints without being much concerned with their representation, GP is mainly a theory concerned with representations. In GP, phonological phenomena are generally considered to be consequences of the positions which the segments in question occupy in the phonological structure. Harris (1994) shows for instance that the reason why, in some English dialects, the /t/ is pronounced as a glottal stop ([ʔ]) foot-internally but never foot-initially is the fact that foot-initially the onset position is relatively strong as compared to that of the foot-internal onset. This is why an almost empty segment [ʔ] is found in this weak position, and the segment [t], which is more complex, in the strong position and not vice versa.¹ To make this more concrete, the phonological structure of the words in question accounts for the fact that in many dialects of English *pity* is pronounced as [piʔi], while *tummy* is never pronounced as *[ʔummy]. After all, in *pity* the *t* is foot-internal (it does not occur in the stress-receiving syllable), which means that it occurs in a weak, dependent position. This position is most suitable for segments which do not consist of much material, such as glottal stops. On the other hand, in *tummy* the *t* is in the onset of the stressed syllable and therefore foot-initial. The foot-initial position is a position which prefers more or stronger material since, as we will see below, it has to license other positions. A comparatively weak segment, such as the glottal stop, is not able to do this. Consequently, foot-initial consonants are weakened only rarely.

Another illustration of the GP approach is the case of Dutch lenition. In a lexically conditioned process, Dutch /d/ can be pronounced as [j] in certain (weak) positions and in an informal register (cf. 2).

¹ The subject of the internal representation of coronals, including /t/ is a complicated one. Sometimes coronals behave as 'regular' consonants while in other cases they behave as almost empty consonants (cf. Chapter 3, section 3.5.2.2)

(2)	rodə / rojə	‘red’
	radə / rajə	‘to guess’
	dodə / dojə	‘dead’
	dədə / dejə	‘did (pl.)’

Word- and foot-initially, that is, in a strong position, this never happens, as is illustrated in (3).

(3)	dədə / *jedə / *jejə	‘acts’
	dodə / *jodə / *jojə	‘dead’ (noun or adj.)

As in the case of English [t] and [ʔ], the second consonant in (2) occurs in the relatively weak foot-internal onset position and is therefore inclined to weaken; this is not the case when the consonant is foot-initial (cf. 3).

2.2. An elemental framework

In GP segments are made up of elements.² Elements are in some ways like ‘traditional’ features but they are considered to be interpretable independently of other elements. This implies also that the phonological primitives of GP, the elements, are fully interpretable phonetically. For instance, the vowel /i/ is the independent manifestation of the element I. Depending on the vowel system in its totality, an /e/ would be something like (I,A) reflecting the fact that it is an open version of a front vowel. In this sense, GP elements are like chemical elements: H stands for hydrogen, O stands for oxygen and in the combination of H₂O it stands for water; in a similar way I is the representation of /i/, A is the representation of /a/ and together they stand for /e/.

This apt comparison demonstrates that, as complex H₂O cannot exist without its ‘ingredients’, oxygen and hydrogen, so the complex of (I,A) cannot exist without independently occurring I and A. This means that the vowel /e/ cannot occur in a language which does not contain the vowels /i/ and /a/. This is in accordance with the facts. Furthermore, the fact that the vowels /i/, /a/, and /u/ are the universally unmarked vowels is reflected by the fact that they have the simplest internal structures of all segments: they are made up of one element, I, A, or U, respectively. Their unmarked status is indicated by the lack of complexity of the segment, that is, in the small number of elements the segments contain. This is of course not the case in a system with features. Such a system would reflect no such thing: depending on the language in question, /i/ or /e/ contain more, less or the same amount of features.

² Similar lines of thought can be found in Dependency Phonology (Anderson and Jones 1974, 1977; Anderson and Ewen 1987) and Particle Phonology (Schane 1995).

The phonological processes which GP allows for, are restricted in kind and number. Elements can undergo fusion or fission. For instance, two adjacent elements can become fused in one segment (e.g. /ai/ > /ε/) and elements can undergo the opposite, fission (i.e. /ε/ becomes /ai/). As a result of this, common processes such as diphthongisation and monophthongization can be analysed in an insightful manner in this theory.

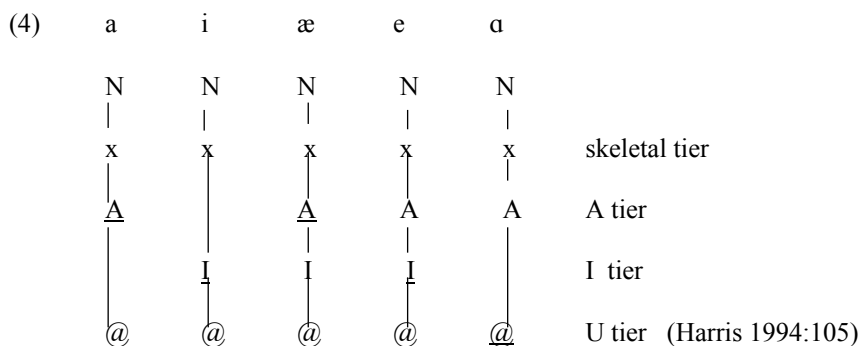
The number of elements is limited; headedness is used (through underlining) to create a larger potential of distinctions among segments. All phonological relations in GP are asymmetrical. In a segment, there is always one head and one or more dependents: for instance, in the example above, the segment /e/ consists of (I,A) - the underlined I is the head of the expression, reflecting the fact that the /e/ is an open version of a front vowel. In the same language, the somewhat more open segment /æ/ would consist of (I,A): in this case, the A element would be preponderant.

2.2.1. Vowels

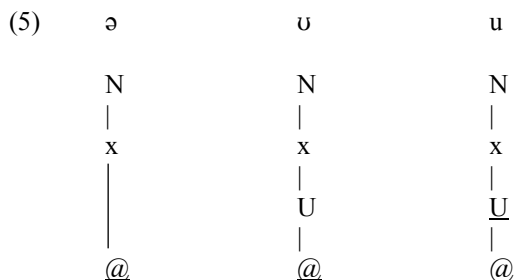
For the representation of vowels we need the elements I, A, U and @; I standing roughly for frontness, A for lowness, U for roundness, and @ for laxness. These are the ‘ingredients’, which - on their own or in combination - represent all possible vowels. A segment which consists of the single element I, is the primary vowel /i/. A and U on their own stand for the peripheral vowels /a/ and /u/.³ The other vowels besides /i/, /a/, and /u/, are combinations or fusions of elements. For instance, /e/ is (I,A), while /æ/ is (I,A) (in a language where this vowel phonologically is the lower version of /e/).

The GP representation of laxness (by means of @) is different from that of other features or elements in the sense that elements such as U, A, or I make their contribution to the character of the segment in question whenever the element is present in the representation of a segment. To have this influence on the segment, it is not necessary to be the head of the expression. On its own, @ is the representation of the cross-linguistic prototypical neutral vowel, often schwa-like in character. In combination with other elements, there are two possibilities. @ is assumed to be present as a kind of baseline in every segment but it only contributes to the expression as a whole when it is the head of the expression, and is consequently underlined. Openness, for instance, is represented by the element A - an element which has its influence on the segment in question whether it is head of not. RTR/lax/centrality, on the other hand, is represented by @, which is the head of the expression by definition. This is illustrated in (4).

³ Generally (lax) A is considered to be the instantiation of the primitive element A (cf. Kaye et al. 1990). In Dutch, however, there is both tense /a/ as well as lax /a/. Consequently, I will consider tense /a/ to be the instantiation of the A element in this thesis.



(4) shows that the elements I and A make their contribution whether they are heads or not: the difference between /a/ and /æ/ for instance is due to the addition of a non-underlined (so non-head) I. On the other hand, the centrality/lax/RTR element @ is present in every segment but has, except in the representation of /ɑ/, no contribution to make. After all, it is not a head and its presence as a base line is therefore not felt; this is why it is customary only to mark the presence of @ in a representation when it is the head. When the element for laxness, @, is not the head of a representation but is merely present without exerting any influence, it is generally assumed to occupy a non-occupied tier (in (4) the U tier).⁴ In example (5) below, we see another instance of the influence of @ when it is the head: together with a dependent U it represents /ʊ/, and without another element it stands for the neutral, schwa-like segment.



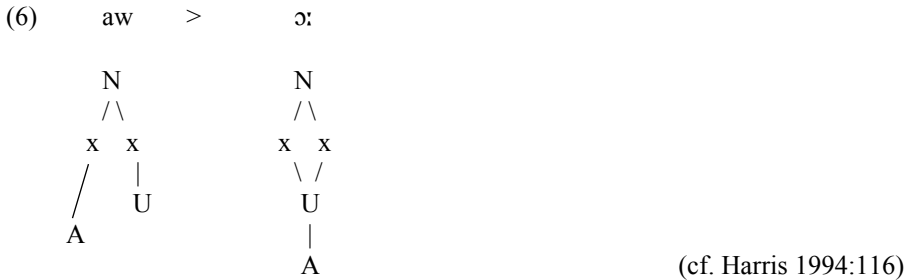
It is important to realise what the implications are of the way laxness is represented in this framework. The fact that @ only makes a contribution when it is the head implies that lax vowels always have a @ head.⁵ A crucial consequence of this special status of @ is the reduced ability to make contrasts among lax vowels. Headedness distinguishes between the tense vowels /æ/ and /e/ in (4) above.

⁴ One may wonder on which tier @ would be located if every tier is occupied by I, A, and U.

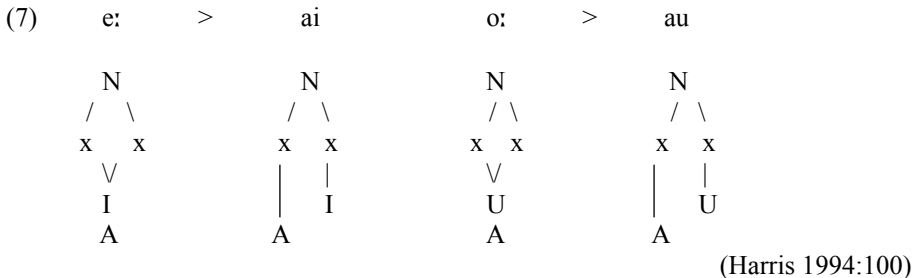
⁵ However, see Chapter 4, section 4.3, where I will briefly discuss Cobb (1997), who argues that lax vowels are headless.

Obviously it cannot perform the same function among lax vowels, since with these vowels the role of headedness is taken by @.

The use of elements can be clarifying in the analysis of phenomena such as vowel reduction as well as in the analysis of diphthongisation or monophthongisation. In an elemental framework we do not have to add or delete feature-matrices; it suffices to rearrange the segments which are already there. Harris (1994:99) uses as an example *caught*, a word which was pronounced with /aw/ in earlier stages of English and with /ɔ:/ in modern English. The fusion or composition of the U and A elements resulted in the long monophthong /ɔ:/, as demonstrated in (6).



The opposite phenomenon, fission or decomposition, can also be illustrated in the English language. In some English dialects spoken in Scotland, Ireland and parts of England the ‘older’ monophthongal forms /e:/ and /o:/ are retained, whereas these forms have diphthongised into /ei/ and /ou/ in other variants of English, in the southeast of England resulting in /ai/ and /au/, respectively. This decomposition or fission of elements, formerly contained in one segment, can be represented as follows.



Another illustration can be found in Dutch. In Dutch dialects we find many monophthongal as well as diphthongal versions of a similar historical form. To give an example, the Standard Dutch word for ‘goat’ is /xɛit/, whereas it is /yɛ:t/ in Tilburg Dutch. Without claiming that this is a historical process going from /ei/ to /ɛ:/ or vice versa, we can represent the difference between the two segments in a straightforward fashion in element theory.

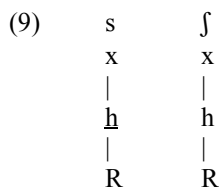
(8) xɛit (Standard Dutch) ɣɛ:t (Tilburg Dutch) ‘goat’



In this subsection the elements for vowels have been introduced. A special place is taken by @ for laxness: this element functions in a unique manner as compared to the other elements. The unique position of laxness among the vowel elements strongly affects the analysis of the Tilburg vowel system, as we will see in Chapter 4. In the next subsection we look briefly at the representation of consonants in GP.

2.2.2. Consonants

The same elements as we found above for vowel segments, are used to represent place for consonants. The element I inheres in palato-alveolar consonants, U in labial and A in uvular and pharyngeal ones. @ specifies velarity for consonants and R stands for coronality (the independent interpretation is the coronal tap).⁶ As far as what is ‘traditionally’ called manner, we distinguish ? for stopness and h for noise. h is present in fricatives; in genuine plosives there is also a ‘noisiness’ which characterises the release phase - these then have an h element (contrary to unreleased stops). In (9) we see that in the vowel /s/ the ‘noisiness’ or stridency is indicated by the fact that the element h is the head.



⁶ Coronal consonants behave in a similar way cross-linguistically. There is some discussion going on within GP about the best way to represent coronal consonants, a.o. in view of the phenomena of the intrusive [r] in English and the placeless /r/ in Dutch dialects (Van Oostendorp 2001). For instance, Kaye and Ploch (2001) assume that the R-element and the A-element should be merged in one and the same element, A (discussion in *Linguist List* 12.1701).

As far as voice or laryngeality is concerned, Harris (1994) points out that laryngeal contrasts are usually uniquely treated as contrasts between voiced and voiceless. It seems, however, that the phonetic realisation of laryngeality is by no means constant cross-linguistically. For instance, in English the contrast between what are usually called voiced and voiceless consonants, really is a contrast in voice onset time. That is, there is a contrast between voiceless aspirated or fortis plosives and neutral ones. In French the contrast between, say, the sounds symbolised as /b /and /p/ or /d/ and /t/ is between fully voiced and voiceless unaspirated. Thus, for a language one needs to determine which segment types have which laryngeal elements. In English the lexical representation of fortis or voiceless aspirated obstruents contain the element H.⁷ Obstruents in the neutral series (/b, d, g, z, v/ etc.) lack a laryngeal element. In French, fully voiced obstruents contain the element L, contrasting with neutral obstruents. In Dutch, the contrast seems to be one between voiced and neutral, the voiced segments bearing the element L. Sonorants in general lack an element L: they have spontaneous voicing (which does not usually participate in phonological processes) and contrary to obstruents, they lack active voicing. Examples are given below.

- (10) aspirated coronal stop /t/ in English (neutral) unaspirated/voiced stop /d/ in English

x h R ? H	x h R ? H
---	---

(neutral) coronal stop /t/ in Dutch voiced coronal stop /d/ in Dutch

x h R ? H	x h R ? L
---	---

⁷ Some people unify phonation and tonal categories: H is then present in (contrastive) high toned segments, L in low toned ones. As Harris (1994) states, this is controversial but since we are not dealing with a tonal language here, we will leave this matter out of consideration.

One would therefore expect that in English a segment might lose its aspiration in a neutralising context. In Dutch one would expect that in a neutralising context a segment might lose the L element: that is, lose its voice. We will see that this is indeed the case, as can be demonstrated from the well-known process of Final Devoicing in Dutch. By way of illustration the following examples are given, illustrating the lack of aspiration in segments in weak positions in English and the lack of voice in segments occurring in weak positions in Dutch.

(11)	strong position	neutralizing, weak position
	English	English
	[t ^h ɪn] (segment contains H)	[aft̩ər] (segment lacks H, aspiration)
	Dutch	Dutch
	[baɗən] ‘to take a bath’ (segment contains L)	[bat̩] ‘take a bath (1 s.)’ (segment lacks L, voice)

This brings us to the effects on consonants when they are in a weak position, e.g. to the consonantal equivalents of the vocalic fission processes that produce phenomena such as vowel reduction: i.e. lenition or weakening. These consonantal reduction phenomena include vocalisation (weakening to a glide or liquid (/d/ > [j]), spirantisation (development of a plosive into a fricative (t > s)), and debuccalisation (loss of supralaryngeal gesture, as in /s/ > [h]). Above we have already seen instances of such processes. For instance, it has been observed that, whereas *pity* is pronounced with [ʔ] and not with a full [t] this does not happen when the segment is in a strong position (*[ʔʊmmi] ‘tummy’). We have also seen that in Dutch vocalisation of a voiced coronal stop can, in certain weak positions, produce a glide (/rod̩ə/ > /roj̩ə/). Finally, Final Devoicing in Dutch is a ‘loss’ of the L element in a weak position (/baɗən/ - /bat̩/). This consonantal lenition - melodic decomposition or fission - is a sign of a position’s diminished ability to support melodic content. That is, some positions are typically resistant to lenition, while others are not – in *tummy* the coronal obstruent is in a foot-initial position and will therefore never be pronounced with a tap or a glottal stop whereas the *t* in a foot-internal onset may well become [ʔ] or [r].

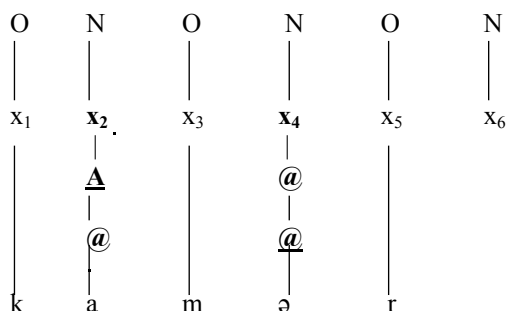
One of the advantages of a theory such as GP might be that this framework has a sound theory about which phenomena occur in which positions. Phenomena such as vowel reduction, consonant weakening or devoicing, which are seemingly unrelated, can be shown to be a consequence of the same mechanism. An important factor in accounting for these phenomena, is licensing: direct and indirect licensing conditions determine what melodic material different positions can support. The next section will therefore discuss constituent structure and licensing relations in GP.

2.3. Constituent Structure

This section deals with autosegmental and prosodic licensing, Licensing Inheritance, and licensing and governing domains. These are all important notions since phenomena such as consonantal weakening, vowel reduction, syncope, and sonority relations are consequences of phonotactic dependencies between head or licenser and dependent or licensed positions within and between constituents. That is, between and within constituents some positions are stronger than others and stronger positions have to license – to sanction, allow for – the weaker ones. In which position a segment may occur depends on the internal structure of the segment and the strength of the position in which the constituent occurs.

Any syllabic unit within a representation has to be integrated into the phonological hierarchy in order to be phonetically interpretable. This integration is done by licensing, an asymmetric function which binds each unit in some way to another unit (Harris 1997:35).⁸ Harris (1997) uses the term A-licensing for autosegmental licensing: the sanctioning of segments by the syllabic positions to which they are attached. P-licensing stands for Prosodic Licensing. All units on a certain level within a prosodic hierarchy need to be P-licensed by another unit, except for the head of the domain. This means that each level of the prosodic or phonological hierarchy constitutes a licensing domain, e.g. a rhymal domain, the licensing domain of the foot, or that of the word. P-licensed units can A-license less material than P-licensing units. For instance, between two nuclei in a word, there is a (P-)licensing relation: the nuclear head of a word P-licenses the other (dependent) nucleus. Therefore the nucleus which is the P-licenser, can have more material (or a non-neutral head) in its segment than the P-licensee. P-licensed positions typically contain less complex material or schwa. This accounts for the fact that in the core, native vocabulary of a language such as Dutch, which is basically a trochaic language, we find many bisyllabic words with some kind of full vowel in the first (stressed) syllable and a schwa in the second syllable. The (P-)licensed - and therefore weak, non-head - position (A-)licenses an almost empty segment such as a schwa. In (12) an example is given of both P-licensing and A-licensing.

⁸ As mentioned there are many versions of licensing. I follow Harris in his use of the terms A-licensing for autosegmental licensing (Harris 1997:335, 1990:123ff; cf. Goldsmith 1990, Itô & Mester 1993, Itô et al. 1995) and P-licensing for prosodic licensing (Harris 1997:335; cf. McCarthy 1982, Itô 1986).

(12) *'kamer* 'room'

/ˈkamar/ in (12) forms a trochee and consequently, the nuclear position x₂ P-licenses the second nuclear position x₄.⁹ The nuclear position x₂ A-licenses the melodic material defining /a/. The nuclear position x₄ A-licenses the melodic expression defining /ə/, a weak segment – headless and without any non-neutral material.¹⁰ Because x₂ (P-) licenses x₄, (a prosodically recessive or weak position) x₂ may A-license more segmental material than x₄.

The difference in licensing potential depending on the strength of the position is also true of non-nuclear positions. In 2.1 I briefly discussed such a case in Dutch. In a lexically conditioned process, Dutch /d/ can, in certain (weak) positions (and in certain informal registers), be pronounced as [j] – examples of this being [dodə]/[dojə] whereas [jodə]/[jojə] ('dead') is unacceptable.

Consonantal lenition – melodic decomposition – is evidence of a position's diminished ability to contain melodic content, that is, the ability to be complex or non-neutral headed is concerned. The foot-initial onset position is a licenser or head position and consequently (P-)licenses the foot-internal onset position. As licenser positions typically (A-)license more segmental material than (A-)licensed positions, lenition (which consists of an increase in sonority and, therefore decrease in complexity)¹¹ typically occurs in the licensed and not in the licenser position. Up to now not much has been said about the reasons behind this difference in (A)-licensing potential, depending on whether a segment occurs in (P-) licensing or licenser position. For instance, in the example above, it has not yet been explained why an onset in a (P)- licenser position may (A)-license more elements than an onset in a (P-) licensed one.

Harris (1994, 1997) accounts for these differences in licensing 'power' with the notion of Licensing Inheritance. Licensing Inheritance states that a licensed position inherits its A-licensing potential from its licenser and that the stock of A-licensing potential is depleted through transmission via an intervening position - it

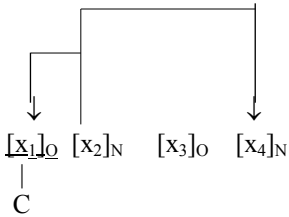
⁹ Stress is indicated by ' in front of or above the syllable in question.

¹⁰ @-headed vowels are often called headless because for a segment the effect of being headless of @-headed is the same in most respects.

¹¹ For now I consider lack of complexity to correspond to sonority. In Chapter 3, I will, however, make some critical comments regarding this connection.

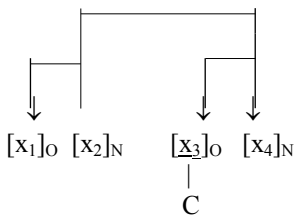
loses some of its potential when there are more intermittent steps between the licenser and licensed position. Because of this, some positions - such as the foot-initial onset, which is only one step away, as it were, from its 'ultimate' licenser - are typically resistant to lenition, while others are not. We can illustrate Licensing Inheritance by the following schemata from Harris (1997:354) – at the same time, giving an account of the already observed [‘doda]/[‘dojə] examples (cf. 2.1).

(13) a. Foot-initial C



(e.g. ‘*tummy* (English), ‘*doje* (Dutch), (instead of *‘*tummy* or *‘*joje*)

b. Foot-internal C (intervocalic/domain-final)



(e.g. *piʔi* (English), *doje* (Dutch))

In (13a) the segment in x_1 is directly licensed by the following nucleus.¹² /t/ is, as it were, only one step away from its licenser, the following nucleus in x_2 . In (13b), /t/ (x_3) is weakened to a glottal stop because it gets its licensing only indirectly. The first nucleus, x_2 , licenses the second nucleus (x_4), which in turn licenses the foot internal onset in x_3 . The licensing is, as it were, two steps away and therefore the licensing potential has diminished. The same applies to /dojə/. The first onset is directly licensed by the following nucleus whereas the second onset is more remote from its licenser. In other words, by the time the licensing potential reaches the foot-internal consonant, it has already lost part of its licensing power.

The notions of licensing and government are treated differently in the literature.¹³ I will basically follow Harris (1994) who considers government to be a sub-case of licensing. One of the characteristics of licensing relations is that there generally is some type of distributional asymmetry between the licenser and the licensee. However, in the sub-case of licensing, government, the licensed position is

¹² Licensing is indicated by arrows.

¹³ See for instance Kaye et al. (1990), Charette (1991) Rowicka (1996, 1999).

subject to particular phonotactic restrictions (Harris 1994:168). That is, government is a kind of licensing in which the licensed position generally suffers from severe restrictions with respect to possibility to support segmental complexity. For the present work it is not necessary to strictly distinguish between the notions of government and licensing; since government is a sub-case of licensing, I will refer to licensing instead of to government.

The licensing principles account for the fact that cross-linguistically constituents are maximally binary branching. Licensing is considered to be local and unidirectional. It follows that constituents are maximally binary branching. In (14) some licensing domains are given, the heads of the constituents being represented by a vertical line.

(14)	<i>licensing domains</i>	
	Non-branching	Branching
Onsets	O x	O \ x x
Nuclei	N x	N \ x x
Rhymes	R N / \ x (x)	R \ N / \ x (x) x

(Harris 1994:150)

Languages vary with respect to whether they possess branching constituents. Some languages don't have branching onsets (Arabic), some languages do not possess branching rhymes (e.g. Zulu), while a language such as Yoruba does not have branching nuclei and therefore no vowel-length contrast (Harris 1994:150).

As mentioned, government has a strong connection with phonotactics: that is, the (elemental) content of the non-head, licensed segment is restricted by the content of the head unit or licensor. Branching nuclei and branching onsets differ from branching rhymes in that the first two are (head-initial) governing domains, while a branching rhyme constitutes a licensing domain but not a governing domain – the coda/rhymal adjunct position is (inter-constituent) governed by the following onset. This is why in a language such as English or Dutch the head of the rhyme and the head of the nucleus do not restrict the content of the rhymal adjunct; it only restricts the rhymal adjunct as far as length-phenomena are concerned. To make this more concrete: in Dutch any coda consonant/rhymal adjunct may follow any vowel, as long as - word-internally - the vowel is lax and not tense (for some, short and not long). Such independence does not exist in the governing domains in the next

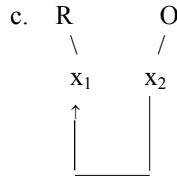
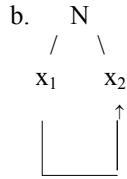
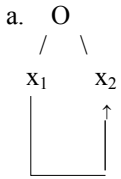
example: in all three domains (in Dutch) the content of the dependent positions is severely restricted by the head of the domain.

(15) *governing domains*

Branching
Onset:

Branching
Nucleus:

Onset-Rhyme domain



twee twe 'two' *wij* wɛi 'we' *ander* andər 'other'
drie dri 'three' *koud* kaut 'cold' *lompen* lɔmpə 'rags'
denken dɛŋkə 'to think'

(Standard Dutch)

The first two representations in (15a) and (15b) - the branching onset and branching nucleus - are instances of constituent government: the head governs (and therefore also licenses) its complement within the constituent. By way of comparison, in (16) an impossible branching onset is presented.

(16) *rd

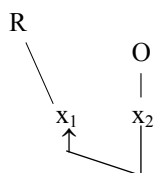


An onset such as */rd/ in (16) is not acceptable because the onset is a head-initial governing domain. Therefore a downward complexity slope should exist between the two positions (viewed from left to right). That is, within a governing/phonotactic domain, the melodic expression occupying the governing position must be at least as complex - in the case of onsets, more complex - as the expression occupying the governed one. This implies that the second position in a branching onset may never contain more elements than the head of the onset in the first position. Examples of branching nuclei are long vowels and diphthongs. In both cases the nucleus branches, the difference being that in a long vowel the material of head and

dependent position is completely shared, while in a diphthong there is just very little independent material in the licensed position (usually a high vocoid).

Besides the governing domains of the onset and nucleus there is one other governing domain generally mentioned in the literature. This is the interconstituent governing domain consisting of an onset and a coda (cf. 15c). The coda is a marked, unwished-for position of a kind of hybrid character due to the fact that the coda position is governed outside of its own (rhymal) domain while it is licensed to occur as a position in its own domain. Government by the following onset is interconstituent government, in which the direction of government is from right to left. This accounts for the fact that in many languages the coda consonant must be homorganic with the following onset - the distinctive source of melodic material, which is shared - in the licensing and governing position. Let us consider the following representation in which part of the segmental material is shared between coda and onset.

(17) Onset-Rhyme domain



Dutch: *ander* andər ‘other’
lompēn lɔmpə ‘rags’

English: *winter*
pamper

In cases such as (17), the segmental content of the coda is determined by the content of the following onset. That is, because the coda is licensed through government by the following onset, it may not contain much material: it may autosegmentally license either the same or part of the same material as its licenser or very little complex material. This is why in codas one often finds only sonorants and/or homorganic consonants.

A result of the obligatory licensing of a coda by a following onset (Coda Licensing) is onset maximisation: *VC.V syllabification follows from the requirement that a coda must be licensed by a following onset. For instance in a word such as English *pity* it is guaranteed by Coda Licensing that the /t/ is syllabified in the onset of the second syllable and not in the coda of the first syllable. If it would be in the coda position, Coda Licensing would be violated as there would be no onset to license the coda. Coda Licensing has far reaching consequences for the analysis of (phonetically) word-final consonants.¹⁴ It is a – rather controversial –

¹⁴ As mentioned, Piggott (1999) has a different view: according to him word-final consonants are in some languages syllabified as onsets and in others as codas. Polgárdi (1998) assumes the mainstream GP principle that word-final onsets by definition have to be followed by empty nuclei to be a violable constraint. See also below in 2.3.2.

theory-internal argument for the syllabification of the domain-final consonant as onset rather than coda. The reasoning is that, if we would accept the notion of a word-final coda, Coda Licensing would be violated as there would be no following nucleus to license it. In order to justify in a theory-internal manner that words can never end on a coda, the theory needs this Coda Licensing. In section 2.3.2 I discuss the consequences for the analysis of word-final consonants and present arguments for this apparently unnecessary abstractness. Before doing this, we take a look at another aspect of Coda Licensing: the notion of empty nuclei.

2.3.1. Empty nuclei

Empty nuclei may occur word-internally or word-finally.¹⁵ First of all the topic of word-final empty nuclei is discussed. The subject of word-internal empty nuclei will be treated subsequently.

If Coda Licensing requires a coda consonant to be licensed by a following onset and if Onset Licensing requires an onset to be followed by a nucleus in order to get licensed (all units must be licensed in order to be pronounceable), this implies that an apparently monosyllabic word such as English *pit* must have the following phonological structure.

(18)	O	N	O ←	N
	x	x	x	x
	p	ɪ	t	

In this example we see that the word-final consonant is in the onset of the second syllable, followed, licensed and properly governed by an empty nucleus – this is indicated by the arrow.

In GP there are two possibilities as far as word-final positions are concerned. Either a language licenses word-final empty nuclei (these are the languages in which words can phonetically end in a consonant) or a language does not license them (these are the languages in which words always end in a vowel, that is, a phonetically realised nucleus). Languages which sanction domain-final empty nuclei are languages in which words phonetically may end in a consonant and in

¹⁵ Strictly speaking, in every empty nucleus there is a latent @ present. Only when it is forced to do so, it surfaces – generally having a schwa-like vowel quality. The concept of empty onsets was suggested before that of empty nuclei. One of the first of these analyses was Charette's analysis of h-aspiré in French (Harris 1994:179). Charette (1991) analyses the difference between *la amie* 'the girlfriend' and *la hache* 'the axe' - [lami] and [la aʃ] - as a consequence of the fact that in *la hache* the word begins phonetically with a vowel but has a word-initial onset at the skeletal level, dominating a skeletal point which prevents the two nuclear points from being adjacent (Charette 1991:91).

which words end in a schwa or another vowel. In fact, Dutch is such a language: it has words such as /modə/ ‘fashion’ as well as words ending (phonetically) in a consonant (actually, an empty nucleus). Harris (1994:181, 182) suggests that the difference between an empty nucleus and a schwa is based on whether the melodic content is headed or not. That is, an empty position contains latently present melodic material @, together with which it forms a potential autosegmental licensing domain. In (19) below, a possible representation is given.

(19)	‘Empty’ nucleus	Schwa	
	N	N	
	x	x	
	@	@	(Harris 1994:182)

When the melodic content of an ‘empty’ nucleus is not autosegmentally licensed - not connected to a skeletal position - it has no element as its head.

Harris (1997:328) argues that there are theory-independent arguments for the existence of domain final empty nuclei. For instance, in metrical analyses of some languages it is assumed that null-vowel syllables are metrifiable in the same way as weak-vowel syllables (see for instance Burzio 1994). The fact that null-vowel syllables are assumed to exist in some languages, of course does not mean that we can assume that they exist in all languages. It *is* however an argument for the possibility of the concept of final empty nuclei. In Spanish, for instance, the final stress pattern of consonant-final words (e.g. *papél*) reduces to the penultimate pattern typically found in vowel-final words (e.g. *patáta*), if we assume that both types of form contain a final trochaic foot - *pa(pél0)* and *pa(táta)*. In English, it is assumed that both *prevent* and *agenda* end in a final heavy-light foot, even though the final weak nucleus in *prevent* is empty (*pre(vént0)*, *a(génda)*).

A second way in which final empty nuclei betray their presence, is when some constraint forces their phonetic interpretation. For instance, Harris (1994) argues that the apparently epenthetic vowel separating obstruents of the same type in English suffixed forms with *-(e)d* or *-(e)s* is the phonetic expression of a domain-final nucleus which otherwise remains silent (cf. also Kaye 1987). Expressions such as *to fade* and *bush* have the following lexical representation (with a final empty nucleus, licensing the word-final onset).

(20) a.	O	N	O	N
	x	x	x	x
	f	e	d	

(20) b.	O	N	O	N
	x	x	x	x
	b	u	ʃ	

When the past tense or the plural suffix is added, a structure results in which two alveolar obstruents are next to each other, only separated by a domain-final empty nucleus.¹⁶

(21) a.	O	N	O	N	O	N
	x	x	x	x]	x	x]
	f	e	d		d	

(21) b.	O	N	O	N	O	N
	x	x	x	x]	x	x]
	b	u	ʃ		s	

In this view the schwa in a past tense form such as *faded* and a plural form such as *bushes* is not an epenthetic vowel, which separates the two alveolar obstruents of the stem and the suffix. It is the domain-final nucleus which does not surface in other contexts because English is a language which licenses domain-final empty nuclei. In this case, the OCP forces the @, which is latently present in every (so-called empty) position, to surface.

Whereas word-final empty nuclei have to be licensed parametrically, word-internally the situation is different. Syncope shows that a vowel can only be suppressed if it's adjacent to a vowel which itself is not suppressed. That is, empty nuclei are sensitive to a restrictive case of government licensing: Proper Government. Proper Government requires that the licensing nucleus itself must not be empty. There is more than one version of the principle for licensing of word-internal empty nuclei, Proper Government. In this thesis the version of Rowicka (1996, 1999), will be adopted. Since this view came as a reaction to the 'Standard' GP view, we will first discuss the standard view briefly.

¹⁶ As we will observe below and in Chapter 5 on Morphophonology, the morphological domains are visible in phonology. Therefore, in (21) - ((fad0)d0) and ((bush0)s0) - we find two domain final empty nuclei: one following the internal lexical domain final consonant and one following the consonant which is in the final position of the total domain, including the suffix.

2.3.1.1. Proper Government

According to the standard view, Proper Government is considered to take place between (nuclear) constituents and therefore is argued to go from right to left. Harris (1994:183ff.) mentions examples from an Amerindian language Tonkawa as well as from English. Proper Government is not obligatory in all languages. Below we will see examples which demonstrate that in English it is not obligatory to leave the nucleus unfilled when it is properly governed by a following filled nucleus. In Tonkawa the situation is different. In Tonkawa the suppression of the vowel in a site that is traditionally called a syncope site, is obligatory. The syncope site is the second nucleus (from the left) in the word: /pic_{na}-no?/. When a prefix is added and a different segment becomes the second nucleus in the word, this vowel is suppressed, as in /we-p_{cena}-no?/.

Optional ‘syncope’ cases in English include words such as *sep(a)rate*, *def(i)nite*, *fact(o)ry*, *mis(e)ry*, *fam(i)ly*, etc. The following example illustrates this.

(22) a. dɛfənət

O	N	O	N	O	N	O	N
x	x	x	x	x	x	x	x
d	ɛ	f	ə	n	ə	t	

(22) b. dɛfnət

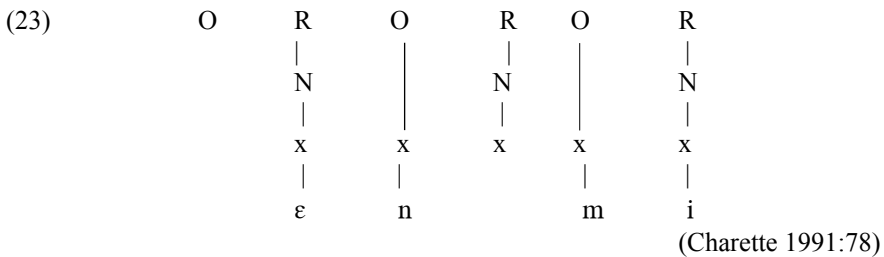
O	N	O	N	O	N	O	N
x	x	x	x	x	x	x	x
d	ɛ	f		n	ə	t	

In (22) we see representations of two possible pronunciations of *definite*: in the a-example all vowels are pronounced, while in the b-example, the second nucleus is silent: [dɛfnət]. English words such as *buttoning* present another interesting case. This word can - in the appropriate region and context - be pronounced as *buttning*, without the intervening schwa-like vowel. The consonants surrounding such a ‘syncope’ site could appropriately be called a bogus cluster: they do not really form a cluster. They are two consonants separated by a nuclear position, which is optionally filled.

A similar empty position separating two consonants, resulting therefore in a similar kind of bogus cluster, can be argued to be the consonants in a word such as *kidney*. Words such as those (also *atlas*, *atmosphere*, etc.) seem to form counter-evidence for a sonority sequencing generalisation, saying that in optimal coda-onset clusters, the first consonant is at least as sonorous as the second (cf. Venneman 1988). Below, in the section dealing with Final Consonants, it will be argued that

final consonant clusters are often similar to word-internal coda-onset clusters and it will be supposed that not only these word-internal cases are coda-onset clusters but that the final-consonant clusters are coda-onset clusters as well. In the next section on final consonants, I discuss work by Charette (1991) on empty nuclei in French. French has a type of consonant cluster word-finally, which English has word-internally only: consonants forming a branching onset. The French case is interesting because the syllabification of word-internal and word-final consonants becomes clear by the vowel length of the preceding vowels. Apparently, French domain-final nuclei can also license a branching onset, contrary to English or Dutch.

Kaye (1987) demonstrates the presence of empty nuclei in Moroccan Arabic. Charette (1991) does the same for French. I will discuss some of her arguments. According to Charette, a word such as *ennemi* [ɛnmi] ‘enemy’ has the following structure.



She gives the following evidence for the structure with an empty nucleus above. First of all, words such as *ennemi* or *appeler* [aple] ‘to call’, can be pronounced with a schwa ([ɛnnemi], [apɛle]) in careful speech, whereas this is never possible with words such as *place* ‘place’ ([plas], [*pɛlas]). The same is true for pairs such as *plage* - *pelouse* (**pelage* - **plouse*). The distinction lies in their lexical representation: words which can be realised with a schwa have an empty nucleus in their representation; words which are never pronounced with a schwa, do not have an empty nucleus. There is no question of an epenthetic vowel; it is rather the case that some words have an empty nucleus, which may or may not be realised (as schwa) under certain conditions.

Secondly, Charette argues that the imperative form may constitute a clue for the presence of an empty position, even when there is no phonetic evidence in the form itself. In the infinitive [aple], *appeler*, there is no evidence of the presence of a nucleus between the [p] and the [l]. However, when we consider the imperative form, we see a vowel [ɛ] in the position where an empty nucleus is positioned ([apɛl!]) ‘call’. In other forms, such as for instance *parler* ‘to speak’, no such alternation is found. The infinitive and the imperative forms are [parle] and [parl], respectively. This is to be expected if the lexical representation of words such as *appeler* contains an empty nucleus (between the [p] and the [l]), contrary to words such as *parler* in which there is no empty nucleus (between the [r] and [l]).

Thirdly, Charette (1991) points at words which have different phonetics, though apparently they all contain the same morpheme. The following words all

contain the base *venir*. Depending on the dialect, the words in (24a) are pronounced without a schwa, while the examples in (24b) all phonetically contain a schwa.

(24) a.	<i>souvenir</i>	suvnir	‘to remember’
	<i>devenir</i>	dəvnir	‘to become’
b.	<i>parvenir</i>	parvənr	‘to achieve’
	<i>subvenir</i>	sybvənr	‘to provide’

The first group in (24a) is phonetically bisyllabic, while the second group in (24b) is phonetically trisyllabic. It seems natural to assume that the base *venir* has the same representation in all cases, in spite of the variation in pronunciation. Therefore Charette assumes that in all these cases there is a nucleus present which receives no phonetic interpretation after a single consonant and which becomes manifest after a consonantal cluster. I will not go into the details of her argumentation. It will suffice to say that in both cases the nucleus is empty. In the [parvənr] cases the empty nucleus is followed by a proper governor (the following nucleus); in spite of this it is phonetically realised since it has to help, at it were, the preceding onset /v/ to govern the coda /r/. In the [suvnir]-cases the empty nucleus can remain empty: it is properly governed by the following nucleus and, since it has no consonant cluster preceding it, there is no objection to it being phonetically unrealised.

Having demonstrated what empty nuclei are in standard GP and in which ways they can be licensed (domain finally, through parameterisation; domain-internally, by Proper Government), I will now propose an alternative analysis of Proper Government for word-internal empty nuclei, based on work by Rowicka (1996,1999).

2.3.1.2. Head-initial or Trochaic Proper Government

According to Rowicka, Proper Government is always left-headed. As the Dutch stress system is trochaic, I will follow her in this for Dutch.¹⁷ In this view the surfacing of empty nuclei is analogous to the assignment of stress: a syllable gets stressed if it is the head of a metrical foot; otherwise it is unstressed. Similarly, an empty nucleus must surface if it is the head in a Proper Government relation.

What is attractive about this view, is that Proper Government now forms an integral part of other inter-nuclear relations, such as stress, vowel harmony and vowel reduction. It is plausible that if a language is head-initial as far as stress is concerned – that is, trochaic – it is head-initial in the other aspects as well. If the behaviour of empty nuclei is on a par with the above-mentioned inter-nuclear relations, we do not expect proper-government to be head-final, while stress is head-

¹⁷ It is not evident that Proper Government is also left-headed in iambic languages. This topic will not be discussed here any further.

initial. In Chapter 5, the chapter on Morphophonology, we will see examples and a more elaborate account of Trochaic Proper Government.

The subject of word-final consonants is closely connected to the subject of empty nuclei, as word-final consonants are supposed to be licensed by empty nuclei in GP. Therefore, word-final consonants will be discussed in the next subsection.

2.3.2. Word-final consonants

In this section I will present arguments of why we assume word-final consonants not to be in the coda position but in the onset position of an empty syllable. Recall, first of all, that traditionally the word-internal coda and word-final consonant were considered to be ‘the same’ structurally: they were both assumed to be codas. One of the more controversial aspects of GP probably is the claim that word-final consonants are not in the coda position but in the onset of an empty syllable. This claim is not only controversial but also has far-reaching consequences which I have already indicated in Chapter 1, announcing my claim that in Tilburg Dutch (and Standard Dutch) word-final consonants after short, lax vowels are structurally ambisyllabic, geminate consonants followed by an empty nucleus. Such a strong claim asks for motivation. Before doing so, two alternative views will be briefly discussed.

Polgárdi (1998) assumes the need of an onset to be licensed by an empty nucleus to be a violable constraint. In this view, phonetically word-final consonants are considered to be onsets which are, depending on the situation, followed or not followed by an empty nucleus. Piggott (1999) allows for both syllabifications: as codas and as onsets, depending on the language in question. For instance, in languages in which no restrictions apply to word-final consonants in contrast to word-internal coda consonants, word-final consonants are assumed to be onsets. There are also languages, according to Piggott, in which word-final consonants are syllabified as codas. In these languages, word-final consonants are subject to the same restrictions as word-internal codas. As Dutch seems to belong to those languages in which there are fewer restrictions on word-final consonants than on word-internal codas, I will assume that in Piggott’s view, Dutch is a language in which the final consonant is syllabified as an onset. It would take too long to discuss the languages for which Piggott assumes final codas. I will not discuss Piggott any further here, nor will I follow Polgárdi; at least in the case of Dutch, I will show that it pays to keep to the most restrictive version of the theory. This is the GP version, in which all phonetically word-final consonants are syllabified as onsets, which are in turn licensed by empty nuclei.

Let us look at the motivation for the assumption that word-final consonants should not be analysed as codas. There are several respects in which word-final consonants and word-final consonant clusters differ significantly from internal codas (Harris 1994:70 ff.). First of all, there is an argument from syllable-typology, which indicates that final consonants are not the same as internal coda consonants. Harris (1997), referring to Kaye (1990), argues that, whether or not a language possesses internal codas is independent from whether or not it sanctions domain-final

consonants. If a word-final consonant and an internal coda share the same syllabic affiliation, one would expect that any language possessing one, would automatically possess the other. This is not correct: Telugu is an example of a language which has word-internal codas but which does not allow word-final consonants. Luo, on the other hand, is cited as a language which has no word-internal codas but which does allow for word-final consonants.

Secondly, a single word-final consonant in languages such as English and Dutch tolerates a short-long contrast in a preceding nucleus, whereas, as we have seen, in these languages there are severe restrictions on the occurrence of VVC-rhymes word internally. That is, there are no restrictions regarding the identity of word-final consonants, whereas there are - in the case of heavy rhymes - heavy restrictions word-internally: only a very limited number of consonants can follow both short and long vowels word-internally. Such distinct behaviour of word-final and word-internal 'codas' is not to be expected if they are the same structurally. In English, for instance, only some fricatives, liquids and homorganic nasals may occur word internally after a VV branching nucleus, (*easter, pastry, boisterous, shoulder, launder, council*), whereas there is no restriction whatsoever as to the kind of consonant which follows word finally after a VV branching nucleus (*slide, soap, steep*, etc.). The same is true for Dutch. Trommelen & Zonneveld (1989:132 ff.) state that probably 99,9% of the Dutch rhymes are binary, consisting of only two segments. The fact that there are no restrictions on word-final consonants, also becomes clear when we look at the phenomenon of closed-syllable shortening. Interestingly, as far as word-stress is concerned, we find the same pattern: a word-final consonant typically or consistently fails to contribute to the quantity of the preceding rhyme, to which it supposedly belongs (Harris 1997, Hayes 1982).

One of the responses to this non-coda-like behaviour of the word-final consonant has been the use of notions such as extrasyllabicity, extraprosodity, or degenerate syllables. In an OT framework extraprosodicity has no independent formal status but is an effect deriving from the interaction between two types of constraints (Harris 1997, Prince & Smolensky 1991), one of which calls for the right edge of a syllable to be aligned with the right side of a word and which can be violated because of some higher ranked constraint which causes the end of a final syllable to be moved away from the end of the word. However, according to Harris (op. cit.), the assumption that a final consonant is outside the syllable or the word, does not lead one to expect phonotactic restrictions that hold over these adjacent consonants. This is contrary to the facts: for instance, final -CC clusters in English show interdependencies; this is accounted for if these represent coda-onset clusters (or, for a language such as French: branching onset clusters). Moreover, these interdependencies among final -CC clusters closely resemble those in medial 'true' coda-onset clusters.

This brings us to the point where we need to find out what these final consonants are if they are not coda consonants. It has been mentioned that final -CC clusters are similar to coda-onset clusters in English: That is, whereas in English word-final consonant clusters the sonority slope is often not as one would expect for codas, the sonority profile is often quite similar to internal coda-onset clusters. Examples from English are given in (25).

(25)	Medial CC clusters	Final CC clusters	
	chapter	apt	
	vector	sect	
	mister	mist	
	after	raft	
	whisper	wisp	
	whisker	brisk	
	pamper	damp	
	winter	flint	
	filter	guilt	
	wrinkle	rink	
	scalpel	scalp	
	cancer	manse	
	dolphin	golf	(Harris 1994:74)

Charette (1991:123 ff.) gives some arguments both for the analysis of word-final C's as onsets as well as for the presence of a final empty nucleus in Quebec French. She gives examples of words showing that, whereas a long vowel may occur before a word-internal single consonant or an obstruent-liquid cluster, a branching nucleus is never found before the sequence liquid-obstruent.

(26) a. Long vowel/branching nucleus before a single word internal consonant:

<i>rêver</i>	reve / ra ^h ve	'to dream'
<i>pâlir</i>	pa:lir / pa ^h lir	'to become pale'

(26) b. Long vowel/branching nucleus before an obstruent-liquid cluster:

<i>sabler</i>	sa:ble / sa ^h ble	'to sand'
<i>prêtrise</i>	prɛ:triz / pra ^h triz	'priesthood'

(26) c. No long vowels/branchng nuclei before a liquid-obstruent cluster:

<i>porter</i>	pɔrte *pɔrte	'to bring'
<i>merci</i>	mersi *mɛ:rsi	'thank you'

These examples show that a nucleus can branch in French - that is the vowel can be long (or constitute a diphthong) – only when it occurs within a non-branching rhyme. A word such as *sabler* is syllabified as /sa.ble/: the rhyme is not branching and therefore the nucleus can branch. However, in a word such as *porter* the syllabification is /pɔr.te/: the rhyme branches and a branching nucleus cannot occur. Interestingly, Charette shows that long vowels have the same distribution in word-final position. While a vowel may be long or diphthongised before a single word-

final consonant or an obstruent-liquid cluster, a vowel may not branch before a liquid-obstruent cluster, as illustrated in (27).

(27) a. Long vowel/branching nucleus before a single word final consonant:

<i>bête</i>	bɛ:t / ba't	'stupid'
<i>tasse</i>	ta:s / ta's	'cup'

(27) b. Long vowel/branching nucleus before a word final obstruent-liquid cluster:

<i>sable</i>	sa:bl / sa'bl	'sand'
<i>pauvre</i>	po:vʀ	'poor'

(27) c. But:

<i>forte</i>	fɔ:rt / *fɔ:rt	'strong'
<i>parc</i>	pa:rk /*pa:rk	'park'

This indicates that word-final consonant clusters are syllabified in the same way as word-internal consonant clusters. She assumes that single word-final consonants are syllabified in the same way as single word-internal consonants: in both cases not within a branching rhyme but in the onset of the following syllable. The structure she proposes for a word such as *fête* 'birthday' is as follows.

(28)	O	R	O	R
		N		N
		/ \		
	x	x x	x	x
	f	a i	t	
		ε		

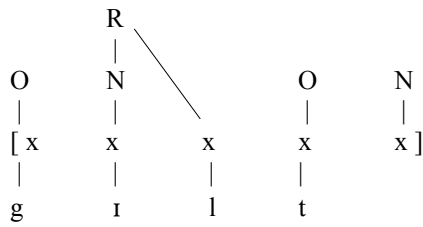
(Charette 1991:125)

We have seen some empirical and theory-internal arguments for treating final -CC clusters as having the same constituent structure as word internal coda-onset (-C.C-) clusters (or, in a language such as French, as coda-onsets or branching onsets). The clusters of English *guilty* and *guilt* can thus both be assumed to consist of a coda-onset combination, as is shown in (29).

(29) a.

		R		
	O	N	O	N
	[x	x	x	x]
	g	ɪ	l	t
				i

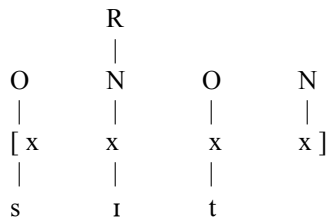
(29) b.



(Harris 1997:327)

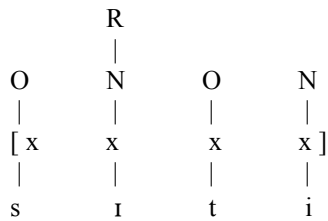
In the same way a word, such as English *sit* would have the following representation.

(30) a.



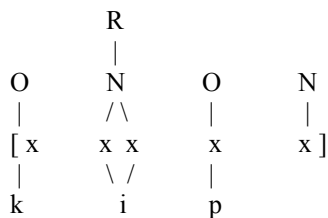
The representation of *sit*, in which the phonetically final consonant is in the onset of the second syllable, is structurally similar to that of a word such as *city*.

(30) b.

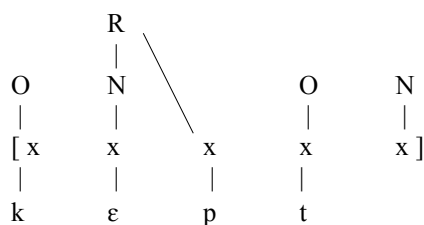


In a (non-productive) verbal pair such as *keep* - *kept* the /p/ can follow a long vowel, because, as we have demonstrated above, it is in the onset and not in the coda. In *kept* however, the onset is occupied by the /t/ and the /p/ is 'forced' into the preceding rhyme - making it impossible for a long vowel to precede it (since the rhyme is already occupied and in English super-heavy rhymes are clearly marked).

(31) a.



(31) b.



This last example brings us to another important subject in GP. Contrary to ‘traditional’ views, pairs such as English *keep - kept* etc. are principally not seen as being cases of resyllabification. Government Phonologists generally do not see these alternations as productive processes any longer: according to them, for instance, both *keep* as well as *kept* are listed in the lexicon. This is important, because in GP there is a strong ban on resyllabification. The Projection Principle forces licensing relations to remain constant during a derivation. This implies that syllable structure cannot change. This is no problem in the case of English. The regular, productive verbal system clearly does not evidence shortening (*leap - leaped*, etc.) and it seems uncontroversial to assume that in cases such as *keep - kept* no resyllabification takes place. However, in Chapter 6 on Morphophonology I will discuss the productive Tilburg verbal system in which shortening is commonly found and which may be described as a productive version of the (unproductive) English *keep-kept* kind. How to analyse this is not immediately clear and an entire chapter is dedicated to this issue.

2.4. Morphology-phonology interface

GP distinguishes between analytic word structure and synthetic or non-analytic word structure. An analytic structure is analysable in more than one phonological domain whereas synthetic or non-analytic word structure consists of just one phonological domain. The above-mentioned English *leap - leaped* is an example of analytic morphology. The form *leaped* ([li:pəd]) thus consists of two phonological domains: one consisting only of [li:p0], and the other consisting of the entire word: [li:p0d0]. Both phonological word domains end in a parametrically licensed empty nucleus: [li:p0]d0]. Productive morphology typically creates analytic word structure. On the other hand, irregular morphology usually creates non-analytic, synthetic phonological word structure. Of such morphology, creating a word structure without internal word-domains, we have just seen an example: *keep - kept*. The past tense of *keep* [kept] is exactly like any other simple monomorphemic English word (e.g. *apt*): there is only one word domain, with one word-final empty nucleus: [kept0].

In Chapter 6 more discussion of the way in which morphology is represented in phonology will follow. I will now discuss the way GP and OT can be combined.

2.5. Government Phonology and Optimality Theory

GP constitutes the foundation of this work but without the GP theory of parameters. As an illustration of the relative ease with which one can replace parameters by constraints, I refer to Polgárdi (1998) and Rowicka (1999) who discuss the case of a dialect of French and a dialect of the Chadic language of Tangale. These examples concern a conflict between GP principles which can be resolved in GP by, for instance, principle ranking or different parameter settings etc. As discussed in 2.3.1, in the section on empty nuclei, Charette (1991:104 ff.) mentions that in French a potentially properly-governed, empty nucleus, remains empty. One such position is the schwa position in *devenir* ‘to become’, a word therefore generally pronounced as [dəvniʁ]. However, such a position is not properly governed and therefore not empty if it has to government-license a consonant cluster ([parvənɪʁ] ‘to achieve’). In *parvenir* the schwa is followed by a full vowel, just as in *devenir*, and therefore we expect that it is not pronounced. However, if it would remain empty it would not be able to perform its function of licensing the preceding cluster [parvənɪʁ]. Apparently, it is more important in French that the consonant cluster remains unchanged than that governed nuclei should be empty.

Charette mentions the case of the Billiri dialect of the Chadic language of Tangale as an illustration of the opposite case. In this language, the principle requiring proper government of an empty position is the dominant one – it is more important for a potentially silent vowel to be silent than for this vowel to government-license the head of a preceding consonant cluster. The properly-governed empty position therefore remains without content; instead, part of the consonant-cluster is deleted (/landa+zi/ ‘your (fem.) dress’ -> *[land-zɪ], [lan-zɪ])). In other words, in Tangale a potentially empty position remains silent and instead, the consonant cluster is reduced. When reduction has taken place, there is no consonant cluster to license anymore and therefore the position can remain empty. If the two principles of Government Licensing and Proper Government are in conflict, languages have a choice in which principle they violate and which one they satisfy.

Polgárdi (1998) and Rowicka (1999) assume these phonological principles to be (OT) violable constraints. In Charette’s terminology priority is given to Government Licensing over Proper Government in a language such as French, whereas in Biliri the opposite solution is chosen. Thus, in OT terminology the priority of one principle over another would be expressed in French by the constraint ranking of Government Licensing over Proper Government. This would be quite the opposite to that found in Biliri. Polgárdi (1998) ‘translates’ all kinds of GP principles into violable OT constraints. I will not follow her in this respect but will generally use the ‘traditional’ GP terminology instead of using OT terms. The question as to whether all principles/constraints are violable remains a valid one, irrespective of whether one works within GP or OT. I will not discuss this issue any further.

2.6. Conclusion

The aim of this chapter was to explain the main aspects of Government Phonology which are relevant for this thesis and to discuss some interesting theoretical topics more thoroughly. It has been observed that GP considers phonological phenomena such as lenition and vowel reduction, to be consequences of the positions they occupy in phonological structure. In this sense GP is pre-eminently a theory on representations. OT is used in this thesis as well, not only because some important concepts are phrased in OT terminology but also because OT seems more suitable to deal with variations between languages than GP.

Phonological elements have been discussed in 2.2, both for consonants as well as for vowels. Some special attention has been paid to the vowel element for laxness, @. Its special character has been demonstrated: @ is always present in every vowel segment, although its influence is only felt when it is the head of the complex.

The integration of segments in a representation is done through licensing. This is discussed in 2.3. Licensing is always asymmetrical: there is a head and a dependent. Strong positions can (autosegmentally) license or allow for more material than weak positions. Government is a sub-form of licensing: within a governing domain the content of the dependent position is strongly restricted by the head of the domain. One governing domain is the coda-onset domain: a coda always needs to be licensed by a following onset. However, we have also seen that onsets need to be licensed by nuclei. Taken together, these principles are responsible for the GP view that phonetically word-final consonants structurally are in an onset followed by an empty nucleus. This empty nucleus is licensed parametrically. Two kinds of empty nuclei occur: word-final empty nuclei and word-internal empty nuclei. For the licensing of word-internal empty nuclei the view of Rowicka (1996, 1999) is followed: word-internal empty nuclei are assumed to be licensed trochaically by their domain-heads.

Furthermore, in 2.4, a distinction is made between analytic and non-analytic/synthetic word-structure: analytic structure gives rise to a layered word structure. In synthetic word-structure, no morphology is visible in the phonology. Finally, the possibility of a combination of GP and OT is discussed in 2.5.

In the next chapter we will discuss an aspect of the phonological word in Tilburg Dutch: the requirement for words to end in an onset and the consequence of this requirement for the segmental structure of words.

3 Word-final consonants

3.1. Introduction

Diphthongs are usually considered to consist of two vowels. Tilburg Dutch has sequences such as /blei/ ‘glad’, /vrâu/ ‘woman’ and /rœy/ ‘moulting’.¹ Those familiar with Dutch observe a strong phonetic similarity with sequences in, among others, the standard variety of this language. Standard Dutch also has /blei/, /vrâu/ and /rœy/: these sequences are called diphthongs.²

Nevertheless I do not discuss these sequences in the chapter concerned with Tilburg vowels, Chapter 4. In the present chapter I will demonstrate that, even though this dialect has vocoid sequences phonetically similar to the Standard Dutch diphthongs, there is a fundamental reason for not treating these as part of the vowel system. The reason for this is the difference in structure between the Standard Dutch and the Tilburg Dutch vocoid sequences. The main observation is that the final high vocoids of Tilburg Dutch sequences such as /ei/, /œy/ and /au/ are not in the nucleus but in the onset. In other words, they are consonants, not vowels. Consequently, diphthongs (in the true sense) do not exist in this dialect.

For older speakers it has indeed sometimes been claimed that Tilburg Dutch has no diphthongs (Van Oostendorp 2000, referring to Van Rijen 1993). That is, where speakers of Standard Dutch would have a diphthong, (older) speakers of Tilburg supposedly often use a long lax vowel. Thus, there is a clear correspondence between long vowels in Tilburg Dutch and diphthongs in Standard Dutch, e.g. Tilburg Dutch /rɛ:k/ (‘rich’) and /mœ:s/ (‘mouse’) for Standard Dutch /reik/ and /mœys/. Younger speakers of Tilburg Dutch are said to have developed /ai/ and /au/, possibly under the influence of the Standard Dutch equivalents /ei/ and /au/ (Van Oostendorp 2000). Boutkan & Kossmann (1996:18-20) provide a list of diphthongs in their description of the phonology of Tilburg Dutch, but argue that the choice whether one considers the second part of the vocoid sequence to be a vowel or a consonant, is rather arbitrary. They choose for the latter option.

My suggestion is similar to that of Boutkan & Kossmann: I consider these high vocoids to be consonants. This is not an arbitrary choice: there is a fundamental structural difference between Standard Dutch /ei/ and Tilburg Dutch /ei/. In Standard Dutch this sequence constitutes a true diphthong, with both vocoids in the nucleus of the syllable, while in Tilburg Dutch the second vocoid is not part of the nucleus but is a consonant in an onset position of the word. The proposal in this chapter is that this difference between Tilburg Dutch and Standard Dutch not only represents the

¹ Boutkan & Kossmann (1996) give a lax instead of a tense second vocoid. For the present analysis this distinction between, for instance, /ɪ/ and /i/ or /ʊ/ and /u/ is not important. What matters, is that we are dealing with a high vocoid, whether tense or lax.

² Below, in section 3.5.2.3, it will be argued that /au/ consists of a vowel and consonant.

fact that diphthongs are marked and ‘ungrammatical’ in Tilburg Dutch. It is also due to the fact that Tilburg Dutch belongs to those language systems in which the word-final segmental material has to occupy an onset position. Onset-positions are preferably occupied by consonantal segments – that is, by segments with little sonority. Consequently, words in this dialect preferably end in a consonant.

Contrary to Standard Dutch, Tilburg Dutch vocoid sequences always occur in word-final position and never word-internally. This is because the need to end in a consonant can be satisfied at relatively low cost, if the high vocoid (/i/, /y/, or /u/) surfaces as a glide. There is no need to add a consonant or to delete one or more vowels. It suffices to link the high vocoid in question to the consonantal onset position. The demand that word-final segments be in an onset manifests itself in the fact that this dialect has relatively few words ending in a vowel as well. In Standard Dutch the situation is different: although some influence of the requirement to end in a consonantal position can be detected, this constraint is ‘less active’.

The main goal of this chapter is to demonstrate the importance of this requirement for Tilburg Dutch. It is in some sense a counter-intuitive requirement: while syllables are reputed for their ‘wish’ to be open, that is end in a vowel, phonological *words* thus have an opposite requirement. I will argue that, in spite of the apparent inconsistency of such a constraint, it perfectly suits the Tilburg Dutch data. Furthermore, I will demonstrate that it not only accounts for the Tilburg Dutch data but also for a range of other data in other languages.

The second goal is to demonstrate that GP theory should consider these facts and find some way to include them in the theory. The necessity for word-final segments to occur in an onset has for the first time been expressed in Optimality Theory by a constraint, FINAL-C (McCarthy 1993).³ This constraint has clear connections with views on representations and is consequently relevant for GP as well.

The chapter is structured as follows. In 3.2 I discuss the different kinds of diphthong-like sequences in Dutch. In 3.3 I will present the Tilburg Dutch vocoid sequences, which constitute the main topic of discussion in this chapter. The data will be followed by a proposal for an analysis, based on FINAL-C, as well as on other constraints, in 3.4. In 3.5 I discuss possible exceptions to FINAL-C in Tilburg Dutch, concluding that French loanwords are the only exceptions. In 3.6 I will demonstrate that the FINAL-C analysis of Tilburg Dutch vocoid sequences analysis is corroborated by other facts in the same language as well as by data in other languages.

³ I have already mentioned that in general the role of Optimality Theory is not as significant in this thesis as that of Government Phonology. In this chapter OT will however function as an important tool, mainly because the demand for word-final segments to occur in an onset, has first been put forward and extensively discussed in an OT framework. Furthermore, OT is a useful framework to express variation between languages.

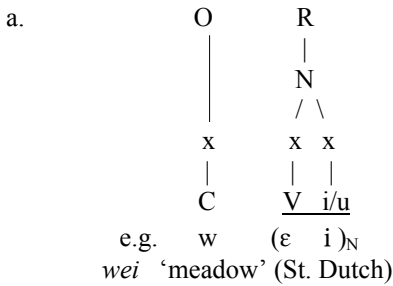
3.2. True and pseudo-diphthongs

Before arguing that Tilburg Dutch has no diphthongs, I need to elucidate what I mean by diphthong. The term is used in various ways in the linguistic literature. It is used in a broad sense, to characterise all sequences of more than one vocoid. In its narrow sense - and that is the way I will use the term here - it is used to indicate a sequence of two vocoids, which are both inside the nucleus.

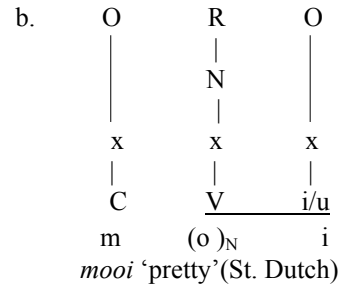
The structure of Standard Dutch vocoid sequences is presented in (1) and (2) below, with the relevant vocoid sequences underlined. First of all, in (1) a word-internal sequence is given. Note that in Standard Dutch Dutch word-internal vowel-glide combinations only occur before coronal consonants. Without proposing an account of this, Booij (a.o. 1995:19) mentions that in Dutch '*glides cannot be followed by other consonants (except alveolar obstruents).*' Below, when I discuss Tilburg Dutch vocoid sequences as well as in the section concerning the Standard Dutch sequence /au/, I will propose an explanation of this fact. In (2) a similar sequence in word-final position can be found. In both (1) and (2a), the second vocoid - for example /i/ or /u/ - is in the nucleus and therefore constitutes the second part of a diphthong. In (2b), on the other hand, the second vocoid is in the onset; it is therefore not vowel but a consonant, a glide.⁴ Recall, for that matter, what has been said in Chapter 2 regarding constituent structure and word-final consonants in GP. Both theory-internal as well as theory-external arguments have led to the GP view of word-final consonants as onsets followed by empty nuclei, instead of codas.

- (1) Structure of vocoid sequences word-internally
- | Diphthong | *Vowel-Glide combination | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------------|-----|---|--|--|--|---|--|---|-----|--|--|-----|--|-----|--|--|--|--------------|---|---|--|
| <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">O</td> <td style="text-align: center;">R</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;"> </td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">/ \</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">x x</td> <td style="text-align: center;"> </td> <td style="text-align: center;">x x</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"><u>V i/u</u></td> <td style="text-align: center;">C</td> <td style="text-align: center;">V</td> </tr> </table> | R | O | R | | | | N | | N | / \ | | | x x | | x x | | | | <u>V i/u</u> | C | V | |
| R | O | R | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| N | | N | | | | | | | | | | | | | | | | | | | | |
| / \ | | | | | | | | | | | | | | | | | | | | | | |
| x x | | x x | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| <u>V i/u</u> | C | V | | | | | | | | | | | | | | | | | | | | |
| e.g. r(ε i) _N k ə | | | | | | | | | | | | | | | | | | | | | | |
| <i>rijke</i> 'rich'(St.Dutch) | *ajp | | | | | | | | | | | | | | | | | | | | | |

⁴ It is generally accepted that the difference between glides and the corresponding high vowels is based upon the position in which they find themselves. This is also the position I take here. Onsets and codas/rhymal adjunct positions typically are occupied by consonants, whereas vowels are always found in nuclei.

(2) vocoid sequences word-finally
Diphthong

Vowel-Glide combination



Generally, diphthongs are assumed to be falling or rising and short or long. The differences between these are as follows. First of all, whereas a long diphthong consists of two skeletal positions, a short diphthong only consists of one. Short diphthongs are among others found in Modern Icelandic, such as in the word /‘haihta/ *hoetta* ‘stop’ (Gussmann 2002:27). The difference between a falling and a rising diphthong is that in a falling diphthong the high vocoid is the second part of the diphthong (/εi/) whereas in a rising one the higher vocoid is the first element (/ie/). Examples of rising diphthongs can be found in, for instance, Slovak. In Kenstowicz (1994) the genitive plural of feminine nouns is discussed. These nouns are formed by the lengthening of the final syllable of the stem. That is, high and low vowels are lengthened and mid vowels turn into rising diphthongs, as in (3).

(3)	nom. sg.	gen. pl.	
	lipa	li:p	‘linden tree’
	mucha	mu:ch	‘fly’
	kazeta	kaziet	‘box’
	sirota	siruot	‘orphan’
			(Kenstowicz 1994:45)

Since only falling, long diphthongs occur in Dutch I will not consider short or rising diphthongs in this thesis.

3.3. Word-final restrictions

Tilburg Dutch has relatively few words ending on a vowel. Words, which *do* end on a vowel often are function words (4a), interjections (4b) or French loans (4c).

(4) a.	Tilburg Dutch function words	
	me	‘with’
	yε	‘you’
	we	‘what’

zɔ 'so' (adv.)
etc.

(4) b. Tilburg Dutch exclamations and interjections:

ba 'yugh'
jɛ 'yes'
ɣɔ 'gee!'

(4) c. Tilburg Dutch (not very recent) French loans

fədysi / fidysi 'trust'
mədɔli 'medal'
pərtensi 'arrogance'
plisi 'police'
etc.

These vowel-final words are relatively rare and belong to certain clearly defined word classes. Below, in 3.5.1 and 3.5.3, possible accounts of these cases are presented.

Besides the cases mentioned above, words hardly ever end in a vowel in this dialect. Word-finally, in addition to consonant-final stems only vocoid sequences occur. The vocoid sequences which can be found in this dialect, are presented in (6). The list is not exhaustive. Whereas they are excluded word-internally, even word-finally vocoid sequences are relatively rare.⁵

First of all in (5), the attested sequences are presented in a vowel chart; for convenience, not with the use of elements but with features.

(5) a. +ATR

		Front		Back			
		Unrounded		Rounded			
High		iu		yu		ui	
Mid				øu			
Low		ai/au					

(5) b. -ATR (short)

		Front		Back			
		Unrounded		Rounded			
High							
Mid		ɛi		œy		ɔi	
Low						au	

⁵ As will become clear later on, these vocoid sequences appear in two contexts: word-finally, as shown here, and before inflectional coronal obstruents.

-ATR (long)

		Front	Back
		Unrounded	Rounded
High			ɔ:i
Mid			ɔ:i
Low			

Not all sequences are equally common (the sequence /ɔi/, for instance, is rare with only one example attested (/hɔi/ ‘hello’)). All Tilburg Dutch vocoid sequences show exactly the same distributional patterns. I will discuss here the sequences which are phonetically similar to, but distributionally distinct from, some sequences in Standard Dutch. To give an impression of all the vocoid sequences found in this dialect, one or more example is given of all of them in (6) below.

- (6) Examples:
- | | | |
|-----|--------|----------------------------------|
| iu | kiu | ‘gill’ (only one example found) |
| yu | nyu | ‘new’ (also nyt, ny) |
| ui | kui | ‘cow’ |
| | yui | ‘good’ |
| øu | løu | ‘lion’ |
| ai | ai | ‘egg’ |
| | kai | ‘stone’ |
| | kərwai | ‘job’ |
| au | yau | ‘soon’ |
| | kau | ‘cold(ness)’ |
| ɔ:i | rɔ:i | ‘red’ |
| ɛi | hɛi | ‘he’ |
| | blɛi | ‘glad’ |
| | rɛit | ‘drive (2 and 3 s.)’ |
| œy | rœy | ‘moulting’ |
| | rœyt | ‘moult (2 and 3 s.)’ |
| | lœy | ‘slow(ly)’ |
| ɔi | hɔi | ‘hello’ (only one example found) |
| ɔ:i | slɔ:i | ‘lettuce’ |
| | kɔ:i | ‘bad’ |
| au | vrau | ‘woman’ |
| | kaus | ‘stocking’ (exception) |
| | pauk | ‘kettledrum’ ,, |

The general picture is clear. In lexical items in Tilburg Dutch, vowels hardly ever occur word-finally while vocoid sequences only occur word-finally (or before an inflectional coronal obstruent, as in /reit/ ‘drive 2 and 3 s.’). There is thus a complementary distribution: word-finally vocoid sequences occur and no ‘simple’ vowels can be found; word-internally we find all kinds of vowels, but hardly any vocoid sequences (except before the inflectional coronal). As an illustration, look at (7).

(7)	word-finally		word-internally	
	blei	‘glad’	mɛ:d	‘girl’
	rœy	‘moulting’	rœ:t	‘diamond’

If we compare these Tilburg vocoid sequences with some phonetically similar sequences in the standard language, we find a remarkable difference between the two variants.⁶ In Tilburg Dutch vocoid sequences (such as /ui/, /ei/, /œy/, and /ui/) only occur word-finally or before an inflectional coronal. In Standard Dutch, on the other hand, we can distinguish two patterns. Some Standard Dutch sequences (e.g. /ai/ and /oi/) show the same co-occurrence restrictions as vocoid sequences in Tilburg Dutch: they occur word-finally and before an (inflectional) coronal. However, other sequences can be followed by almost any kind of consonant (for instance, /ei/). In (8) the Standard Dutch vocoid sequences are given. The sequences which are underlined may co-occur with almost any kind of consonant whereas the other sequences show similar restrictions to the Tilburg Dutch sequences.

(8)	Standard Dutch vocoid sequences		
	iu		ui
	eu / <u>ei</u>	<u>œy</u> <u>au</u> ⁷	ɔi / oi
		ai / ai	

Thus, in Standard Dutch the /iu/, /eu/, /ɔi/, ai/, and /ai/ can only occur word-finally and with (mostly inflectional) coronal obstruents, just like all Tilburg vocoid sequences as in (9a). The second group of vocoid sequences is commonly believed to co-occur with all sorts of consonants, as in (9b).

⁶ I could make similar remarks in comparing the Tilburg facts with facts from other Dutch dialects. In fact, at the end of the chapter some remarks concerning the character of vocoid sequences in other Dutch dialects are made. For now I limit myself to a comparison with the standard language.

⁷ The Standard Dutch vocoid sequence /au/ is generally assumed to co-occur with all kinds of consonants, just like /ei/ and /œy/. However, as will be discussed below, the behaviour of /au/ does not really match that of /ei/ and /œy/. I will try to demonstrate that this difference in behaviour is due to the consonantal status of the second part of the /au/.

- (9) a. Examples of vocoid sequences word-finally or before an inflectional coronal in Standard Dutch

<i>mooi</i>	/oi/	‘nice’	<i>fraai</i>	/ai/	‘nice’
<i>kooi</i>		‘cage’	<i>haai</i>		‘shark’
<i>zooi</i>		‘mess’	<i>baai</i>		‘bay’
<i>hij gooit</i>		‘he throws’	<i>jij naait</i>		‘you sew’
etc.			etc.		

- (9) b. Standard Dutch vocoid sequences with other than coronal obstruents

/ei/	rɛipst	‘ripest’
	rɛik	‘rich’
	wɛif	‘woman (pejorative)’
	hɛix	‘pant (1 s.)’
	blei	‘glad’
/œy/	rœyt	‘window-pane, diamond’
	rœym	‘large, wide’
	hœys	‘house’
	kœyp	‘tub’
	rœy	‘moult’

The second group of Standard Dutch diphthongs – those occurring in non-final position – generally correspond to Tilburg Dutch long lax vowels, as in (9c).

(9) c. Tilburg	Standard Dutch	
/ɛ:/	/ei/	
dɛ:k	dɛik	‘dike’
vɛ:f	vɛif	‘five’
rɛ:kst/rɛkst	rɛikst	‘richest’
ɣɛ:t	ɣɛit	‘goat’
/œ:/	/œy/	
rœ:m	rœym	‘spacious’
rœ:t	rœyt	‘window’
hœ:s	hœys	‘house’
slœ:pə	slœypə	‘to steal’

Summarising, in two closely related languages - Tilburg Dutch and Standard Dutch - similar vocoid sequences show distinct distribution patterns. Furthermore, lexical words with word-final vowels are relatively rare in both languages, but even more so in Tilburg Dutch. In Tilburg Dutch the relatively rare words which *do* end on a vowel are mainly function words, exclamations, interjections, and French loans. In

the next section I try to account for the difference in distribution between diphthong-like sequences (word-finally) and monophthongs (word-internally) in Tilburg Dutch and for the differences in this respect between Standard and Tilburg Dutch.

I will argue that the difference between the two varieties of Dutch is partly due to a difference in the markedness or acceptability of diphthongs. In the Tilburg dialect the grammar does not allow them, contrary to the standard dialect. The standard dialect does not allow for long lax vowels, whereas in the Tilburg dialect these vowels are very common.⁸ The most interesting difference is the difference with respect to the restrictions regarding word-structure: in Tilburg Dutch words preferably have their word-final segmental material occurring in an onset, contrary to the standard dialect in which this preference seems less influential. These differences will be expressed in the technical apparatus of OT, through the FINAL-C constraint (McCarthy 1993).

3.4. Analysis: FINAL-C and other constraints

For the analysis of the distributional peculiarities of vocoid sequences in Tilburg Dutch, as compared to those in the standard Dutch dialect, I will consider Standard Dutch /ei/ and Tilburg /ei/ and /ɛ/. Standard Dutch /ei/ is suitable because in this variant this vocoid sequence is found in the nucleus, accepting almost any kind of consonant(s) to occur after it. I compare this Standard Dutch diphthong with the Tilburg Dutch long lax vowel /ɛ:/ (word-internally) and vocoid sequence /ei/ (word-finally).

My analysis of words without inflectional affixes is based on the insights expressed below. In the case at hand, I will demonstrate that in Tilburg Dutch, more than in the standard dialect, the word-final material must be in an onset (by definition followed by an empty nucleus). This grammatical difference between the two varieties can be efficiently expressed by an OT constraint: FINAL-C.

3.4.1. FINAL-C or the need for word-final material to be in an onset

First of all, I want to account for the fact that we find long, lax vowels word-internally in Tilburg Dutch but not word-finally; in word-final position one usually finds a vocoid sequence. In Standard Dutch this distributional distinction is less strong. This makes sense if we assume that in the Tilburg dialect the constraint that word-final segments should occur in onsets, followed by empty nuclei, is more relevant than in Standard Dutch. That is, this distributional distinction is to be expected if FINAL-C is more important, higher-ranking, in Tilburg Dutch than in Standard Dutch.

⁸ Long lax vowels do occur in Standard Dutch loanwords. Examples are /sɛ:re/, /frœ:le/, ('sun lounge', 'lady') etc.

FINAL-C is a constraint saying that ‘a Prosodic Word cannot end in a (short) vowel, though it can end in a consonant or glide’ (McCarthy 1993:176). This constraint can be interpreted in more than one way. A discussion of some interpretations and a motivation of the interpretation chosen in this thesis follow in 3.5.3. For now, we assume the following definition, slightly adjusted to the GP framework:

- (10) FINAL-C Word-final segmental material must occur in an onset position

The high position of this constraint in the hierarchy of Tilburg Dutch accounts for the fact that we find vocoid sequences word-finally but not word-internally. In words such as /mɛ:d/ and /rɛ:f/ (‘girl’ and ‘rake’, respectively) there is a word-final consonant (/d/ and /f/, respectively) so the high element, occupying the second position of the vocoid sequence, does not have to function as such. Let us consider the (simplified) tableaux of /blei/ and /mɛ:d/ in which we can observe that, in words *without* a final ‘true’ consonant, the high element takes the final onset position in order to satisfy FINAL-C (cf. 12), whereas in consonant-final words the high element occurs in the nucleus - its preferred position (cf. 16).

The tableaux presented in (11), (15) and (16) may be considered mini-grammars of this dialect, accounting for the distribution of the elements I and U. First of all, let us consider the evaluation of an input, which ends in a vocoid sequence in (11).

(11) Tilburg Dutch

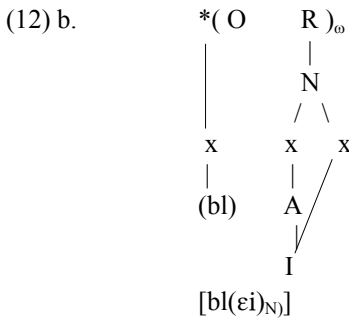
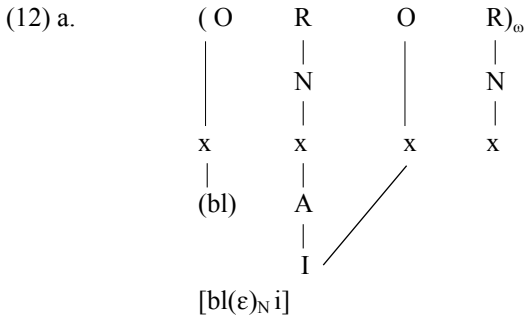
/blei/	FINAL-C	*M/I(~U)	*P/I(~U)
[bl(ɛ) _N]	*!		*
[bl(ɛi) _N]	*!		*
☞ [bl(ɛ) _N i]		*	

FINAL-C has the highest position in the hierarchy: outputs ending in a long lax vowel are generally ungrammatical and unattested. Consequently the candidates [bl(ɛ)_N] and [bl(ɛi)_N] are rejected by the first constraint, FINAL-C.

In Tilburg Dutch elements such as I and U occur in a nuclear position rather than in a consonantal position. This is formulated as *M/I (~U) >> *P/I (~U) (cf. Prince & Smolensky (1991)), which expresses that the element I (and U) rather occurs in a nucleus (‘P’ stands for peak or nucleus) than in a margin (‘M’ is margin, that is, an onset or coda position). In other words, it is worse for I and U to occur in a margin than in a peak position. However, constraints are violable and this is exactly what happens here: although the I element would rather not, it occurs in a margin (that is, onset) position, however *only* because, that way, a more important (therefore higher-ranking) constraint can be satisfied. That is, the I element occurs in a word-final onset, violating *M/I (~U), forced to do so by FINAL-C. Consequently, the I element will only be part of the long lax vowel in the nucleus in consonant-final words, in which FINAL-C is inherently satisfied, as we will see below. bl(ɛ)_Ni

consequently is the form which gets the pointed finger (☞) in the tableau, as it is the winning candidate.

In (12) the representations of $[bl(\epsilon)_N i]$ and $[bl(\epsilon i)_N]$ are given to show the structural difference between the two forms and to demonstrate why $[bl(\epsilon)_N i]$ satisfies FINAL-C.



In (12a) the I element is linked to the onset position, thereby satisfying FINAL-C. In (12b) the I element occurs exclusively in the nucleus; this gives a fatal violation of FINAL-C.

The tableau in (11) accounts for the fact that we find vocoid sequences only word-finally. Of course, this is based upon the assumption that the element I, which represents the high vocoid /i/, is in an onset position and not in the nucleus. One might wonder whether there is any motivation for the assumption that the element I in /blei/ may occur in an onset at all: that is, how do we know that $[bl(\epsilon)_N i]$ is a possible representation? After all, not every vocoid can appear in a consonant position. Furthermore, we have just observed that I and U elements rather occur in nuclei than in onsets or coda's - as represented by the ranking $*M/I (\sim U)$ over (\gg) $*P/I (\sim U)$. This is where another constraint becomes relevant: POSS-MAR ($\pi Mar = I (\sim U)$) (Prince & Smolensky (1991).

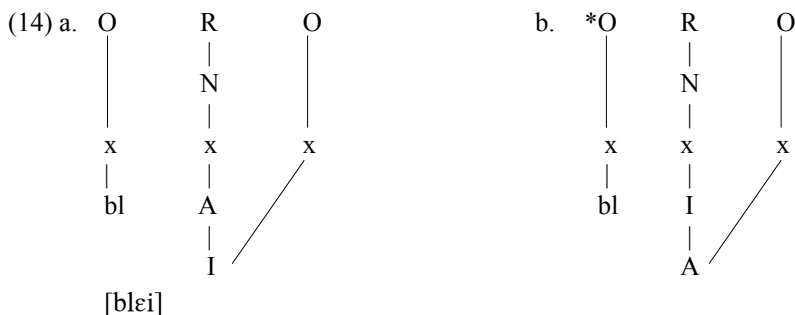
3.4.2.POSS-MAR_t (Mar = I (~U))

The constraint POSS-MAR ($\pi_{\text{Mar}} = \text{I} (\sim\text{U})$) (Prince & Smolensky (1991)) is defined as follows.

- (13) POSS-MAR ($\pi_{\text{Mar}} = \text{I}/\text{U}$) Segments with a sonority greater than π_{Mar} may not be parsed as margins (=onsets or rhymal adjunct positions/codas)

The constraint in (13) tells us which segments may occur in an onset or rhymal adjunct/coda position. It is a parameterised constraint: the value of π_{Mar} depends on the language in question as well as on the universal sonority hierarchy. For Tilburg Dutch the value of π_{Mar} turns out to be I and U (in elemental terms) or /i/ and /u/ (in terms of the segments, represented by these elements), implying that no element *with a higher sonority* than I or U may occur in a consonantal position.⁹ This constraint is motivated as follows.

First of all, the assumption that single I and U elements may occur in onset positions, is not unjustified: high vocoids in onset positions are relatively rare in Tilburg Dutch but they do occur. For instance, there are words beginning with a single element I, commonly transcribed as /j/ in Tilburg Dutch (e.g. /jɔnk/ ‘young’, /jɔ:r/ ‘year’, etc).¹⁰ This means that a single I element can occupy a final onset position in Tilburg Dutch, whereas, for instance, a single A or a combination of A and I could not (cf.14).



In (14a) the I element is fused with A in the nucleus, as a representation of [ɛ]. However, the word-final onset position is occupied by the element I only. This accounts for the fact that words with final /i/ — in a word-final onset position, that

⁹ If I would be fused with, for instance, A, the result would be a segment with a higher sonority (/ɛ/), which would render its occurrence in a consonantal position impossible (in this language).

¹⁰ The situation of the U element is more complicated. It seems as if it is more consonantal than the I element. It might be the case that this is a quality of the element U as such or it might be the case that in consonantal position [u] is not just the element U but has some element extra. I will not go into this subject any further (but see Van der Torre 2003).

is, *not* in the nucleus — are acceptable, whereas for instance words, ending on /a/ (or element A) are not, even if this vowel is linked to a word-final onset position (cf. 14b). Of course, this is why in Dutch we have no glide corresponding to the A element: the constraint forbidding segments more sonorous than /i/ in such a position, prohibits this.¹¹ Note that violating POSS-MAR in order to satisfy the constraint FINAL-C, is not possible because POSS-MAR is more important, higher-ranking, than the constraint necessitating word-final material to be licensed by an onset. Consider the tableau in (15).

(15) Tilburg Dutch

/blɛi/	POSS-MAR	FINAL-C	*M/I(∼U)	*P/I(∼U)
[bl(ɛ:) _N]		*!		*
[bl(ɛi) _N]		*!		*
☞ [bl(ɛ) _N i]			*	

The position of POSS-MAR in the hierarchy is the highest of all constraints. Therefore an imaginary word-final sequence of the type in (14b) can never be found in Tilburg Dutch: with no higher-ranking constraint present to force the violation of POSS-MAR, such an extremely marked segment would never be licensed to occur in that (onset) position. Consequently, such input would never get a phonetic interpretation.

I have discussed the constraints FINAL-C, *M/I (∼U), *P/I (∼U) and POSS-MAR. We have seen why the phonetic form [blɛi] has a representation with the high vocoid – the element I – in the word-final onset position and not in the nucleus ([bl(ɛ)_Ni] vs. *[bl(ɛi)_N]). We have also observed the importance of FINAL-C: without it, the I element would simply occur in the nucleus, as it prefers to do. This means that at least part of an answer is proposed to the question regarding the rarity of words ending in vowels in Tilburg Dutch. If in the input of a word there is a word-final element I or U, it attaches to the word final onset and consequently satisfies the high-ranking FINAL-C. However, there is another distributional fact to account for. Above an attempt has been made to explain why *word-finally* there are hardly any vowels. But, we have still to account for the fact that *word-internally* there are hardly any vocoid sequences in Tilburg Dutch. This is where the constraints *DIPHTHONG and *LONGVOWEL (*LONGV) become important.

¹¹ Note that for English it has been suggested that the /r/ is the ‘glide’ variant of the /a/. There is some discussion about the best way to represent coronal consonants, a.o. in view of the phenomena of the intrusive /r/ in English and the placeless /r/ in Dutch dialects (Van Oostendorp 2001). For instance, Kaye and Ploch assume that the R-element and the A-element should be merged in one and the same element, A (discussion in Linguist List 12.1701, 2001)

3.4.3. *DIPHTHONG and *LONGVOWEL (*LONGV)

The constraints *DIPHTHONG and *LONGVOWEL (*LONGV) have not yet been discussed. They are included in the tableau in (16).

(16) Tilburg Dutch

/mɛ:d/	POSS-MAR	FINAL-C	*M/I (~U)	*DIPHTHONG	*LONGV	*P/I (~U)
☞ [m(ɛ:) _N d]					*	*
[m(ɛi) _N d]				*!		*
[m(ɛ) _N id]			*!			

The input /mɛ:d/ in (16) surfaces with a long lax vowel because apparently a diphthong – two vocoids occurring in a nucleus – is impossible. Given that FINAL-C is already satisfied by the word-final consonant, no violation of *M/I (~U) is enforced. That is, we do not expect the occurrence of a form such as *[m(ɛ)_Nid]: FINAL-C is satisfied by the word-final [d].

It is a well-known observation that there are languages that do not have diphthongs. Tilburg Dutch appears to be one of them: it dislikes diphthongs and prefers long (lax) vowels. Standard Dutch seems to be the opposite. It hardly has phonologically long vowels, but diphthongs amply occur in this dialect.¹² In OT, the constraints *DIPHTHONG and *LONG VOWELS can be used to account for this. These are merely descriptive labels and I propose that what they stand for is the following:

- (17) *DIPHTHONG all material in a dependent position of a nucleus must also be licensed by the head position
- (18) *LONG VOWEL elements in a nuclear non-head position may not be as sonorous as elements in the head position.

In these definitions, it is assumed that whether a language allows for diphthongs or long vowels (or both) is decided in phonology. *DIPHTHONG means that it is only acceptable for an element to be in a dependent nonhead position, if this element is also licensed by the nuclear head. *LONG VOWEL on the other hand stands for the demand that elements in a dependent position of a nucleus may not be as sonorous

¹² As will be discussed in Chapter 4, I adopt the proposal of analysing *phonetically* long/tense vowels as vowels, which are *phonologically* tense or which lack the feature lax. This means that phonologically long vowels are very infrequent in the standard dialect - exceptions are (often French) loans such as [sɛ:rə], [frœ:lə] ('sun lounge', 'lady'), etc.

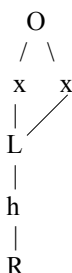
as the material in the head. This is based on the assumption that segmental material rather is in a head position than in a dependent one.

The view that in the case of diphthongs and long vowels segmental material is licensed in the dependent position as well, is contrary to what has been observed in the section dealing with constituent structure in GP (cf. Chapter 2, section 2.3). I have mentioned there that, if melodic material is shared in governing domains it is usually considered to be the case that (part of) the phonetic interpretation of a licensed position is determined by the content of the licenser. This is expressed by Harris in the following way: ‘*This implies that the relevant melodic content is distinctively lodged in the licensing position, even though its phonetic manifestation is smeared over both positions*’ (Harris 1994:166). The case of diphthongs, among others, argues for the assignment of material in a licensed position in phonology itself and not in phonetics. As an illustration, consider a similar case of sharing of material between two position, namely that of branching onsets. Two kinds of branching onsets are presented below.

(19) a. dr



b. *dd



In (19a) the elemental composition of a very common branching onset in Dutch is represented (as in, for instance, /drad/ ‘thread’, /drox/ ‘dry’). Dutch has no geminate onsets: a structure such as the one shown in (19b) is impossible. It is well known that languages do not generally favour geminate onsets or onsets consisting of two segments with only little difference in sonority: the sonority slope in an onset is relatively steep cross-linguistically and this is usually given as an argument for the rarity of geminate onsets. This is rather unexpected if phonologically the melodic material only occurs in the licensing position: if for instance in the representation of a geminate onset, the dependent position in such a domain would *phonologically* be empty, the interpretation being just a matter of phonetics, one would expect geminate onsets to be commonly found cross-linguistically.

The same is true in the case of diphthongs and long vowels. The distinction between long or geminate vowels on the one hand and diphthongs on the other, clearly is a phonological one. However, if all material in such a branching constituent is located in the head, the distinction between diphthongs and long vowels is also largely phonetic. After all, the only distinction between these depends on whether phonetically all material is spread to the dependent position or only some of it.

The notion of Licensing Inheritance (Harris 1994, 1997) has presented the theory of GP with a means to understand why the dependent position can license less material than the head: after all, the prosodic licensing potential becomes depleted when going from head to dependent. The less prosodic licensing power is left for a position, the less autosegmental licensing power it has to license material or, in other words, P-licensed units can A-license less material than P-licensing units. If a dependent position shares its material with its licensing head, this dependent position does not need as much licensing potential. This is why in a coda position some or all of the material is shared with the following, licensing onset. Likewise, in a branching nucleus most material occurs in the head position, the dependent position only licensing the same material as that in the head (long vowels) or the dependent position only licensing material which is less sonorous.

Now that we have discussed all relevant constraints, some remarks concerning the precise ranking of these constraints in this mini grammar of Tilburg Dutch are in order. The fact that only high vocoids (and never A elements, for instance) occur in a word-final onset position in Tilburg Dutch indicates a ranking of POSS-MAR over (>>) FINAL-C. That is, the constraint saying that no element more sonorous than a single I or U element may ever occur in a consonantal or margin position is more important in this dialect than the constraint forcing the final element in the final onset position. This gives us the following ranking.

(20) POSS-MAR >> FINAL-C

Clearly, the fact that we find [blei] and not [ble:] in Tilburg Dutch indicates that FINAL-C is higher ranked than *M/I (OR U) – the constraint *P/I (or U) being so low in the hierarchy that its influence is not felt. That is, although it is undesirable for an I or U element to occur in a margin position (= *M/I (OR U)), it may do so if by violating *M/I (OR U), FINAL-C can be satisfied. This gives us the order in (21).

(21) POSS-MAR >> FINAL-C >> *M/I (OR U) >> *P/I (OR U)

The constraint *DIPHTHONG is higher in the hierarchy in Tilburg Dutch than *LONG VOWEL. This gives us the hierarchy we have seen in (16).

We can now compare this mini grammar of Tilburg Dutch with that of Standard Dutch. In (22) a tableau of [blei] in Standard Dutch is presented, and in (23) that of a consonant-final word, such as [meid]. It is clear that FINAL-C is lower ranking in Standard Dutch than in Tilburg Dutch.¹³ Furthermore, recall that in Tilburg Dutch [bl(ε)_N i] is the final output, demonstrating that in this variety it is worse for a word *not* to end in a consonant than to have the element I in a margin position. In Standard Dutch the situation is different: the element I does not occur in the margin position of such a word: after all, it is not forced to do so in order to satisfy a higher-ranking constraint, such as FINAL-C. Finally, there is no high-ranking constraint prohibiting diphthongs.

¹³ However, see Zonneveld (1978), Krusinga (1983-1939) and Van Ginneken (1934-1935).

(22) Standard Dutch

/blei/	POSS- MAR	*M/I (~U)	*LONGV	*DIPH- THONG	FINAL -C	*P/I (~U)
[bl(ɛ:) _N]			*!		*	*
☛ [bl(ɛi) _N]				*	*	*
[bl(ɛ) _N i]		*!				

(23) Standard Dutch

/meid/	POSS MAR	*M/I (~U)	*LONGV	*DIPH- THONG	FINAL -C	*P/I (~U)
[m(ɛ:) _N d]			*!			*
☛ [m(ɛi) _N d]				*		*
[m(ɛ) _N id]		*!				

If the account just given explains why, in Tilburg Dutch, words generally do not end in a vowel, we are left with the problem that there are exceptions to this general pattern. I will now propose an account for some of the forms in this dialect which do *not* satisfy FINAL-C: function words, exclamations, interjections and i-final French loanwords. In the next subsection (3.5.1) function words, exclamations and interjections are discussed. The sequence /au/ is studied in 3.5.2, while French loan words are discussed in 3.5.3.

3.5. Possible exceptions to FINAL-C

3.5.1. Function words, exclamations and interjections: exceptions?

We will begin our discussion with a group of words which clearly belongs to the class of function words. To account for the vowel-final forms in (4a) (repeated below), I refer to McCarthy (1993). On the basis of intrusive-r phenomena in Eastern Massachusetts American English, McCarthy suggests that function words are not parsed as phonological words. Considering that FINAL-C only affects phonological words and that function words are not parsed as such, these forms do not need to satisfy the constraint.

- (24) Tilburg Dutch function words
 me 'with'
 yɛ 'you'

we 'what'
 zo 'so' (adverb)
 etc.

A similar explanation can be given for word-final vowels in interjections and exclamations (cf. (4b)). It is fairly obvious that these word classes show different phonological regularities in comparison with 'normal' lexical words, just like function words are subject to other phonological constraints than lexical words. For instance, the consonant sequence [ts] is almost non-occurring in Standard Dutch (except for rare words such as *tsaar* 'tsar'). In spite of this, this sequence can be heard often in exclamations. In interjections and exclamations we also find syllable structures that are not acceptable in lexical Dutch words. While in the phonology of Dutch there is a strong ban on syllable final (and word final) lax vowels, we find these in Standard Dutch exclamations and interjections (/ba/ 'yugh', /hɛ/ 'what, how is that?', /xɔ/ 'geel', etc.). These common examples are interesting. As will be discussed in Chapter 4, Dutch has a high-ranking constraint (CONNECT N', LAX) saying that the nucleus of a syllable that consists of a lax vowel needs to be in a branching rhyme; it needs to have a tautosyllabic consonant following it (cf. Van Oostendorp 2000). This constraint is never or almost never violated in lexical words. Nevertheless, it is commonly violated in function words, exclamations, and interjections. If such an important, high-ranking constraint is so commonly violated in such forms, it is only to be expected that violations of a lower-ranking constraint, FINAL-C, occur as well. (25a) presents examples of words violating 'only' FINAL-C and (25b) presents examples, in which both CONNECT N', LAX and FINAL-C are violated. In (26a) and (b), the same is done with function words.

(25) a. Interjections/exclamations violating 'only' FINAL-C

jɔ: 'yes'
 ne: 'no'

b. Interjections/exclamations violating both CONNECT N', LAX and FINAL-C

ɣɔ 'jee'
 ba 'yugh!'

(26) a. Function words 'only' violating FINAL-C

me 'with'
 wi 'who'

b. Function words violating both CONNECT N', LAX and FINAL-C

de 'that'
 za 'will'

In Boutkan & Kossmann (1996), examples can be found of words such as /stɔ:/ 'stand' and /wɔ:/ 'would (want)', violating either just FINAL-C or CONNECT N', LAX

and FINAL-C. These words may be called semi-lexical (following Corver and Van Riemsdijk 2001, referring to Van Riemsdijk (1998)). Typically, these ‘in-between’ subclasses can be characterised as the most frequently used and semantically least specific members of a lexical category (Emonds 1985:162-191, Corver and Van Riemsdijk 2001). Phonologically they seem to behave as function words.

3.5.2. /au/: an exception to FINAL-C?

I have not yet said much about the vocoid sequence /au/ which occurs in Tilburg Dutch as well as in Standard Dutch and in English.¹⁴ I mentioned that in general the standard dialect vocoid sequences /ei/, /œy/ and /au/ are considered to be diphthongs but that there are some doubts regarding the structure of the sequence /au/. In this section I will demonstrate that /au/ is different from other vocoid-sequences, in Tilburg Dutch as well as in Standard Dutch and in English.

Except for Tilburg Dutch, /ei/, /œy/ and /au/ are usually considered to be diphthongs, especially because they are supposed to have the same distributional possibilities as tense vowels. In this section I propose that the Standard Dutch vocoid sequence /au/ has a different structure than /ei/ and /œy/ in that it accepts either no following consonant at all or only a coronal.

Tilburg Dutch /au/ also has a distinct behaviour. In Tilburg Dutch /ei/ and /œy/ may only occur word-finally or before an inflectional coronal. This is not the case with /au/ which may also occur before a non-inflectional coronal consonant, although this is not frequent. We will first consider the Tilburg Dutch case of /au/.

3.5.2.1. /au/ before non-inflectional consonants in Tilburg Dutch

In Tilburg Dutch the alternation between, for instance, /ei/ and /ɛ:/ is phonologically minimal. The distribution can be argued to be determined by the need to satisfy an important requirement in this dialect, such as the requirement for words to end in onsets or the requirement for words not to have diphthongs. For /au/ the situation is different: there is no such minimally distinct alternative. Therefore, it has to stay a vocoid sequence even when it is followed by a coronal consonant. This is possible because of the special character of coronals. The special situation of coronals will be discussed after having considered why there is no alternative to /au/.

¹⁴ The transcription of /au/ varies. For instance, whereas Booij (1995) transcribes the Standard Dutch sequence as /ɔu/, Van Oostendorp (2000) represents this sequence as /bu/. Harris (1994:278, note 52) discusses what appears to be the same vocoid sequence in English and transcribes it as /aw/.

First of all, we will go back to the schematic representation of vocoid sequences, repeated from the beginning of the chapter.

(27) a. +ATR

		Front		Back	
		Unrounded		Rounded	
High		iu		yu	ui
Mid				øu	
Low		ai/au			

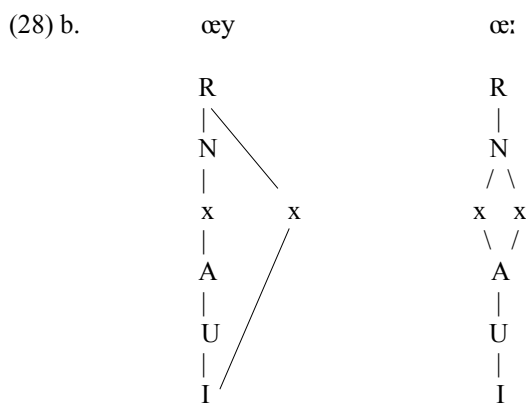
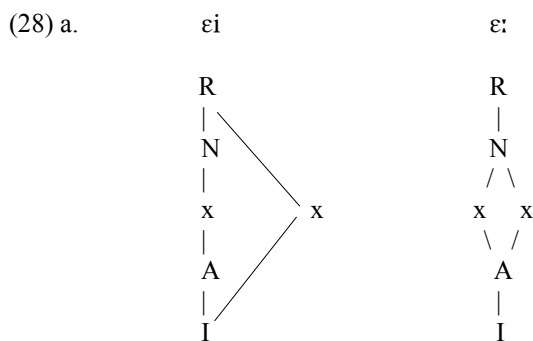
(27) b. -ATR (short)

		Front		Back	
		Unrounded		Rounded	
High					
Mid		ɛi		œy	ɔi
Low					au

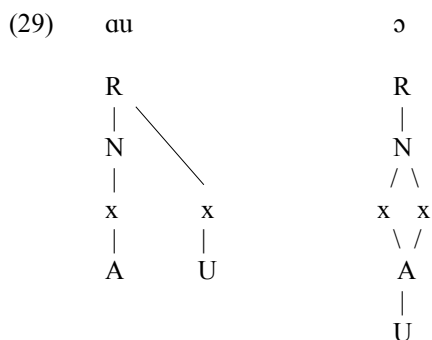
-ATR (long)

		Front		Back	
		Unrounded		Rounded	
High					ʊɪ
Mid					ɔɪ
Low					

Of the vocoid sequences in (27), only the /au/ behaves in this strange fashion, accepting following non-inflectional coronal consonants with relative ease. In order to understand why, we will compare the representation of /au/ with that of /ɛi/ and /œy/. In elements the structure of /ɛi/ (and the corresponding /ɛ:/) and /œy/ (and corresponding /œ:/) is as follows.



The representations above imply that either the element I is uniquely linked to two positions or that all elements are linked to two positions. It also implies that the structure of the head of the rhyme is the same in both representations in (28a) and in (b): it remains respectively (A,I) or (A,U,I). The only thing that changes is the dependent, licensed position in the rhyme. In the sequence-case it shares relatively little material (the element I or U), whereas in the long vowel-case it shares all the elements with the head. Let us compare this with the representation of /au/.



In the first representation in (29) there are two elements in the vocoid sequence, A and U, but, contrary to /ei/ and /œy/, the U element is *only* linked to the second, dependent position.¹⁵ This means that the internal representation of the head of the rhyme changes if there would be an alternation between /au/ and /ɔ/. I will assume that a change in the representation of elemental structure of the dependent, licensed position of the rhyme is acceptable, whereas a change of the elemental structure of the head of the rhyme is not. It is plausible to assume that heads are more stable than dependants. The same situation can be observed with vowel reduction, for instance. The vowel in the head nucleus of a word never reduces, whereas in a licensed position such a phenomenon is widespread. This is illustrated with some examples from Dutch. In /bɑːˈnan/ (‘banana’), for instance, the vowel in the unaccented syllable often reduces in fast speech ([bɑːˈnan]). The vowel in the head nucleus cannot undergo such a change of elemental composition (*[bəˈnən]/*[bɑːˈnən]). The same is true of a word such as /,ekɔnɔːmi/ ‘economy’: the vowels in the dependent positions can change into schwa (/,ekənəːmi/), whereas the vowel in the head nucleus cannot (*[,ekonoːmə], *[,ekənəːmə]).

(30) Standard Dutch vowel reduction

reduced form

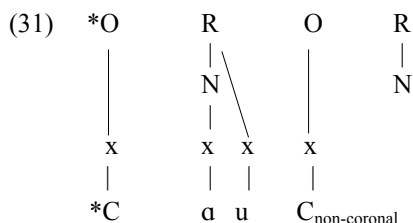
bɑːˈnan	bəˈnan	‘banana’
,ekɔnɔːmi	,ekənəːmi	‘economy’

In a similar way as the vowel in the licensing nucleus of /banan/ does not change, the head of a vocoid sequence or long vowel does not change even if constraints such as *M/I (OR U) >> *P/I (OR U) or *DIPHTHONG, render the alternative form (/au/) highly marked. This implies that in the mind of the speakers there is a tight connection between these vocoid sequences and their corresponding long lax vowels (that is, between /ei/ and /ɛ:/ and between /œy/ and /œ:/). This is not the case for the ‘pair’ /au/ and /ɔ/. This is the reason why we find more *non-inflectional* consonants following this vocoid sequence than other sequences. In other words, the non-existence of an alternative form to /au/ is the reason that we do not see a strict complementary distribution between /au/ and some other long vowel in Tilburg Dutch.

¹⁵ There is no reason to assume otherwise: if the elements A and U would both be linked to the head position in the diphthong, the result would be */ɔu/. However, phonetically there clearly is a A-like sound in the first part, whereas in the general structure of the vowel and consonant system there is no motivation for an analysis which departs from this phonetic identity.

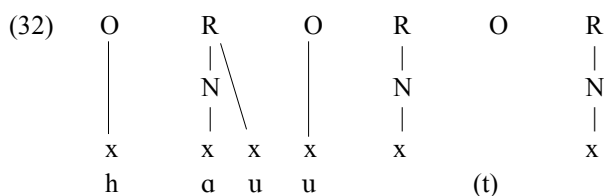
3.5.2.2. Tilburg Dutch /au/ before non-inflectional coronals.

/au/ before non-coronal consonants is worse than before coronal ones. This can be related to the special character of these consonants. In Tilburg Dutch a structure such as the one in (31) below – with a non-coronal consonant following the high vocoid – is impossible or at least very rare. This might be due to the fact that this is an undesirable form. U prefers to be in a nucleus in Tilburg Dutch. In (31) U is in a marginal, coda position without an obvious reason – such as the presence of a high-ranking constraint such as FINAL-C.



On the other hand it *is* possible for the high vocoid (/u/ - or the element U) to be followed by a *coronal* consonant. This suggests that words of a form such as (/CauC_{coronal}/) do not have the same structure as (31).

Coronals are known to have a special status. McCarthy and Taub (1992) observe in their review of Paradis and Prunet (1991) that, although some questions are still unanswered, the common opinion is that coronals are the least marked of all consonants. I propose the phonological representation in (32) for such /CauC_{coronal}/ words. I follow the literature in the assumption that the vocoid sequence in words such as /haut/ ‘wood’ consists of a lax vowel and /u/. I have to assume that /u/ is both in the coda and in the onset position of an empty syllable: if not, the lax vowel would not be followed by a tautosyllabic consonant.



This form is marginally possible because the word-final obstruent is a coronal, which is in some way invisible: it has no skeletal position to which it is attached through A-licensing.¹⁶ The result is as if there is no word-final onset at all.

¹⁶ In Tilburg Dutch there are other words with a structure in which there is one coronal /t/ ‘too much’, such as the second part of /kerheɲst/ ‘troublemaker’. Also in Standard Dutch we have words such as /herfst/ ‘autumn’, in which there are even two coronals extra. In this respect,

Consequently, the /u/ has *some* function after all because it is in some sense word-final (the coronal being only ‘partly’ present). Furthermore, it is a possible phonological structure because the two *adjacent* empty nuclei are collapsed into one, word-final, empty nucleus as a result of the OCP.¹⁷ This solves the problem, because in this language the word-final empty nucleus is by definition licensed. Of course, such a form is, although not as bad as */haup/, not optimal and therefore rare.

3.5.2.3. Standard Dutch /au/

We will now look at the case of /au/ in Standard Dutch. In Standard Dutch, the diphthongs /ɛi/ and /œy/ can occur before any consonant. If /au/ also were a diphthong, it is strange that this sequence has strict co-occurrence restrictions, that is, it can only co-occur with a coronal. As illustrated in (32b), the diphthong /ɛi/ can co-occur with almost any consonant in Standard Dutch, just like tense vowels (cf. 33a).

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------|----|----|--|--|--|---|--|---|--|--|--|---|---|--|----|-------------|-----|----------|-----|-----------------|-----|----------|------|--|---|---|----|----|--|--|--|---|--|---|---|--|--|-----|---|--|------|---------------|------|----------|------|--------|------|--------|------|--|
| <p>(33) a. tense vowels
(in word-final syllable)</p> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">(O</td> <td style="text-align: center;">R)</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;"> </td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">e</td> <td style="text-align: center;">C</td> <td></td> </tr> </table> <p>e.g.:</p> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">et</td> <td>‘eat (1s.)’</td> </tr> <tr> <td>lek</td> <td>‘layman’</td> </tr> <tr> <td>bef</td> <td>‘tremble (1s.)’</td> </tr> <tr> <td>kel</td> <td>‘throat’</td> </tr> <tr> <td>etc.</td> <td></td> </tr> </table> | R | (O | R) | | | | N | | N | | | | e | C | | et | ‘eat (1s.)’ | lek | ‘layman’ | bef | ‘tremble (1s.)’ | kel | ‘throat’ | etc. | | <p>b. diphthongs
(in word-final syllable)</p> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">(O</td> <td style="text-align: center;">R)</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;"> </td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> \</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">ɛ i</td> <td style="text-align: center;">C</td> <td></td> </tr> </table> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">beit</td> <td>‘bite (1 s.)’</td> </tr> <tr> <td>leik</td> <td>‘corpse’</td> </tr> <tr> <td>leif</td> <td>‘body’</td> </tr> <tr> <td>zeil</td> <td>‘sail’</td> </tr> <tr> <td>etc.</td> <td></td> </tr> </table> | R | (O | R) | | | | N | | N | \ | | | ɛ i | C | | beit | ‘bite (1 s.)’ | leik | ‘corpse’ | leif | ‘body’ | zeil | ‘sail’ | etc. | |
| R | (O | R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| et | ‘eat (1s.)’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| lek | ‘layman’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| bef | ‘tremble (1s.)’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| kel | ‘throat’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| etc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | (O | R) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| \ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ɛ i | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| beit | ‘bite (1 s.)’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| leik | ‘corpse’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| leif | ‘body’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| zeil | ‘sail’ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| etc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

The same freedom with respect to the co-occurrence restrictions with following consonants, can be observed with the Standard Dutch diphthong /œy/: it can occur with almost any consonant, just like the tense vowel /ø/, cf. (34).

coronal consonants are different from other consonants. The invisible t-analysis is therefore not ad-hoc: we need some kind of invisibility analysis anyhow.

¹⁷ In a sequence of two adjacent nuclear points, the first one is deleted as a result of the OCP (Charette 1991)

(34)a.	lɔt	‘fun’	b.	bœyt	‘booty’
	bøk	‘beech’		lœyk	‘hatch’
	gløf	‘groove’		dœyf	‘pigeon’
	bøl	‘executioner’		kœyl	‘pit, hole’
	etc.			etc.	

Clearly, /ɛi/ and /œy/ seem to have as much freedom to occur with different consonants as tense vowels. In contrast to this, /au/ only occurs word-finally or before coronals, just like vowel+consonant sequences such as /oi/ or /ai/. These sequences only rarely end in non-coronal consonants, for instance /au + k/: /glauk/ ‘some kind of colour’ and /pauk/ ‘kettledrum’ and /bauksit/ ‘bauxite’. Of these two words /glauk/ is only very marginally known and /pauk/ is onomatopoeic (according to a Dutch etymological dictionary).

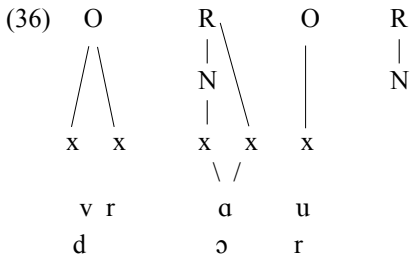
It is remarkable that these Dutch dialects show similar co-occurrence restrictions for /au/. Similar facts have been reported for English as well. In general, only coronal consonants can occur after the diphthong *aw* in English (Harris 1994:278, note 52; Anderson 1986; Hammond 1999). Some examples in the languages in question are provided in (35) below.

- (35) Tilburg Dutch: /vrâu/ ‘woman’, /kaus/ ‘stocking’, /paus/ ‘pope’
 Standard Dutch: /staut/ ‘naughty’, /paus/ ‘pope’, /blau/ ‘blue’
 English: /mauθ/, /paut/, /praud/, /kraun/

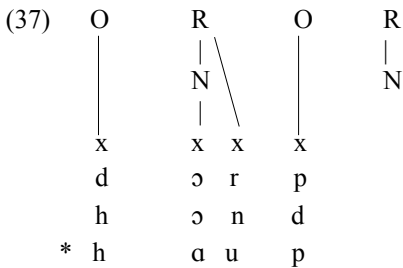
I suggest that for Standard Dutch the explanation lies in the fact that this vocoid sequence is not a diphthong but - unlike /ɛi/ or /œy/ - a vowel+glide sequence or a pseudo-diphthong.¹⁸ This may have to do with the consonantal nature of the U element. The fact that /au/ may co-occur with coronals is not problematic: the behaviour of coronals is special, as has been mentioned above.

The representation of words such as /vrâu/ (‘woman’) or /kau/ (‘cold(ness)’) is structurally the same as the representation of ‘normal’ Dutch words as /dɔr/ (‘barren, dry’). Furthermore, the structure of these forms is similar to that of Tilburg Dutch vocoid sequences. The representation of these words is given in (36).

¹⁸ I suspect that the explanation for the English data is similar, in that English /au/ is not a diphthong but a vowel+glide sequence.



With ‘normal’ Dutch words such as /dɔr/ there is nothing in principle preventing a word-final consonant cluster. Words such as /dɔrp/ (‘village’), /bɔrx/ (‘surety, bale’) and /hɔnd/ (‘dog’) are perfectly regular Standard Dutch words.¹⁹ Such a word-final consonant cluster may end in a coronal but does not necessarily so. In (37) I present the structure of a Standard Dutch word with a word-final consonant cluster.



In such a situation the word-final onset position licenses the rhymal adjunct position; since the /p/ or the /d/ in the onset is less sonorous and more complex than the /r/ or the /n/, this is no problem. Why then do we not find a similar structure with words ending in /u/, except when the last consonant is a coronal (/kaus/ ‘stocking’, /paus/ ‘pope’, /haut/ ‘wood’, etc.)?

I suggest that /u/ cannot occur in a coda position. It occurs in onset positions, although only marginally. This is why we find some words with onsets in /u/ (in Dutch orthography *w*) and words such as (/kaus/ ‘stocking’), which end in a coronal, because of which the /u/ can occur in the onset instead of the coda. It is not clear why exactly /u/ may not occur in coda positions. This is a question for this consonantal analysis of the second part of /au/ vocoid sequences but it also a question for the theory of Dutch phonology in general. Why can’t glides, including

¹⁹ This might be a difference between Standard Dutch and Tilburg Dutch: while in Standard Dutch there is nothing wrong with word-final coda-onset clusters (cf. /dɔrp/ (‘village’), /bɔrx/ (‘surety, bale’)), in Tilburg Dutch the situation is different. In this dialect, it seems that there is a schwa in between these consonants. Only word-final consonant clusters with a final coronal occur. This might indicate that in Tilburg Dutch a word-final onset - which gets its licensing from the following empty nucleus - is never strong enough to license the preceding adjunct or coda position, consequently not allowing structures with two final non-coronal consonants.

the /u/, occupy coda positions? It is well-known that consonants in Dutch do not as freely occur in codas as they do in onsets but this generally goes in the other direction: the more sonorous a consonant is, the more fit to occupy a coda position. I will not discuss this subject any further here.

There are at least two items which need some further clarification. The special status of coronals and the suggestion that U is the most consonantal of the vowel elements in Dutch need some motivation. The special status of coronals has been discussed in the section on /au/ in Tilburg Dutch. The consonantal character of U is discussed here. First of all, the data are not unambiguous. It appears that the Standard Dutch /u/ is more consonantal than /i/ (cf. Van der Torre 2003). Some independent evidence for this is the fact that, in Dutch, sequences of */ji/ are unacceptable (Booij 1995:42, Janson 1986:192 who claims that in many languages the /j/ does not occur before the /i/). The Dutch constraint against tautomorphic */j/ + /i/ is an instance of the OCP (Van Oostendorp 2000:39). That is, words starting with /ji/ start with the element I twice. It is interesting that in the same language /wu/ is well-formed, as in /wudə/ ‘anger’, while */ji/ is impossible. This indicates that /wu/ is *not* represented by two adjacent U elements. This gets some support by the fact that words starting with a /i/ in the onset in Dutch are limited in number as compared to words starting with a /u/. About 26 pages with words beginning with a /i/ as compared to about 127 pages with words starting with /u/ were found in the standard Dutch dictionary (Geerts 1992). This difference in behaviour of the elements I and U might indicate that U in the onset position is not merely an U element but has something extra, ‘disabling’, as it were, the OCP from doing its job when it is followed by a single U element in the nucleus. It might also be due to a lower sonority of the U element in general. On the other hand, the constraints *M/I (OR U) >> *P/I (OR U) have been introduced above, indicating the preference of both U and I elements for nuclear positions in Tilburg Dutch. This preference for nuclei seems difficult to reconcile with the proposal that, fundamentally, the element U is more consonantal than the I element. This point will not be pursued here any further.

In the next section the last category of possible exceptions to FINAL-C is discussed.

3.5.3. Structure versus no structure or the case of French loans

Of the words, which were called possible exceptions to FINAL-C in 3.3, function words, interjections and exclamations have been discussed. In 3.5.1 I have argued that these are not exceptions since these words are not phonological words. In 3.5.2 I discussed that the Tilburg Dutch /au/ behaves in an exceptional fashion because it has no close alternates. Finally, we come to a class of words for which I will conclude that they constitute exceptions. These are French loanwords ending in /i/. The examples of (4c) are repeated in (38).

- (38) fədysi / fidysi ‘trust’
 mədoli ‘medal’

pərtensi	‘pretension’
plisi	‘police’
etc.	

First of all, I will demonstrate that a simpler interpretation of FINAL-C may also account for the supposedly exceptional French loan words. Then I will argue that this interpretation should be rejected in spite of the fact that this grammar seems more inclusive and simple. The reason that it should be rejected is of a theoretical nature.

Consider the French loans *fidysi* and *plisi*. It is clear that they do not satisfy FINAL-C in its current interpretation. Both words end in a filled nucleus position and not in an onset. The margin constraint, POSS-MAR, cannot be of help: in the constraint reference is made to a margin position, which is, like onset, a structural position. There is, however, no way we can say that the word-final [i] in /plisi/ ‘police’ is in a margin position. On the contrary, it clearly is connected with the nuclear position. From the tableau in (39) below, we deduce that /plisi/ should not surface in Tilburg Dutch.

(39)

/plisi/	POSS-MAR	FAITH ²⁰	FINAL-C	*M/I(~U)	*P/I(~U)
[plis]		*!			
[plisit]		*!			
[plisi]	*!		*		

The form [plisi] fatally violates POSS-MAR and consequently should not be a possible output in Tilburg Dutch; however, it is. If we had a grammar such as the one above, we would have to consider such words to be exceptional.

Suppose we leave out all reference to structure in our constraints (margin, onset or any other reference to structural positions). In such a ‘structure-poor’ grammar the two constraints FINAL-C and POSS-MAR amount to the same thing, viz. a constraint forbidding words to end in anything more sonorous than the single elements I or U. Let us label this constraint FINALI/U.

FINALI/U: no word may end on a segment more sonorous than that represented by a single I or U element.

In the mini-grammar below, it can be observed that in such a case the i-final French loans are no longer exceptional.

²⁰ We need a constraint FAITH to exclude forms with epenthesis or deletion. In earlier tableaux we have left it out, because it was unnecessary. For the same reason I have left out *DIPHTHONG and *LONGVOWEL in the tableaux (39), (40) and (41).

(40)

/plisi/	FINALI/U	FAITH	*M/I (~U)	*P/I (~U)
[plis]		*!		
[plisit]		*!		
☛ [plisi]				*

In (40) [plisi] is fine because it consists of nothing more sonorous than single I or U. Furthermore, the mini-grammar based on these new constraints functions also with vocoid-final inputs.

(41)

/blɛi/	FINALI/U	*M/I (~U)	*P/I (~U)
[blɛ:]	*!		*
☛ [bl(ɛi) _N]			*
[bl(ɛ) _N i]		*!	

In (41) [bl(ɛi)_N] is the optimal candidate whereas [blɛ:] is still excluded since in that candidate the final segment consists of more than single I: it consists of (I,A).

The tableaux above demonstrate that we can dismiss FINAL-C and POSS-MAR, replacing them with something like FINALI/U, a constraint which allows for vocoids word-finally but only if they are no more sonorous than the single elements I and U and irrespective of the structural position, in which such vocoids occur. However, I do not consider this a good alternative for the following reasons.

Let us repeat the constraints and their interpretations needed in the two alternative potential grammars of Tilburg Dutch. In the first grammar, reference is made to segmental content, structural positions and the relations between the two. These are constraints referring to segmental content and to constituent position. In this respect these constraints may be called ‘vertical’: they crucially refer to structural relations.

FINAL-C Word-final segmental material must be licensed by an onset position

POSS-MAR ($\pi_{\text{Mar}}=I/U$) Segments with a sonority greater than π_{Mar} may not be parsed as margins (=onset or rhymal adjunct position/coda)

The second grammar has only one constraint. This grammar has a ‘horizontal’ orientation: only the sequence of segments is referred to:

FINALI/U No word may end on a segment more sonorous than that represented by a single I or U element.

One objection to the horizontal FINALI/U grammar is that it is not restrictive enough. If no reference is made to structural positions, things become arbitrary. For instance,

there is no reason why one could not just as easily suggest that there is a language in which words have to end in something less sonorous than a /b/ or /r/; or that segments in the middle of a word can never be more sonorous than a /p/. It is of course highly improbable that such a language exists. If on the other hand, reference to structure *is* made – if for instance, the constraint (or rule) affects a margin (onset or coda) or a nucleus – a constraint such as the one on /b/ or /r/ or /p/, would be impossible. This is so, because the universal sonority preference laws for constituents such as onset and coda exclude such a constraint.

There is also a more fundamental objection to such structure-less constraints as FINAL/U. Constraints are part of a grammar and the analysis of a grammar or grammars should give insights in important aspects of language. If we make use of the constraint FINAL-C, reference is made to requirements on the level of segmental structure, of constituent structure and to the notion of sonority. Consequently it provides insights into these structures.²¹ The following case illustrates this.

It is well known that sonorous segments prefer to be in a nucleus and occupy a margin position only when some other requirement forces them to do so. Tilburg Dutch is such a language. Consider a Tilburg Dutch input /kat/ ‘cat’. This is in many respects an optimal phonological form: the (initial and final) onsets are occupied by two voiceless stops (i.e. of no sonority), whereas the nucleus is occupied by a vowel – a highly sonorous segment. Such a word is an optimal realization of the *requirements on the level of constituent structure*: the word begins and ends in an onset and the onset is filled with non-sonorous material. Similarly, the form is an optimal realization of the *preferences of the segments*: non-sonorous segments such as /k/ and /t/ prefer a consonantal margin position and a sonorous segment such as /a/ prefers to occur in the nucleus. No compromise between requirements on the level of constituent structure and requirements on the level of segmental structure is required.

A compromise is often necessary: if the segments in question consist of only vowels or only consonants, one of those may sometimes accept a less optimal choice. Consider the input /iɔ:r/ ‘year’. In such a word two vocoids (with a relatively high sonority) are present: /i/ and /ɔ/. The second vowel is long: it occupies two positions. In such a situation a compromise is necessary. In this language, the requirement on the level of constituent structure requires the word to begin with an onset. There is only an /i/ present as first segment; it prefers to be in the nucleus (one of the demands on the segmental level). In this case the demand on constituent structure for words to begin with an onset, outweighs the demand on segmental preference, requiring vowels (even high ones) to be in the nucleus. Therefore, the word is pronounced with an initial glide, *j*aor ‘year’. Of course this is a gross simplification of the facts. My aim is merely to illustrate the necessity of having grammars which refer to vertical structural relations and the way the vertical and horizontal dimensions are mapped on each other. From the discussion I conclude that French loanwords are best analysed as exceptions to FINAL-C.

²¹ The entire discussion of this subject draws heavily on Prince & Smolensky (1991).

3.5.4. Sonority

As sonority plays an important role in this chapter, I will dedicate the next paragraphs to a discussion of this notion. Most scholars agree that sonority plays an important role in many diverse and very common phonological phenomena. Yet there is little agreement about what sonority is and what the representation of it should be. A simple version of the sonority hierarchy is given in (42).

- (42) vowels glides liquids nasals obstruents
 most sonorous → least sonorous

As straightforward as such a hierarchy might seem, it is difficult to find a clear phonetic correlate. This is one of the reasons why Van der Linde (2001) calls sonority a purely *phonological* or *structural* notion - it has more to do with the structure of phonological units, such as the syllable or the word than with *phonetic* (articulatory or auditory) characteristics.

This subject received some attention when I discussed lenition processes in Dutch in Chapter 2. I have argued that such sonority related phenomena can be quite adequately ‘covered’ by complexity in the GP view of Harris (1994). The more complex a segment is, the less sonorous it is and the more prone to lenite in a weak position. This is an advantage of GP over other theories: the sonority hierarchy is as it were, already present in the structure of the segment in terms of complexity. An example of such a lenition process in Tilburg and Standard Dutch is the process by which a voiced coronal obstruent (/d/) becomes a glide (/j/) foot-internally. This can be considered a process of decomposition: the segments become less complex. This is illustrated by the Standard Dutch facts in (43).

- (43) rodə /rojə ‘red’
 radə /rajə ‘to guess’
 dodə /dojə ‘dead’

In an elemental representation this would be something like:

- (44) d > j
- | | | |
|---|---|---|
| x | | x |
| | | |
| | h | |
| | | |
| | R | I |
| | | |
| | L | |

In (44) the segment clearly becomes less complex. In this chapter we have come across another instance of a sonority-related process. I refer to the sonority-related scalar difference, not only between stops and vowels but also, in a more subtle fashion, between vowels, such as /i/ and /a/. We have followed Prince & Smolensky (1991) and proposed a requirement that in Tilburg Dutch the segment /i/ (or /u/) is the most sonorous element which can occur in a margin position (i.e. POSS-MAR ($\pi_{\text{Mar}} = \text{I}$)). This constraint refers to a sonority hierarchy in which the vowel /a/ (represented by element A) is more sonorous than /i/ (element I) which in turn is more sonorous than any consonant.

The determination of optimal margin (onset and coda) segments and optimal nuclear segments seems harder to express in GP. Complexity will not prove satisfactory here. The problem is evident in at least two cases. A hierarchy going from extreme margin-preference to extreme nucleus-preference cannot be easily expressed in the framework of Harris (1994). In this framework sonority is expressed as ‘lack of complexity’: the more sonorous a segment is, the less complex its representation and vice versa.²² I will discuss in some detail the problems connected to Harris’ (1994) proposal. If (high) sonority is lack of complexity, it makes sense that for instance /p/ has three elements in its representation and /a/ one, as in (45).

(45)	p	a
	x	x
	h	A
	U	
	?	

However, when we compare /a/ with the representation of consonants such as /r/ or /ʔ/ the story becomes less clear. All these segments consist of only one element, R, ?, and A, respectively. However, nobody would deny that /r/ and /ʔ/ are consonants and less sonorous than the vowel /a/. A vowel such as /e/ would even have more elements and would therefore be more complex and less sonorous than consonants such as /r/ and /ʔ/. One can hardly imagine a language in which there is a rule or constraint saying that a nucleus should consist of that /r/ and /ʔ/ rather than of the vowel /a/. The same is true of two vowels, such as /e/ and /i/. Although the first vowel is more sonorous than the second, the last one is less complex.

²² Rice (1992) also connects complexity and sonority but in the inverse way. That is, in both views sonority is encoded in segmental structure itself, in segmental complexity, but in Rice greater sonority implies greater complexity. The principle in both approaches is the same: sonority is expressed in terms of complexity.

One of the problems is that the GP representation of Harris (1994) includes more factors than sonority. These factors contribute to complexity while they are not relevant for sonority. Take for example place.²³ As far as place is concerned, a segment such as /e/ could very well be represented as a combination of the elements I and A. This would however make the vowel in question more complex and thus less sonorous than the /i/, which is quite contrary to known typological facts.

It is not only the case that many elements not relevant to sonority, are contributing to the complexity of a segment, but it is also the other way around: not every factor relevant to sonority is included in the representation. It appears that continuancy is relevant for sonority. Lenition phenomena in which obstruents such as /p/ or /t/ historically change into /f/ and /s/ are widespread. In Harris' framework this can be expressed as a loss of complexity, as illustrated in (46).

(46) t > s

x	x
h	h
R	R
?	

(Harris 1994:124)

This is a case in which an obstruent becomes more sonorous through the loss of 'stopness' and/or the increase of continuancy (structurally the loss of the element ?). A phenomenon which we may analyse as having to do with continuancy occurs in Tilburg Dutch. In this dialect FINAL-C is satisfied if the word ends in a margin-position. For instance a final onset occupied by a high vocoid (element I or U). This is a second-best solution, since these high vocoids prefer to occur in a nucleus. However, the vocoid /a/ (A in elemental terms) not only prefers to occur in a nucleus, it is also completely disallowed in a margin position. Thus, there is a difference between the vowels /i/, /u/ and /a/ – or elements I, U and A – in this respect. One may assume that the difference between vowels such as /i/ and /a/ – or the elements I and A – is mainly one of sonority. With the element I there is more closure and therefore less continuance, than with A. One might think of this difference as one on the same scale as the difference between /p/ and /f/: going from /p/ to /f/ is like going from /u/ to /a/. It goes from non-continuous to somewhat continuous to even more continuous, etc. There is no way to express this in GP.

While the elemental structure functions very well in many respects, the structural representation of vowels and consonants needs something more. What we need is an expression of what I have called here 'continuancy' or stridency. In the literature one can find a relevant proposal: Radical CV Phonology (among others,

²³ See Rice (1992) and work cited therein for arguments that place is not part of the sonority dimension. This contrary to for instance Selkirk (1984) who argues that place *can* be part of the sonority scale.

Van der Hulst 1995, Ewen and Van der Hulst 2001). Van der Hulst (1995) uses C for a relatively high degree of stricture and V for an unimpeded outflow of air (as in sonorants). In this way one can analyse the sonority hierarchy from the most open vowels to the most ‘closed’ obstruents. However, it also has another advantage. Harris (1994) states /i, a, u/ to have the most simple structure of the vowels, a structure consisting of the elements I, A, and U only. These are the most unmarked vowels universally. However, the ‘primary’, unmarked consonants, the voiceless stops, have a complex structure. This is a consequence of the fact that the elemental structure also represents sonority. If we take sonority out of the elemental representation as found in Harris (1994), we can present stops as the most unmarked consonants (cf. Van der Hulst op. cit.).

In other words, at least two important factors determine where a segment might be found. In the first place, the factor of complexity: licensing positions demand a higher complexity of its segments than licensed ones. In the second place, there is the factor of C/V, consonantness/vowelness, stridency/sonority: in licensed positions, a C or V can become more C-like or more V-like depending on the surrounding context.

I do not want to go into the details of the theory presented in Van der Hulst (1995). However, I think that the solution to the problem of how to represent the processes which are connected with sonority, lies in the approach which represents sonority as relating to ‘vowelness’, V. Non-sonority or extreme stricture can be seen as ‘consonantness’, C. Consonantal lenition can then be considered to be assimilation: an intervocalic consonant assimilates to the vowelness, i.e. the sonority, of the surrounding vowels (cf. 47).

$$(47) \quad V \quad C\alpha \quad V \quad \rightarrow \quad V \quad \begin{array}{c} V \\ | \\ C\alpha \end{array} \quad V$$

(Van der Hulst 1995:101)

In such a view, the representation of lenition in (43) and (44) implies that a consonant assimilates to the surrounding vowels by becoming more vowel-like. The opposite process, Final Devoicing (cf. Chapter 6), can be considered to be a process in which a voiced stop becomes more consonant-like. As expected both processes only occur if the relevant positions are weak (licensed).

In this section I have motivated my choice for FINAL-C, a constraint referring to structural relations as well as to segmental content, over that for FINALI/U, a constraint referring to segmental content and sequence only. I have also discussed the way in which sonority is an important item in the selection of /a/ over /i/ for a nucleus. I have argued that in GP this subject might need more attention. FINAL-C, itself, deserves further study. Its controversial character makes it important to demonstrate that it does not only show up in the case of the diphthong/monophthong distribution in Tilburg Dutch.

3.6. Support for FINAL-C

3.6.1. Diphthongs in other Dutch dialects

This chapter started with a discussion of diphthong-like structures in Tilburg Dutch. I have attempted to show that the behaviour of vocoid sequences in this dialect can be accounted for by the high-ranking of the constraint FINAL-C in this dialect. We will now consider similar phenomena in other Dutch dialects.

It is interesting that Dutch shows a large variation as far as the dialectal distribution of diphthongs is concerned. Standard Dutch is commonly assumed to have three diphthongs: /*ei*/, /*œy*/, and /*au*/ - I abstract from my own conclusion in section 3.5.2. that /*au*/ actually is not a true but a pseudo diphthong. Historically their predecessors are the following (cf. Van Bree 1987, Van Loon 1986, Boutkan & Kossmann 1996).

- (48) *ei* < **ai*, **i*
 au < **u*
 œy < **iu*, **u*

For our purposes it is not relevant to discuss the different reflexes of these Westgermanic forms in detail. I will make some remarks, however, with respect to role of FINAL-C and its relation to diphthong-like constructions in Dutch dialects.

Weijnen (1991) discusses diachronic and synchronic Dutch dialectal phonology. He mentions that in many Dutch dialects (including Standard Dutch), West-Germanic long /*i:/* and /*u:/* have become diphthongs.²⁴ This was the case in the dialects of the Holland and Utrecht area as well as the southern central parts of the Dutch language area. The monophthongs /*i:/* and /*u:/* remained monophthongal in the north- and south-eastern parts of the Dutch language speaking area (from the province of Groningen to the eastern part of the Limburg province) and the south western dialects (French- and West Flanders and the Dutch province of Zeeland) (cf. Weijnen 1991:252, map 11 and Goossens et al. 2000). Interestingly, in the eastern parts – where the monophthong is still present – a vocoid sequence generally occurs word-finally. Of course, this word-final context is not the only factor in diphthongisation; Weijnen (1991) mentions other factors as well. As the present chapter is dealing with FINAL-C, I will restrict myself to that topic.

Goossens et al. (2000) discusses, among other things, the vowels, including what they call ‘diphthongs’ in Dutch dialects, on the basis of the West-Germanic proto-forms. With respect to the West-Germanic /*i:/*, we find that in the north-eastern part of the Dutch speaking area – in the provinces of Groningen and Drenthe – the vowel is monophthongal when it is not word-final. If we look at specific places in

²⁴ West-Germanic **ai* has shown a more complex development; I will not discuss its reflexes here.

that area, for instance Aduard, Sint Annen and Roderwolde, we find a long or short /i/ as the equivalent of Standard Dutch /ei/. Consider the following examples.

(49)	Roderwolde	Aduard	Sint Annen	Standard Dutch
	fin	fin	fɪ:n	fɛin
	listər	listər	listər	lɛistər

However, in the equivalents of the Standard Dutch *vrijen* ‘to make love’, we find an /ei/. In Goossens et al. (2000) the position of this /ei/ is called ‘hiatus position’. In the terminology of this thesis, this is an internal or lower word position: the lower phonological word, corresponding to the morphological stem /vrɛi/ without the inflectional, infinitival suffix /ən/ for infinitive.²⁵ The following representation makes this clear (see also chapter 5).

(50)	Morphological Structure:	[[vrɛi] _v	n] _v
	Phonological Structure:	((vrɛi) _ω	n) _ω

(50) shows that the vocoid sequence occurs at the end of the phonological word – the word without inflection. This means that FINAL-C is active in the domain of the phonological word without adjoined inflectional material (see Chapter 5). Apparently there is a complementary distribution between the /i:/ and the /ei/: the first occurs word-internally and the second word-finally. I propose that /ei/ in this dialect is not a true diphthong. The high-ranking constraint FINAL-C forces the high vocoid in a consonantal position.

We will now go from the north-eastern part of the Dutch language area to the south-eastern part. According to Weijnen (1991) a ‘diphthong’ often occurs in hiatus or word-final position in the eastern parts of the monophthongal area (where the /i:/ and /u:/ remained monophthongs). An instance of a south-eastern dialect is Meijels – a dialect spoken in Dutch Limburg, not far from Northern-Brabant. Hermans and Crompvoets (2002) discuss the phenomenon of palatalization in this dialect as a compensation for the reduction of diphthong-constructions. I will not attempt to present their analysis but will present some of their examples.

Hermans and Crompvoets show that the dialect of Meijel has palatal consonants where the standard dialect has coronal ones.

(51)	Meijels	Standard Dutch	
	[ɪs ^j]	[ɛis]	‘ice’
	f[m ^j]	f[ɛin]	‘nice’

²⁵ In the north-eastern dialect this suffix generally consists of a syllabic nasal only, without a schwa. In Standard Dutch, this suffix is a schwa, without a nasal. For the analysis here this is of no importance.

br[ɣtʰ]	br[œyt]	‘bride’
d[ɣzʰ]ent	d[œy]zent	‘thousand’

(Hermans and Cromptvoets 2002:35)

This palatalization cannot be the result of assimilation, as non-palatalized consonants also occur after these vowels.

(52)	z[ɪ]s	‘six’
	p[ɪ]nne	‘spiders’
	k[ɣ]sse	‘pillow’
	k[ɣ]nning	‘king’

The essence of their analysis is that palatalization in this dialect is an instance of the tendency to avoid diphthongs, while keeping the [+high] element. This element is attached to the following consonant, if this is a coronal. However, the fact that diphthongs, even though they are rare, *do* actually occur in this dialect is a problem for their analysis. They suggest that a solution could lie in the fact that diphthongs occur word-finally (cf. 53).

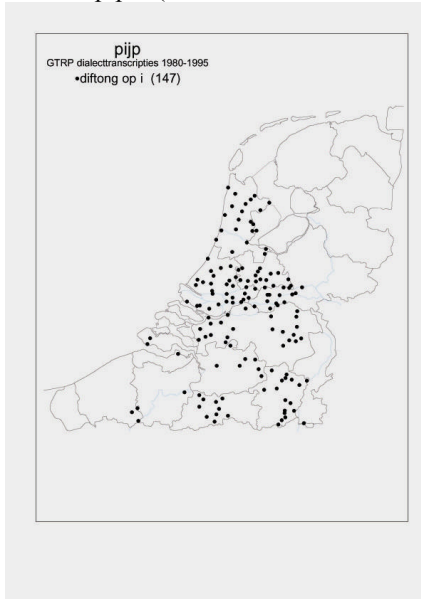
(53)	sn[ɛi]	‘cut’ (1 s.)
	vl[ɛi]	‘flatter’ (1 s.)
	[ɛi]	‘egg’

Hermans and Cromptvoets suggest that these diphthongs occur because of a high-ranking constraint, preventing segments from changing word-finally. This prevents underlying diphthongs from being realized except in these contexts. Draye (2002) remarks that this is contrary to the historical facts. Dutch diachronic phonology shows, according to Draye, that diphthongisation does not occur less often but on the contrary, more often before hiatus, including pause. Thus it seems probable that these diphthongs occur word-finally in this dialect because of the high-ranking constraint FINAL-C.

As a final illustration of FINAL-C and its apparent role in the complementary distribution between monophthongs word-internally and (pseudo-)diphthongs word-finally in Dutch dialects, I have included two maps: one of the equivalents of English ‘pipe’ (Standard Dutch /peip/) and one of the equivalents of English ‘free’ (Standard Dutch /vrei/).²⁶ The dots indicate the presence of diphthong-like constructions. It is evident from these two maps that word-finally a diphthong-like construction is much more frequent than word-internally: the difference is quite striking, especially in the eastern part. This is, I suggest, partly a result of FINAL-C.

²⁶ I thank Boudewijn van den Berg for these maps, as well as for the map in the first part of Chapter 1.

Map 2. Occurrence of word-internal diphthong /ei/ of Dutch, as in Dutch /pɛip/ ‘pipe’ (source GTRP dialect transcriptions 1980-1995)



Map 3: Occurrence of word-final diphthong /ei/ as in Dutch /vrɛi/ ‘free’ (source GTRP dialect transcriptions 1980-1995)



This monophthong /pseudo-diphthong distribution is not the only indication of FINAL-C in Dutch. Below I provide evidence from the dialect of Tilburg Dutch as well as from other dialects, such as the dialect of Groningen in the north-eastern part of the Dutch language area, as well as, remarkably, from Standard Dutch.

3.6.2. Other phenomena supporting FINAL-C

3.6.2.1. FINAL-C: Dutch dialects and placeless consonants

Not only the distribution of diphthongs but also the behaviour of /r/ indicates the relatively high-ranking of FINAL-C in Tilburg Dutch. As argued in Van Oostendorp (2001), the /r/ shows chameleonic behaviour with respect to consonantality. The more consonantal the position, the less sonorous the realisation of /r/ is. The author claims that the /r/ is particularly sensitive to such a constraint because it is not predetermined for place.

In Tilburg Dutch, the /r/ is classified as a fricative by Boutkan & Kossmann (1996). However, if one looks at the data in their book, it seems that the picture is less straightforward. That is, the /r/ in Tilburg Dutch does indeed show chameleonic behaviour: sometimes it behaves as if it were a sonorant, sometimes it behaves as if it were a fricative. As we would expect its behaviour is more consonant-like and thus more fricative-like, if it is word-final; when not word-final, it behaves like a sonorant.

In (54) and (55) I give some examples in which the /r/ behaves as a fricative. In these cases, the /r/ is word-final, except for an inflectional coronal obstruent. With respect to these inflectional coronals I claim that they are outside the phonological word proper in Tilburg Dutch (cf. Chapter 6). In (54) /r/ patterns with fricatives in that in words ending on fricatives and /r/, vowel shortening in certain inflectional forms is unnecessary or even impossible.

(54)	blɛ:və	‘to stay’	hɛi blɛft/blɛ:ft	‘he stays’
	drɔ:və	‘to carry’	hɛi drɔ:xt	‘he carries’
	vɛ:rə	‘to spring’	<u>hɛi vɛ:rt</u>	‘he/it springs’
	<u>hɛ:rə</u>	‘to hear’	<u>hɛi hɛ:rt/hɛ:rt</u>	‘he hears’
	versus:			
	lɔ:pə	‘to walk’	hɛi lɔpt	‘he walks’
	stɔ:tə	‘to push’	hɛi stɔt	‘he pushes’
	bɛ:nə	‘to tie’	hɛi bɛnt	‘he ties’
	vɛ:lə	‘to file’	hɛi vɛlt	‘he files’

(Boutkan & Kossmann 1996:37)

In (55) /r/ final stems pattern with /v/ and /ɣ/ final stems in that they always have a -t ending whereas verbs ending on /p/, /k/, /m/, /n/ /ŋ/, or /s/ (with vowels /ʊ/, /u:/, /ɪ/, /ɪ:/ there is variation).

(55)	ɣei blɪ:ft	‘you stayed’
	ɣei bu:xt	‘you bowed’
	<u>ɣei vərɫʊ:rt</u>	‘you lost’
	versus:	
	ɣei klʊm / klʊmt	‘you climbed’
	ɣei dʷɔŋ	‘you forced’
	ɣei wɪ:s / wɪ:st	‘you showed’

(Boutkan & Kossmann 1996:65)

For the moment, I have nothing to say on the question as to why stops pattern with sonorants.²⁷ This seems exactly opposite to what we expect. What is relevant at the moment, though, is that, in word-final position the /r/ patterns with fricatives and not with sonorants. Below I will give some examples, in which the /r/ patterns with sonorants.

(56) a.	kæ:rəf	‘basket’
	ɛ:rəm	‘arm’
	kələf	‘calf’
	kələm	‘calm’

(Boutkan & Kossmann 1996:36)

b.	after /m/, /n/, /ŋ/, /l/, /r/, /ə/ : /zə/ (3 s. enclitic)	
	vil-zə	‘did she fall down?’
	<u>ɣur-zə</u>	‘did she sail?’
	rest: /sə/	
	lip-sə	‘did she walk?’
	blɪ:f-sə	‘did she stay?’
	ɣɔ:sə	‘does she go?’
	re-sə	‘did she drive?’

(Boutkan & Kossmann 1996:71)

Even though not all details are clear, it is evident that the behaviour of Tilburg /r/ is forced by FINAL-C to pattern with fricatives when it is word final and with sonorants elsewhere. That is, in this dialect not only the distribution of diphthongs and long lax vowels show the force of FINAL-C, but also the properties of the /r/.

²⁷ A connection between stops and sonorants is that both are [-continuant] in contrast to fricatives, which are [+continuant].

It has been argued that in Tilburg Dutch the consonant /r/ shows chameleonic behaviour with respect to consonantality. The more consonantal the position, the less sonorous its realisation is. The /r/ can be considered to be especially sensitive to such a constraint because it is not predetermined for place. This seems to be the case not only for Tilburg Dutch, as I have demonstrated in the preceding paragraph, but also for both Groningen Dutch and Maasbracht Dutch, as I will demonstrate presently.

In Maasbracht Dutch FINAL-C plays a role in the realisation of /r/ and /ŋ/: both these consonants are placeless; consequently FINAL-C can determine the realisation as an obstruent word-finally and as a sonorant word-internally (Van Oostendorp 2001). The same is true of Groningen Dutch. Note, for that matter, that both dialects are spoken in the eastern part of the Dutch speaking area – where Weijnen (1991) notes a preference for monophthongs word-internally and diphthongs word-finally. It is not surprising then, that in these dialects FINAL-C has an influence on the realisation of a placeless consonant such as /r/.

3.6.2.2. Maasbracht Dutch

Hermans (1994) discusses the dialect of Maasbracht Dutch. This dialect has two tones, usually called a falling tone and a dragging tone. The falling tone begins with a high pitch which swiftly falls (high-low). The realisation of the dragging tone depends on its position in the word: it is a level, high tone when it is followed by another syllable in the utterance. When it is utterance-final, the first part of the tone is falling and its second part rising (high-low-high). Some examples can be found in (57).

(57)	falling tone	dragging tone
	bii ‘bee’	bii ‘at’
	buu ‘to build’	buu ‘construction’
		(Hermans 1994:283)

There can only be a tonal contrast if there are at least two sonorants. In (57) we have seen minimal pairs with (long) vowels. In (58) we find minimal pairs with short vowels and sonorant consonants. As can be seen in (58b), no tonal contrast is possible when an obstruent follows the short vowel.

(58) a.	falling tone	dragging tone
	mm ‘minus’	mm ‘vile’
	məl ‘to break’	məl ‘mole’
b.	prt ‘kernel’	
	tæs ‘bag’	

What is striking is that in word-final position, the /r/ and the /ŋ/ are not tone-bearing units (cf. (59)). In a manner of speaking, they behave as if they were obstruents

instead of sonorants. This is not the case in word-internal position: /ɛr.ɣər/ ‘worse’ and /‘ɛr.ɣər/ ‘to annoy’ have distinct patterns - the first a falling and the second a dragging tone (Van Oostendorp 2001).

- (59) strɑŋ ‘severe’
 stɔŋ ‘stood’
 krɪŋ ‘bitch’

 vær ‘far’

Van Oostendorp (2001) suggests that /ŋ/ and /r/ are both placeless consonants. Therefore FINAL-C is at liberty to take up the most consonantal realisation of /ŋ/ and /r/ in the final consonantal position in the word.

3.6.2.3. FINAL-C in Groningen Dutch

Humbert (1996) notes a similar phenomenon in the Dutch dialect of Groningen. In this dialect the /r/ is deleted - that is, it becomes vocalised - before labial and velar consonants. However, before coronal consonants or word-finally the /r/ generally is realised.

- (60) /r/ before coronals:
 /bɔ:rd/ [bɔ:rt] ‘beard’
 /hird/ [irt] ‘fireplace’
 (but e.g. [swat] (without r) ‘black’)

 /r/ before labials and velars:
 /arm/ [am] ‘arm’
 /stœrm/ [stœm] ‘storm’

(Schuringa 1923:53-59)

Humbert (1996:151) argues that these distributional facts have resulted from the tendency in Dutch to have word-final syllables end in a coda. Although she does not mention a FINAL-C constraint, her analysis clearly amounts to the same thing.

3.6.2.4. Standard Dutch and FINAL-C

Even though a constraint such as FINAL-C does not really play an important role in output structures of Standard Dutch, its presence in the language is clear. For instance, according to Trommelen and Zonneveld (1989:154) Standard Dutch diphthongs *ei/ij*, *ui* and *ou/au* (/ɛi/, /œi/, and /au/) are more frequent in final syllables than non-finally. However, contrary to Tilburg Dutch, they occur word-

internally as well. This indicates that the constraint FINAL-C plays a role in the standard language, but that this role is less prominent than in a dialect such as Tilburg Dutch (and others, see below). Though the influence of FINAL-C is less marked in Standard Dutch than in other Dutch dialects, a principle amounting to something like FINAL-C is mentioned by quite a few authors, long before McCarthy (1993) formulated this constraint.

Zonneveld (1975, 1976) argues for a morpheme structure constraint disallowing (underlying forms of) monosyllabic native noun stems ending on a vowel - that is, they end either in a consonant or in a glide.²⁸ In Zonneveld (1978) it is mentioned that, independently, this constraint is already given in Kruisinga (1938/9),²⁹ and is hinted at in Van Ginneken (1934-1935:9-10): '*Also word finally all vowels are relatively rare*'.³⁰ Kruisinga does not discuss the difference between underlying forms and surface representations in this respect. We may assume that he claims this to be true of the words as he observes them in the language. According to Kruisinga, the high amount of words ending in a consonant is not only observed in Dutch but also in English and German, although less so in English.³¹ In French, Kruisinga states, words are more often vowel-final than consonant-final.

Zonneveld (1978) mentions a small class of Modern Dutch verbs with monosyllabic infinitives, e.g. the verbs *doen* 'to do', *gaan* 'to go', *slaan* 'to beat', *staan* 'to stand', and *zien* 'to see'. These common verbs appear to use the consonant-final forms as stems in derivational morphology (instead of the first-singular forms/'true' stem forms such as *doe*, *ga*, *sla*, *sta*, and *zie*, respectively). Examples can be found in (61).

(61)	<i>ondoenlijk</i>	'unfeasible'
	<i>weldoener</i>	'benefactor'
	<i>begaanbaar</i>	'passable'
	<i>onverslaanbaar</i>	'unbeatable'
	<i>buitenstaander</i>	'outsider'
	<i>voorziening</i>	'provision'

(Zonneveld 1978:90-91)

²⁸ Supposedly this morpheme structure constraint would be true for underlying forms, such as /kui/ and /vloï/. To arrive at the surface /ku/ and /vlo/ ('cow' and 'flee', respectively) Zonneveld proposes a rule of final glide deletion. This form suggests a constraint in the standard language which is higher-ranking than FINAL-C and which forces its violation.

²⁹ Kruisinga (1939) mentions that, although monosyllabic words in Standard Dutch rarely begin with a vowel, it is even more rare for them to end in a vowel. This would not only imply a high-ranking of the constraint ONSET - as is commonly assumed to be the case cross-linguistically - but in Dutch also of the constraint FINAL-C.

³⁰ 'Ook aan het wordeinde zijn alle vocalen betrekkelijk zeldzaam'

³¹ Golston and Wiese (1998) state that 96% of the German roots are consonant-final. According to the authors FINAL-C that accounts for this. According to the authors 94% of their corpus consists of consonant-initial roots.

Van Oostendorp (2000) suggests that the schwa-epenthesis, occurring in words such as /mɛlk/ ‘milk’, /kɛrk/ ‘church’ - pronounced as /mɛlk/ or /mɛlək/ and /kɛrk/ or /kɛrək/ - is determined to occur within the word and not word-finally because of this constraint. A word such as *[mɛlkə] is according to Van Oostendorp structurally better than [mɛlək]. However, because of FINAL-C the less-preferred syllable structure is actually the attested one.

Zonneveld (1978) gives evidence for his Final Vowel Constraint from historical change in Dutch. He mentions stems of nouns and verbs which have changed from an open (mono-)syllable to a closed one at a later stage. Nouns such as *ka ‘crackling’, *pee ‘carrot’, *schoe ‘shoe’ and *tee ‘toe’ saw their plurals *kaan*, *peen*, *schoen*, and *teen* being reinterpreted as stems after Middle Dutch (Zonneveld 1978:91; Franck and Van Wijk 1949). This reinterpretation gave rise in its turn to the Modern Standard Dutch plurals *kanen*, *penen*, *schoenen*, and *tenen*.

Another, diachronic, indication of the FINAL-C constraint is that, according to Zonneveld (1978:91) the past-tense consonant became generalised throughout the paradigm, in Middle-Dutch verbs that show an alternation between a monosyllabic open-syllable present and a closed syllable preterite, e.g. *hangen* ‘to hang’ (<*haen), *plegen* ‘to commit’ (<*plien), *tijgen* ‘to move’ (<*tien), and *vangen* ‘to catch’ (<*vaen) (Zonneveld 1978, Schönfeld and van Loey 1970). That is, instead of on a final vowel stem such as *va- (‘to catch’) the entire paradigm was based on the closed syllable preterite form (vaŋ-).

As a last point, Zonneveld mentions that a (hypercorrectly working) process of contraction has produced a reanalysis of the stem, from an open syllable to a d-final closed syllable (e.g. the verb *geschieden* ‘to happen’ (<*geschien)).

In Dutch dialects, especially those in the eastern part of the Dutch language area, the influence of FINAL-C is noticeable in more than one domain. This supports the analysis of the complementary distribution between monophthongs and pseudo-diphthongs which I proposed for Tilburg Dutch in section 3.4. In the following section I will demonstrate that the influence of a constraint such as FINAL-C is noticeable in other languages as well. I begin with English, the language and the data which brought McCarthy (1993) to the formulation of this constraint in the first place.

3.6.2.5. Other languages and FINAL-C

As we will see below, there seems to be some evidence for FINAL-C in non-Dutch languages such as Yapese, Axininca Campa, Choctaw, colloquial Arabic, Lardil, and Tunica. As yet FINAL-C has not been related to diphthongs. The constraint is formulated for the first time by McCarthy (1993), who uses this constraint to account for something different: that is, for intrusive-r phenomena in Eastern Massachusetts American English. Some examples can be found in (62).

(62) r-Deletion, Intrusion, and Linking (underlined /r/ is intrusive, crossed off /r/ is deleted)

- | | |
|---|--|
| <p>a. The spa seems to be broken
They put the tuna down
The boat tends to yaw some</p> | <p>b. The spar seems to be broken
He put the tuner down
You're somewhat older</p> |
| <p>c. r-intrusion
The spa<u>r</u> is broken
He put the tun<u>a</u>r away
The boat'll yaw<u>r</u> a little</p> | <p>d. r-linking
The spar is broken
He put the tuner away
You're a little older</p> |
- (McCarthy 1993:170)

The generalisations are as follows. The consonant /r/ doesn't occur utterance-finally or before a consonant but must be followed by a vowel in the same utterance (cf. (62b) vs. (62d)). Furthermore, the vowels /a/, /ə/, and /ɔ/ cannot be followed by a vowel in the same utterance: if such a situation would occur, an intrusive /r/ appears (cf. (62a) vs. (62c)).

Before McCarthy (1993) came forward with his analysis, the distribution of /r/ was assumed to be syllabically conditioned. On the one hand, /r/ is deleted if it is the syllable-final consonant. On the other hand, /r/ was considered to resolve hiatus, by separating two adjacent heterosyllabic vowels. The phenomena were considered to be a response to two constraints regarding syllabic wellformedness: CODA-COND (McCarthy 1993, Itô 1986, 1989) and NO-HIATUS. The first constraint prohibits /r/ in a post-nuclear position or forces it to be in the onset while the second one prohibits heterosyllabic vowel-vowel sequences.

McCarthy (1993) argues that an analysis on the basis of CODA-COND and NO-HIATUS cannot account for all the data. After function words, NO-HIATUS is violated freely (e.g. *to* → *add*, *the* → *appel*), meaning that we need yet another constraint to account for the facts. For this purpose, McCarthy proposes the constraint FINAL-C. This constraint has the phonological word as its domain and not the syllable. Following the generally-accepted assumption that lexical words, contrary to function words, are parsed as phonological words, it is to be expected that intrusive /r/ occurs after a lexical word and not after a function word (such as *to* or *the*). Compare the examples in (62c) above (repeated here for convenience sake in (63a) with the examples in (63b). In (62a) *spa*, *tuna*, and *yaw*, are lexical words and consequently parsed as phonological words. As such they are required to end in a consonant - by the high-ranking of FINAL-C - resulting in r-intrusion. On the other hand, neither *to*, *do*, nor *the* are phonological words, which makes FINAL-C irrelevant. This way FINAL-C accounts for the presence of /r/ in (63a) and the absence of /r/ in (63b).

(63) a. *Intrusive-r after lexical words (thus, phonological words)*

The spar is broken
 He put the tunar away
 The boat'll yawr a little

(63) b. *No intrusive-r after function words*

To(*r) add to his troubles
 Why do(*r) Albert and you ...
 The(*r) apples

(McCarthy 1993:173,174)

McCarthy (1993:178) refers to other cases in the literature, where versions of this constraint can be observed. He mentions for instance Yapese (Piggott 1991:304), Axininca Campa, Choctaw and colloquial Arabic (for references on these languages, see McCarthy 1993). In Arabic, for example, noun and verb stems must end in a consonant. I will illustrate FINAL-C in somewhat more detail in two other languages, Tunica, a 'native' American language (Lombardi 1998) and Lardil, a Pama-Nyungan language of Australia (Prince & Smolensky 1991:97 ff.; McCarthy 2002).³²

First we will look at the case of Tunica, an American Indian language (Lombardi 1998, referring to Haas (1940)). In this language, we find epenthesis of /n/ phrase-finally. According to Lombardi (op. cit.) this epenthesis is due to PHRASE-FINAL C (phonological phrases should end in a consonant).

This case is not only an example of a language where 'plain' FINAL-C is relevant. It also illustrates that FINAL-C does not necessarily concern phonological words only. It appears that some languages, such as Tunica, want phonological phrases to end in consonants - while others want lower phonological words (the word without affixes) to have such an ending, as we will see in Chapter 5. That is, apparently this constraint can be parameterised for different phonological domains. In Tunica, then, the domain is the phonological phrase.

(64)	regular form	phrase-final form	
	hatika	hatika <u>n</u>	'again'
	sahku	sahku <u>n</u>	'one'

(Lombardi 1998, tone not marked)

When McCarthy proposed FINAL-C in 1993, it was considered to be relevant for the domain of the phonological word. That is, no r-intrusion occurs after function words, because, he argues, function words are not parsed as phonological words. We now conclude that FINAL-C should be parameterised for its domain of application.

³² The authors do not call the constraint in Lardil FINAL-C but FREE-V; as they mention themselves, the connection with FINAL-C is however, quite evident.

3.6.2.6. FINAL-C (or FREE-V) in Lardil³³

I will not give a detailed explanation of the actual difference between FINAL-C and FREE-V (cf. McCarthy 2002). It is an interesting case of the obligation of words not to end in a vowel and therefore it will be discussed here – although without details. In the discussion of Lardil I will follow the authors and speak of FREE-V. This constraint expresses that the original stem-final vowel is deleted.

(65) FREE-V Word-final vowels must not be parsed (in the nominative)

If a stem-final segment is deleted (or remains unparsed, to keep to the terminology of the article), this has consequences for the way the morphological shape is mirrored in the phonological one. It results in a difference between the final edge of the stem and final edge of the syllable. In (66) the stem includes the final /i/ while the final edge of the syllable is before the /i/ (the final syllable is /.yil./). The stem-final /i/ is unparsed and therefore phonetically deleted in the end.

(66) Stem: /yiliyili/_{Stem} ‘oyster’
Syllable: /.yi.li.yil.)_σi/ (phonetically: [yiliyil])

It appears that languages differ with respect to the acceptance of such violations of perfect mirroring. The technical term used for this constraint is ALIGNMENT (ALIGN). It can be formulated as follows.

(67) ALIGN The final edge of the stem corresponds to the final edge of a syllable

As an example I will use an input which is a polysyllabic vowel-final stem, such as /yiliyili/. The input (stem) /yiliyili/ is phonetically realised as [yiliyil]. The high-ranking constraint FREE-V forces the /i/ segment to remain unparsed and eventually to become deleted phonetically. As an illustration, look at the following tableau (from Prince & Smolensky 1991:120, with some adaptations).

(68) (Part of) tableau of the stem /yiliyili/ ‘oyster’

/yiliyili/	FREE-V	ALIGN	PARSE
☛ [.yi.li.yil.<i>]		*	*
[.yi.li.yi.li]	*!		

This tableau demonstrates that it is acceptable to violate the constraints ALIGN and PARSE, if, by doing so, the higher-ranking constraint FREE-V can be satisfied. PARSE is concerned with phonetic realisation. If the segment /i/ remains unparsed (indicated as < i >), it means the segment is not syllabified and as a consequence cannot be

³³ The case of Lardil is more complicated than shown here. For an extensive treatment, see McCarthy (2002).

realised phonetically. Because of the fact that the final vowel is not parsed, the constraint ALIGN is violated as well: there is a difference between the final edges of the stem and the syllable. However, in this language it is so important that these stems do not end in their original vowel, that it is possible to delete an entire segment and to consequently create a difference between the morphological and phonological representations, to reach this goal.

The other candidate does not suffer from these shortcomings. In the form [yiliyili] all input elements are parsed and therefore pronounced. Consequently, PARSE is not violated, nor is ALIGN – as the morphological form is completely aligned with the prosodic form. However, in this case, the constraint FREE-V is violated. As the constraint FREE-V is higher ranked in this language than PARSE and ALIGN, it is worse to violate the single constraint FREE-V than to violate the two lower constraints ALIGN and PARSE.

We have seen two illustrations of FINAL-C in two languages, Tunica and Lardil. Lardil is a rather complicated example but impressive in its preference for deletion over having the original vowel word-finally. Tunica is also an illustration of the parameterisation of this constraint for different domains. We have seen that words can be forced to end in an onset (with an empty nucleus) and that this may apply to phonological phrases as well.

3.7. Conclusion

This chapter has been devoted to FINAL-C, a high-ranking constraint responsible for the distribution of vocoid sequences and long lax vowels in Tilburg Dutch. FINAL-C is argued to be a constraint referring to segmental content and to structural relations within the word. It requires the word-final segmental material to be licensed in an onset position. The analysis of French loans in this dialect gave rise to a question regarding the amount of structure we want to represent. The topic of sonority has been discussed because of its relevance for constraints such as FINAL-C, as well as because of its possibly questionable representation in GP.

I have shown that the influence of this constraint is noticeable not only in Tilburg Dutch but also in a number of Dutch dialects and in other languages as well. A lot of attention was paid to these indications of FINAL-C because it appears to be a counter-intuitive constraint: it is the opposite of NOCODA, which demands that syllables be open and to end in a vowel. It might be the case that FINAL-C languages take the word domain for structural wellformedness (Van Oostendorp p.c.). This implies that, even though the structure is far from optimal from a syllabic point of view because it violates NOCODA, it *is* optimal with respect to word structure because it satisfies FINAL-C. For syllables it appears to be best to have a final, filled nucleus, while for words it seems best to have their final segment occurring in an onset. Consequently, languages which consider the word domain to be the most relevant, preferably have words ending on a consonantal position. According to Van Oostendorp, other languages, such as Italian, look at the syllable domain with respect to structural wellformedness. Since syllables prefer to end in a filled nucleus,

words in such languages are mainly vowel-final. In these languages, the syllable-level wins over the word-domain.

This chapter was meant to make progress towards a better understanding of the demand to have word-final segmental material occurring in an onset. The next chapter will consider the Tilburg Dutch vowel system. We will see what the consequences of the GP view of laxness are for the analysis of the vowel system in this dialect.

4 Vowel system

4.1. Introduction

In Chapter 2 it has been argued that the analysis in terms of GP elements and, in particular, the use of the element for laxness, affects the analysis of the Tilburg vowel system. We will now consider this in more detail. My conclusion will be that without a restrictive framework such as GP, it would be a mere matter 'of taste' or even coincidence whether one chooses an analysis in which the vowel system consists of mid and low lax vowels or of high and mid lax vowels. Because of this, perhaps, linguists often decide on different analyses of similar kinds of data, such as data from vowel alternation in Tilburg Dutch, Standard Dutch and German. However, GP strengthens the case for an analysis in which the lax vowels are high and mid (instead of mid and low). The relevant issue in GP theory is laxness: many Government Phonologists agree that lax vowels lack distinctive headedness. Whether this is achieved by analysing these vowels as headless or by analysing them to have a centrality element as head, the result is the same. Because of this they lack the ability to show as many different vowel distinctions as tense vowels. It will be demonstrated that this view on laxness makes it impossible to analyse the lax vowels in Tilburg Dutch as being mid and low (the Mid-Vowel analysis or MV) and forces us to represent them as high and mid (this will be called the High-Vowel analysis or HV). This in turn enforces an analysis of vowel alternations in Tilburg Dutch, in which these vowel alternations are considered not only to be caused by a change in syllable structure but by either apophony or some sort of relic of an older raising-umlaut system as well.

First of all, we will briefly discuss an issue especially relevant to Standard Dutch but also to Tilburg Dutch: the debate on tenseness versus length. This debate concerns the choice of phonological length or tenseness/laxness as the phonological feature distinguishing two classes of vowels in Standard Dutch. As will become clear below, this discussion is not as relevant for Tilburg Dutch itself, as both features are needed in this dialect, but all the more relevant for the analysis of Standard Dutch. The vowel systems and the vowel alternations are, in essential aspects, so similar in German, Standard Dutch and Tilburg Dutch, that the discussion will include all these languages. The tense-length debate will be reviewed in the next section. In section 4.3 the GP view of laxness will be discussed. In 4.4 I will discuss the problematic consequences of the laxness analysis on a Mid-Vowel representation of the Tilburg Dutch vowel system. The alternative, High-Vowel, analysis will be presented in 4.5. In 4.6 arguments for both the HV and MV analysis follow: these come from language acquisition, and phonetics as well as from data on vowel alternations in Tilburg Dutch, Standard Dutch and German. In 4.7 I discuss what kind of analysis of the vowel alternations would be the result of the adoption of the MV or the HV. The conclusion is that in both representations of the vowel system in Tilburg Dutch the vowel alternations can be accounted for – be it with lax vowels as high and mid or with lax vowels as mid and low. Language acquisition data, phonetics or the representation of the vowel system cannot determine the

choice between the HV and MV. The interpretation of laxness in GP solves the problem of arbitrariness: it forces us to accept a High-Vowel analysis. In 4.8 two kinds of High-Vowel analyses will be introduced: one based on apophony and the other one based on raising-umlaut. In this section I will make a choice for one of the alternative views.

4.2. The tense-length debate in Standard Dutch

In Standard Dutch phonetic length tends to coincide with phonetic tenseness. This has resulted in a debate which has started in the 1930s and continued until today, with the last contribution, as far as I know, being Gussenhoven (2000). By and large, I follow the view of Van Oostendorp (2000), who claims that laxness is the phonological feature underlying the contrast between phonetically long tense and short lax vowels (see Van Oostendorp (2000) for an extensive list of references).

The two vowel groups in question not only differ in phonetic length/tenseness but also in height. Accordingly, three ways of characterising these groups are possible. The difference in height is almost never used as a phonological label for the languages discussed here because the use of phonological height does not obviously result in the dichotomy actually found. The fact that /i/ is higher than /ɪ/, which is higher than /e/, which in its turn is higher than /ɛ/, does not account for the fact that /ɪ/ and /ɛ/ behave similarly in contrast to /i/ and /e/.

This leaves us with two possible characterisations – short/long or lax/tense – and both of these labels could account for the behavioural dichotomy just mentioned. As mentioned by Van Oostendorp (2000), we are faced with a paradox: syllable structure facts point in the direction of an analysis based on length, while other facts, notably stress, point towards a laxness-based analysis. The main aspects of his argument will be presented below.

One of the strongest arguments for phonological length instead of tenseness/laxness is syllable structure. In Germanic languages short/lax vowels may co-occur with more consonants than long/tense vowels in a syllable (cf. 1a) – except at word-edges, where at most one extra non-coronal (or two, when the preceding vowel is short/lax) and/or one or more coronal consonants may follow. Furthermore, syllables cannot end in a short/lax vowel – that is, the structures in the right hand column in (1b) are not acceptable.

(1) a.	CV _{short/lax} CC			*CV _{long/tense} CC
	lɪnt	‘tape’	(Standard Dutch)	*li:nt/*le:nt
	pɛns	‘paunch’	„	*pe:ns
	lɛnt	‘ribbon, tape’	(Tilburg Dutch)	*le:nt/*le:nt ¹

¹ With long/tense /a/ clusters do occur: /mand/ ‘basket’, /axt/ ‘eight’ etc. (Boutkan & Kossmann 1996:20)

	pens	‘stomach’	„	*pe:ns/*pe:ns
	durç	‘through’	(German)	*durç
	gern	‘please’	„	*ge:rn
(1) b.	CV _{long/tense}			*CV _{short/lax}
	la:	‘drawer’	(Standard Dutch)	*la
	re:	‘deer’	„	*rɛ
	kni ²	‘knee’	„	*kni
	po:	‘chamber pot’	„	*pɔ
	hi.a:t	‘hiatus’	„	*hi.at

Analysts advocating phonological length as the distinguishing factor between short, lax vowels and long, tense vowels, can account for the above-mentioned restrictions through the notion of rhyme binarity. The assumption is that syllable rhymes are made up of exactly two positions. Because of this, syllable-final, short vowels (*CV.) do not occur: in such a case, a minimal rhyme constraint is violated (cf. 1b) whereas a long, tense vowel in a closed syllable is ungrammatical because the syllable rhyme contains more than two segments (cf. 1a).

Arguments against length and in favour of laxness are given below (Van Oostendorp 2000, partly referring to Van der Hulst (1994)). An important problem for a length-based theory is that Dutch would have a stress system, in which CVV syllables do not count as heavy, whereas CVC syllables do. This is most exceptional cross-linguistically: it is generally accepted that, whenever a language distinguishes between heavy and light syllables, CVV syllables count as heavy.

Another objection to a length-based theory is that, if tense/long vowels count as long, Dutch has no core syllables consisting of one consonant and one vowel (Van Oostendorp 2000:38; cf. Trubetzkoy 1969 and Jakobson 1962). Short/lax vowels are always followed by tautosyllabic consonants. Only phonetically long/tense vowels can occur syllable-finally but if these vowels were considered to be phonologically long, only CVC and CVV syllables would occur.

Furthermore, the length distinction runs against Trubetzkoy’s (1969) markedness criterion, according to which an unmarked set is always larger than a marked set. If the phonetically long/tense vowels are analysed as long vowels, that is as phonetically short, lax vowels plus length, we would expect the short/lax vowels to constitute the larger set. However, this is not the case: the phonetically long/tense vowels are the largest set in all varieties of Dutch.

Choosing phonological tenseness/laxness as the distinguishing factor between short, lax vowels and long, tense vowels, the analysis of the data is as follows: a lax vowel has to occur in a branching rhyme and, vice versa, a branching rhyme has to be headed by a lax vowel (Van Oostendorp 2000). The fact that lax vowels are not allowed syllable-finally is accounted for by the fact that such a lax

² Phonetically, the high tense vowels /i, y, u/ are short (except before /r/); their behaviour, however, coincides with that of the other tense long vowels.

vowel would occur in a non-branching rhyme, which is disallowed. The fact that tense vowels cannot be found in a closed rhyme (CVC), can be understood by the fact that a branching rhyme can never be headed by a tense vowel and vice versa (cf. 2).



Analysing the Dutch data on the basis of laxness, Dutch is no longer an exception to language universals, such as the one stating that unmarked sets are the largest: if lax vowels are the marked ones (by the feature lax (or a head element @)), it is only to be expected that the set of tense vowels is the largest. In the same way, Dutch is no longer an exception to the claim that all languages have CV syllables.

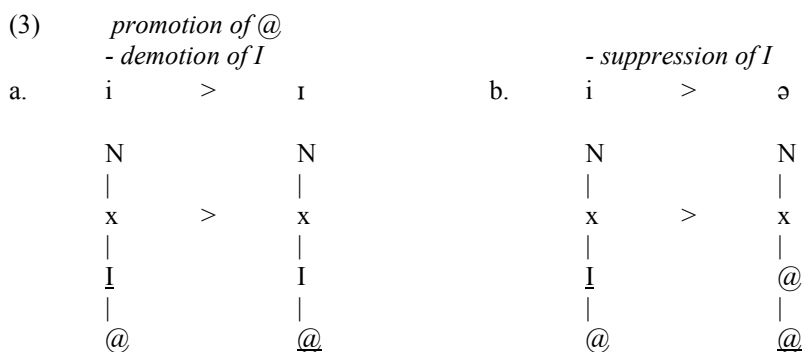
Henceforth, laxness will be considered to be the distinguishing factor in Dutch – represented by the element @. As we will see in the next section, Tilburg Dutch has tense vowels and truly long (lax) vowels.

4.3. The special status of laxness

Laxness plays an important role in this thesis³. The representation of laxness - in terms of elements and headedness - is the main theoretical reason for my claim that the Dutch lax vowels /ɪ, ʏ, u/ are not of the same height as /e, ø, o/. This view on the representation of tenseness/laxness is by no means the only possibility. To mention one alternative GP proposal, Harris & Lindsey (1995) discuss the use of a special element for ATR (instead of RTR or laxness). They reject this ATR element since this would imply that true peripheral vowels are more complex than less peripheral vowels. According to them, this would be contrary to the spirit of the theory, in which the ‘bounds of vowel space’ are defined by the extremes represented by I, A, and U. The representation of non-ATR, lax vowels by way of @-headedness pays tribute to the fact that they are centralised versions of the peripheral elements A, I, and U. The fact that, in the phonological representation, tenseness is unmarked in comparison with laxness, is consistent with the observation that, cross-linguistically, lax vowels are more marked than tense ones. This markedness of lax vowels can be observed in Standard Dutch and in other Germanic languages, in which the set of tense vowels is larger than that of lax ones (Van Oostendorp (2000:38 ff.).

³ I follow Harris 1994:113 in the assumption that laxness/tenseness in Germanic languages is more or less the same as RTR/ATR in African languages.

A further argument in favour of the way laxness is represented here, is that it allows a straightforward, natural account of common processes, such as centralisation. We have already seen how GP deals with cases of monophthongisation or diphthongisation in an insightful manner. In a similar fashion instances of vowel reduction can be represented as the promotion of the latently present @ to head-status and the concomitant demotion of the former head to a dependent status (3a) or complete suppression of the former head (3b). Such an analysis is only conceivable if @ is (latently) present.



(Harris 1994:112)

Another reason for such a representation is that laxness can be argued to perform a function different from features such as roundness, openness or frontness. In GP terms one could say that @ is of a different character than I, A, and U. Whereas these last elements have pre-eminently a phonetic, articulatory character, laxness plays a significant role in phonological structure, especially in syllable structure. Viewed from that perspective, it is only to be expected that it is difficult to find phonetically-adequate descriptions of laxness (Van Oostendorp 2000). In this respect, laxness equals sonority: in both cases clear cross-linguistic acoustic and articulatory properties seem to be lacking (Van der Linde 2001).

The relevance of laxness for syllable structure has been observed in the literature. It has been argued for instance that lax vowels need a branching rhyme and vice versa (Van Oostendorp 2000). Standard Dutch /ɪ/ and /ɛ/ are specified for laxness and occur in a closed syllable, as a consequence of a high-ranking constraint demanding that lax vowels be in a branching rhyme (i.e. followed by a tautosyllabic consonant).⁴ This is not only the case for Dutch, but also cross-linguistically it appears to be the case that laxness is tied in with syllable structure (Van Oostendorp

⁴ In this respect he mentions among others, Sievers (1901) and Trubetzkoy (1969), who speak of, respectively, 'strongly cut versus weakly cut' and Syllable Cut.

2000).⁵ This can be expressed by way of the following constraint: *CONNECT* N^1 , lax).⁶

- (4) *CONNECT* (N^1 , lax) =
 PROJECT (lax, N): N^0 dominates [lax] → N^1 branches
 PROJECT (N^1 , lax): N^1 branches → N^0 dominates [lax]
 (Van Oostendorp 2000:6)

The constraint in (4) says that a rhyme can only branch if its head is lax and, vice versa, a head can only be lax if it occurs in a branching rhyme.

The suggestion that there is a strong connection between laxness and phonological (syllable) structure is supported by data from aphasia. Van der Linde (2001) observes a correlation between errors concerning phonology-based features, such a sonority and laxness, and certain kinds of aphasia, on the one hand, and between errors concerning articulation-based features and certain other kinds of aphasia, on the other. She finds that patients suffering from a breakdown at the phonological level generally make more errors regarding sonority and laxness than those having difficulties at the phonetic level.

Interestingly, we may observe another connection between syllable structure and @. Recall that the neutral vowel in Dutch, the schwa, is also @-headed. In this respect schwa is like a lax vowel, except for the fact that a schwa has no other element material than @. In (5) I give a representation of a lax vowel and a schwa. In the representation of the lax vowel there are two kinds of elements: the element I, indicating frontness, and the centrality element @. The representation of the schwa, on the other hand, consists of centrality material only.

(5)	lax vowel	schwa
	(here: /ɪ/)	
	I	ə
	N	N
	x	x
	I	@
	@	@

In a way, the connection between lax vowels and syllable structure is just opposite: lax vowels demand to be followed by a coda consonant in their syllable (and can without any problem follow a branching onset) while schwa can only head a syllable without a coda (or branching onset) (Van Oostendorp 2000). This apparent

⁵ Van Oostendorp (2000:51), however, discusses the possibility (mentioned in Chung 1983) that in Chamorro the feature [high] has such an effect as well.

⁶ N^1 stands for rhyme, N^0 is the nucleus.

contradiction is closely connected to the default position of schwa as opposed to full, lax vowels in foot structure. A head of a foot must license the nuclear position in the dependent rhyme. We will assume that, in order to be able to do so, it has to have ‘real’ elemental material and it must have a non-neutral head. When a tense vowel is in the nucleus of the head, these conditions are fulfilled because tense vowels always have a non-neutral element as the head of the segment. This is shown in (6).

(6) ‘kamər *kamer* ‘room’

Word/Foot	‘				
Rhyme	R		R		
Nucleus	O	N	O	N	O
	x	x	x	x	x
	k	<u>A</u>	m	@	r
		@		@	

In a Dutch word such as *kamer* in (6), the head of the foot is a tense vowel, /a/; the first rhyme is headed by a nucleus, which is filled with an underlined A element. The @ is present as ‘baseline’. Since it fulfils the two conditions necessary in order to license the schwa segment in the following, dependent rhyme, this structure is well- formed. Let us now consider the following structure.

(7) Word/Foot	‘				
Rhyme	R		R		
Nucleus O	N	O	N	O	
	x	x	x	x	x
	k	A	m	@	r
		@		@	

The structure in (7) is ungrammatical: the head of the first rhyme is not strong enough to license the second, dependent nucleus because it contains a neutral head. A ‘way out’ is possible when the weak nucleus in the first rhyme is followed by some non-weak or non-neutral (headed) material in the coda position. Such a structure can be found in (8) below. Note that the coda position is required to make its rhyme strong enough to license the following rhyme.

(8)	Word/Foot	‘					
	Rhyme		R		R		
	Nucleus	O	N	O	N	O	
		x	x	x	x	x	
		k	A	N	h	@	r
			@	U	@		
		k	a	m	f	ə	r ‘camphor’

The structure in (8) is well-formed. In spite of the fact that the first rhyme has a neutral head, it is strong enough to license a dependent rhyme because it has headed material in the rhymal coda position.⁷ Note that @ cannot license the presence of the coda: @ can occur in a closed syllable only when it possesses some other, ‘true’ (non-neutral) material. This is why schwa does not occur in a closed syllable. More importantly, however, it does not *need* to: closed syllables occur only when forced to by some other constraint. One of these we have seen: for a rhyme to be able to license a following rhyme, it has to acquire some strength, some non-neutral head, in the coda position. A schwa never occurs in an accented head of a foot position. It therefore does not need to license dependent position. Consequently, a schwa does not need to occur in a closed syllable.⁸

In the discussion above I have assumed that lax vowels and schwa are both @-headed, the difference between the two categories being that lax vowels have other (dependent) material present whereas schwa only has neutral elemental material. Setting apart sonority for the moment, there is one more proposal within GP dealing with laxness. This is the proposal by Cobb (1997, referring to Kaye 1994). She defends a representation of tenseness/laxness on the basis of headedness or lack of it. For the purposes of the present study, it does not really matter whether a lax vowel has no head or whether a lax vowel has @ as head in its representation since in both cases the consequence is that among lax vowels fewer distinctions are possible than among tense vowels. There *is*, however, a reason why it might be better to represent lax vowels as being @-headed instead of being headless. Taking into account that the @ is the representation of the neutral vowel, the above-mentioned connection between this element and phonological structure becomes clear from the representation. That is, if we represent a lax vowel, such as /ɪ/ or /ɛ/,

⁷ This is one of the few reasons for codas to occur at all - in itself, they are ‘unwanted’ (cf. OT constraint NO CODA). This might have to do with the peculiar character of the coda. It has been observed in the literature that a rhymal domain differs from, for instance, a nuclear domain in that a nucleus merely influences the presence of a coda position but does not influence the segmental content of this position (Harris 1994), implying that the content of a coda position is not licensed within the domain in which it occurs.

⁸ This proposal is partly the result of discussions with and comments by Van der Hulst.

as @-headed and /ə/ as consisting of no other element than @, it is to be expected that all of these segments will have a clear connection with syllable structure.

As mentioned above, the connection between laxness and syllable structure is possibly not as well-known as the connection between sonority and syllable structure. However, the relation between syllable structure and laxness is not only mentioned in the literature on Dutch. As far as English is concerned, the literature (cf. Harris 1994 and Hammond 1999) seems to indicate that there is a connection between laxness and syllable structure as well - although some authors refer to the relevant distinction as length instead of laxness. French also displays a contrast between tenseness and laxness (Féry 2003a). The mid vowels show a contrast between a tense and lax variant; tense vowels tend to appear in open syllables and lax vowels in closed syllables. Below are some examples.

(9)	o	~	ɔ		
	sot		sotte	‘silly, masc.’	‘silly, fem.’
	culot		culotte	‘cheek’	‘pants’
	ø	~	œ		
	veut		veulent	‘want, 3 s.’	‘want, 3 pl.’
	e	~	ɛ		
	premier		première	‘first, masc.’	‘first, fem.’
	charnier		charnière	‘grave’	‘hinge’

(Féry 2003a)

It is interesting that the two ‘features’ – laxness and sonority – which are exceptional in that they both are difficult to define in terms of articulatory phonetics and both show such a clear connection with phonological structure, are also the two ‘features’ which occupy an exceptional position within GP. They are set apart in GP from other elements: in the case of laxness, its element functions in a (slightly) different fashion and in the case of sonority, it is not an element at all.

In summary, in this section I have provided arguments for the special status of laxness (@) in line with Van der Linde (2001) and Van Oostendorp (2000). I have demonstrated the structural, phonological character of tense/lax distinctions and of the element @ - in contrast to more phonetically-based elements such as U for roundness. Van der Linde (2001) demonstrates that sonority and laxness/tenseness are not phonetically based but structural and phonological by nature. Van Oostendorp (2000) provides arguments for the role of @ in schwa-like segments and lax vowels: schwa and lax vowels show a clear connection with syllable structure. A discussion of laxness is a necessary step towards an analysis of the Tilburg vowel system. In the next section I will demonstrate in what sense this conception of laxness does not pattern with an analysis of the Tilburg vowel system in which /ɪ, ʏ, ʊ/ are represented as mid instead of high.

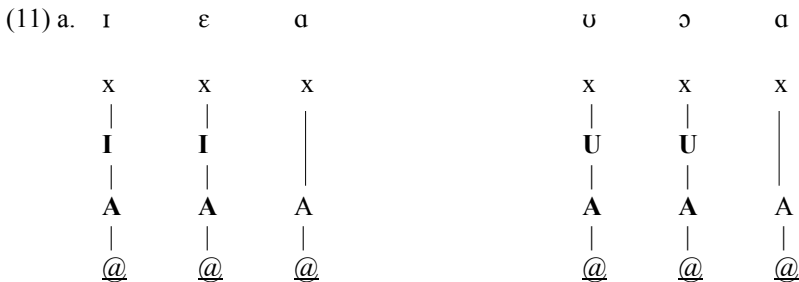
4.4. A Mid-Vowel analysis

As mentioned in the introductory chapter, the Tilburg vowel system consists of three vowel series (disregarding the schwa): a series of short, lax vowels, a series of long, lax vowels, and a series of tense vowels. In Tilburg Dutch, we thus need both tense/lax and length. We may represent the vowels of Tilburg Dutch by ‘traditional’ features as in (10).⁹ In this representation, lax /ɪ, ʏ, ʊ/ and tense /e, ø, o/ are mid and /ɛ, œ, ɔ/ are low.¹⁰ This is what I call a Mid-Vowel analysis (MV) because /ɪ, ʏ, ʊ/ are considered to be mid vowels. The low vowels /a/ and /ɑ/ are distinguished from the other low vowels by the feature [dorsal].

(10) Mid-Vowel analysis (MV)

	Tense			Lax		
High	i	y	u			
Mid	e	ø	o	ɪ	ʏ	ʊ
Low				ɛ	œ	ɔ
Dorsal	a			ɑ		

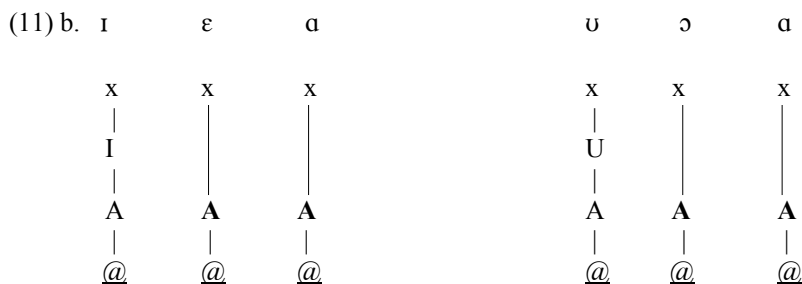
This MV representation is problematic. Recall that in GP lax vowels are characterised by the fact that @ is the head of the expression. If the lax vowels /ɪ, ʏ, ʊ/ are represented as mid, it is not possible to distinguish between, for instance, /ɪ/, /ɛ/ and /a/. That is, if /ɪ/ is mid, it has to contain an A element, just like /ɛ/. However, if we cannot make distinctions among lax vowels by means of headedness, how do we distinguish between /ɪ/ and /ɛ/, or between /ʊ/ and /ɔ/? The problem is illustrated in (11a) and (11b).



⁹ Recall that in the preceding chapter I have argued that true diphthongs do not exist in Tilburg Dutch. They actually consist of a vowel-glide combination.

¹⁰ In Van Oostendorp’s (2000a) analysis of Tilburg Dutch [ʊ] is represented as [ɔ̥] and [ɔ̥] as [ɔ̥]. In this respect I follow Boutkan & Kossmann (1996).

The difficulty with the representation in (11a) lies in the fact that if /ɪ/ is mid, /ɪ/ and /ɛ/ would end up with exactly the same representation: (I,A(@)). If we try to solve the problem by representing /ɛ/ as low, we are left with the same problem, though this time for /ɛ/ and /ɑ/: they would both be (A,@). This is illustrated in (11b).



Consequently, we have to consider an alternative to the MV: a High-Vowel analysis (HV), in which /ɪ/ and /ʊ/ are not mid but high and contain the element I or U only. For /ɻ/ it does not really make a difference, because for /ɻ/ we have to use three elements anyway. I will, however, assume the /ɻ/ to have the same height as the /ɪ/ and /ʊ/.

4.5. A High-Vowel analysis

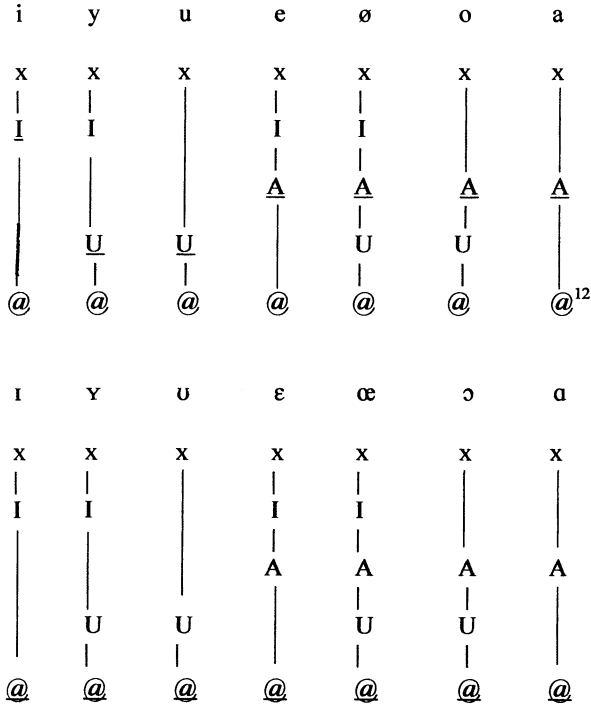
In the High-Vowel analysis (HV) in (12) lax /ɪ, ʏ, ʊ/ are analysed as high, just as tense /i, y, u/. Lax /ɛ, œ, ɔ/ are represented as mid just as tense /e, ø, o/.

(12) High-Vowel analysis (HV)

	Tense			Lax		
High	i	y	u	ɪ	ʏ	ʊ
Mid	e	ø	o	ɛ	œ	ɔ
Low	ɑ			ɑ		

In (13), an elemental representation of the Tilburg vowel system according to the HV is presented.¹¹

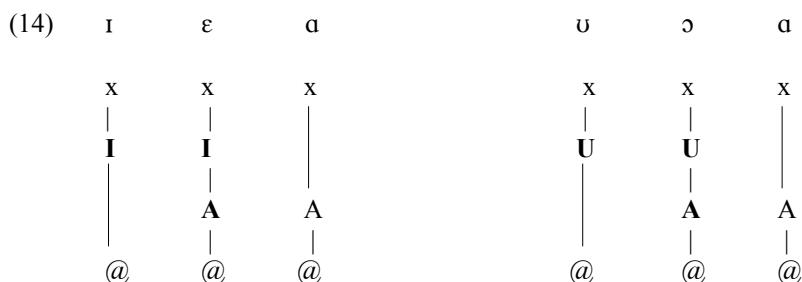
(13)



Except for my representation of schwa — of which I assume that it is the neutral vowel, consisting of @ only, with no elements for place — I follow Boutkan and Kossmann (1996) in the representations of the vowels. It is important that /ɪ, ʏ, ʊ/ are represented with the same height as /i, y, u/, that is, as high vowels, because this way I can make all the necessary distinctions in terms of elements. As (14) shows, in HV the distinction between the lax vowels is no problem: /ɪ/ is simply (I, @), /ɛ/ is (I, A, @), and /ɑ/ is (A, @).

¹¹ Smith et al. (1989) give an analysis of the Standard Dutch vowel system in a different version of the elemental framework. These authors assume an element I to denote tenseness; lax vowels lack this element.

¹² Recall that @ only has influence if it is the head. If it is not the head, it is usually not marked in the representation.



Van Oostendorp (2000) gives a fairly elaborate analysis of the Tilburg vowel system and considers /i, ɣ, u/ to be mid vowels, partly because of their alternating behaviour with /e, ø, o/. I will argue that there are strong theoretical arguments to consider these lax vowels as high.

Until now, the discussion in this chapter has concentrated on two representations of the vowel system of Tilburg Dutch, called MV and HV. I have argued that a MV representation would be difficult to combine with a GP view of laxness. As I have mentioned above, the vowel systems in Tilburg Dutch, Standard Dutch and German are, to a large extent, similar. We can make use of arguments used for the other languages in order to decide whether we should choose MV or HV. In the discussion of Standard Dutch, we may, by and large, distinguish two groups: those adhering to a MV Analysis (Van Bakel (1976), Moulton (1969) and, in some respects, Booij (1995) and Van Oostendorp (2000) and those adhering to a HV analysis (Cohen et al. (1959), Trommelen & Zonneveld (1982) and Van der Hulst 1984).¹³

In the next subsections, I will consider arguments for MV or HV from the literature on language acquisition and phonetics and in the second place from vowel alternations in Tilburg Dutch, Standard Dutch and German.

4.6. Arguments for MV / HV

4.6.1. Arguments from language acquisition and phonetics

Levelt (1994) attempts to choose between a HV and a MV analysis by looking at acquisition data. She concludes that the acquisition data point in the direction of a system in which /i/ is of the same height as /e/ (just as /ɣ/ is of the same height as /ø/). However, looking closely at the facts regarding the /e/ – /i/ distinction, the data are not clear. The vowel /i/ is problematic. The children's early attempts to produce

¹³ Standard Dutch does not have /u/. Consequently, the discussion for this dialect is concentrated on /i/ - /e/, and /ø/ - /ɣ/.

the vowel /ɪ/ point to a categorisation in one group with the high vowels (Levelt 1994:141) while the comparatively frequent substitution in the data points to a classification with ‘mid’ or ‘high, mid’. In some respects /ɪ/ behaves as if it is a high vowel (rate of acquisition), while in other respects (high error rates) it does not behave as a high vowel. In conclusion, these data from language acquisition (of Standard Dutch) do not solve the problem.

The confusion does not decrease when we look at the phonetic literature on this subject. If one looks at the International Phonetic Alphabet (1993 version, Pullum & Ladusaw 1996:xxxiv; 295-296), /ɪ/ and /ʏ/ have a vowel height in between the close (/i/, /u/) and the close-mid vowels (/e/, /o/). However, Nootboom & Cohen (1984:23) consider the /ɪ/ to be lower than the /e/ (cf. 15).

(15)

Close (high)	i	y	u
Semi-close (semi-high)	e	ø	o
Semi-open (semi-low)	ɪ	œ	ɔ

(Nootboom & Cohen 1984:23, with some adaptations)

Whereas in the 1993 IPA version (Pullum & Ladusaw 1996:xxxiv; 295-296) the /ɪ/ is considered to be lower than /i/ and higher than /e/, the /ɪ/ is considered lower than /e/ in Nootboom & Cohen (1984).

Apparently, data from language acquisition and phonetics cannot give us clear information about the phonological height of the Standard Dutch and Tilburg Dutch vowels, /ɪ/, /ʏ/, (and /ʊ/).

4.6.2. Vowel alternations

4.6.2.1. Tilburg Dutch

An important item in the discussion on HV versus MV is the subject of vowel alternations. These vowel alternations have been presented as an argument for a Mid-Vowel analysis of /ɪ /- /e/, /ʊ/ - /o/, etc. The analysis changes, as we will see below, if we do not take these vowels to have the same height. When they are mid, the vowel alternations are based on ‘pure’ laxing (that is, on syllable structure); when they differ in height, something else is involved as well.

Vowel alternations occur in Tilburg Dutch, both in inflectional and derivational morphology, between short lax and tense vowels, between short, lax and long, lax vowels and, marginally, between back and front vowels. In (16) the alternating pairs are listed.

(16)	tense ~ lax	long lax ~ short lax	back ~ front
	e ɪ	ɪ: ɪ	u y
	ø ʏ	ʏ: ʏ	ʊ ʏ
	o ʊ	ʊ: ʊ	ɔ œ
	a ɑ	ɛ: ɛ	
		œ: œ	
		ɔ: ɔ	

In (17), examples of diminutive alternations are given, because the diminutive formation makes use of all three kinds of alternations: tense/lax, long lax/short lax and back/front. The alternations in (17c) are based on fronting umlaut. They are rare and their synchronic non-productivity is generally agreed upon. They will not form an essential part of the discussion. As far as the alternations between tense and lax and long, lax and short, lax vowels are concerned, it appears to be the case that the tense/lax alternations are not as widespread as the pure shortening cases. In almost every morphological suffixation, pure shortening of long, lax vowels is attested. Tense/lax alternations do not occur so frequently. In (17a), examples are given of tense/lax pairs, followed by long, lax/short, lax pairs in (17b)

(17) Diminutives:

- a. alternations between tense and lax¹⁴
- | | |
|------------------|---------------|
| strep - stripkə/ | ‘stripe’ |
| stri:p - stripkə | |
| døk - dʏkskə/ | ‘dent’ |
| dʏ:k - dʏkskə | |
| slop - slɔpkə/ | ‘pillow case’ |
| slɔ:p - slɔpkə | |
- b. alternations between long lax and short lax
- | | |
|---------------|--------|
| bɪ:n - bɪntjə | ‘leg’ |
| mɛ:t - mɛtjə | ‘girl’ |
| pɔ:l - pɔltjə | ‘pole’ |
- c. umlaut
- | | |
|--------------|----------|
| huk - hykskə | ‘corner’ |
| høk - hœkskə | ‘cage’ |

(Boutkan & Kossmann 1996:31-2)

¹⁴ There is some variation between speakers with respect to the form of the lexeme (eg. /strep/ or /stri:p/).

In addition to arguments based on the lack of /ɪ/ - /i/ alternations and on observations from r-colouring, Van Oostendorp (2000) presents the /e/ - /ɪ/ alternation as one of the main reasons to consider these vowels to be of a same height. As I will demonstrate presently, these tense - lax alternations cannot be taken as an argument for a MV or a HV system since they are compatible with both vowel systems.

4.6.2.2. Vowel alternations in Standard Dutch

Booij (1995:87ff.) discusses a number of unproductive vowel alternations in Dutch. Dutch has twelve vowels, excluding the schwa (which is quite distinct from the other segments in all respects) and the diphthongs. Reaching similar conclusions to those of Van Oostendorp (2000) in his analysis of Tilburg Dutch, Booij apparently considers the /ɪ/ and the /e/ to have the same phonological height. Interestingly, arguments in favour of an analysis in which the vowel /ɪ/ is *not* of the same height as the /e/ can be found here as well.¹⁵

Standard Dutch vowel alternations are unproductive and go in ‘different directions’- e.g. /ɪ/ corresponding with /e/ or /ɛ/. In the first place, Booij (1995) discusses an unproductive rule of vowel lengthening in open syllables, as illustrated below. He regards this as a synchronic, lexically-governed phenomenon.

(18)	g <u>o</u> d	- g <u>o</u> den	‘god’ - ‘gods’
	sch <u>i</u> p	- sch <u>e</u> pen	‘ship’ - ‘ships’
	w <u>e</u> g	- w <u>e</u> gen	‘way’ - ‘ways’

In (18), both /ɪ/ and /ɛ/ change into /e/ in the plural form. Other irregular, unproductive /ɪ/- /e/ alternations are found in inflectional and derivational forms. These vowel alternations are not based on syllable structure, although the alternating segments are the same as in Tilburg Dutch. This is illustrated with the diminutive forms in (19).

(19)	singular	plural	diminutive	
	sch <u>i</u> p	sch <u>e</u> pen	sch <u>e</u> pje	‘ship’ - ‘ships’ - ‘small ship’
	w <u>e</u> g	w <u>e</u> gen	w <u>e</u> ggetje	‘road’ - ‘roads’ - ‘small road’ etc.
				(Booij 1995:72)

¹⁵ I will concentrate on the representation of the vowel [ɪ]. Because of diachronic developments the correspondence between Tilburg [ʊ] and [ɔ] and Standard Dutch [ɔ] is not so clear, whereas the [ɣ] is more marginal anyway.

Another case of alternations takes place between /ɪ/ and /e/ and between /ɛ/ and /e/. These are cases in which vowels can be shortened in word-initial position under the condition that the syllable in which they occur does not bear the main stress of the word. For instance, in (20) [ɪ] alternates with [e] and [i].

(20)	a - ɑ:	para'deɪs	pɑrɑ'deɪs	'paradise'
	e - i:	telə'vɪsɪ t	tɪlə'vɪsɪ	'television'
	o - ɔ:	poli'tɪk	pɔli'tɪk	'politics'
	i - i:	dɪrɛk'tɔr	dɪrɛk'tɔr	'director'

(Booij 1995:136, without marking of secondary stress)

It appears to be the case that in Standard Dutch a great many alternations between /ɪ/ and /e/ and between /ɛ/ and /e/ can be found. None of these are productive. I conclude that vowel alternations in Standard Dutch do not form substantial evidence for a MV or a HV analysis.

4.6.2.3. Vowel alternations in German

Wiese (2000) discusses the German vowel system in some detail. To begin with, he considers German /i/ and /ɪ/, /y/ and /ʏ/, /u/ and /ʊ/ to be of the same height, both phonetically as well as phonologically. This implies that he assumes a similar vowel system for German as is proposed here for Tilburg Dutch (that is, he assumes a HV analysis). In (21) the German vowel inventory is presented, with the high vowels underlined.

(21) Phoneme system for German (only relevant aspects presented)

	<u>i:</u>	<u>ɪ</u>	e:	ɛ:	ɛ	a:	ɑ	o:	ɔ	<u>u:</u>	<u>ʊ</u>	<u>y:</u>	<u>ʏ</u>	ø:	œ	ə
high	+	+	-	-	-	-	-	-	-	+	+	+	+	-	-	-
low	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
ATR	+	-	+	-	-	-	-	+	-	+	-	+	-	+	-	-

(Wiese 2000:20)

Regarding the tense - lax distinction, Wiese mentions that it would be more along the lines of IPA to use vowel height as the phonological distinguishing feature between the two groups. However, just as we noted above for Dutch, he states that such a proposal would not express the fact that -ATR vowels behave as a natural class as far as syllabification is concerned.

Wiese also discusses vowel alternations in German. He discusses umlaut (which I will not consider here) and Vowel Raising. Traditionally this is called *Brechung*. In a moderately large number of irregular verbs *Brechung* adds a feature [+high] to /e/ and /ɛ/ which consequently change to /i/ and /ɪ/, respectively. According to Wiese (2000)'... *umlaut is only the major type of alternation in*

Modern Standard German for which an analysis in terms of adding a feature may be the most adequate one' (Wiese 2000:194). The conditioning factor of vowel raising is the presence of the morphological features (minus past, minus plural, 2nd and 3rd person). This is shown in (22).

- (22) (ich) esse '(I) eat'
 (du) ißt '(you) eat'

The striking thing is that for the analysis of Dutch this same verb is used by some advocates of a Mid-Vowel analysis of /i/-/e/ as an argument for treating the /e/ -/ɪ/ alternation as a purely phonological alternation based on syllable structure alone, as in (23).

- (23) etə / ɪt 'eat pl.' / 'eat s.'

(Van Oostendorp 2000:111)

In a closely-related language system the same alternations are thus analysed in different ways.

Processes which Wiese (2000) calls vowel *shortening*, also exist. He mentions a set of regularities which has received less attention than umlaut. According to him, vowels of Modern Standard German show a set of alternations in length, sometimes with a concomitant variation in tenseness (ATR in his analysis). This is illustrated in (24).

- | | | | | | | |
|------|--------|---|------------|-----------|---|-----------|
| (24) | sieben | - | s[ɪ]bzig | 'seven | - | seventy' |
| | räder | - | R[a]d | 'bicycles | - | bicycle' |
| | Gräser | - | Gr[a]s | 'grasses | - | grass' |
| | Gase | - | G[a]s | 'gas | - | gasses' |
| | Flüge | - | Fl[u]gzeug | 'flight | - | airplane' |
| | Städte | - | St[a]dt | 'cities | - | city' |
| | grobe | - | gr[ɔ]b | 'coarse | - | coarse' |

(Wiese 2000:195)

This shortening is generally optional and there is a large amount of lexical variation. Historically, however, this was open-syllable lengthening: Middle High German short, syllable-final vowels were reanalysed as long vowels (Wiese refers to Reis 1974 in this respect). These cases seem to be instances of Closed Syllable Shortening. Note that Wiese appears to treat the /i/ - /ɪ/ alternation in (24) as shortening.

Recapitulating, the case of vowel alternations in German demonstrates that it might be correct to consider /ɪ/ and /i/ (and not /ɪ/ and /e/) as being of the same height, that is, as high vowels. Wiese clearly adheres to a HV; he considers these alternations to be based on a phonological rule of Vowel Raising and apparently not on a syllable-structure-induced laxing rule. On the other hand, Van Oostendorp and Booij (1995) consider /ɪ/ to be the lax counterpart of tense /e/: this makes them

proponents of a Mid-Vowel Analysis. This implies that for three languages with comparable vowel systems and vowel alternations, different analyses are put forward. Before trying to make a choice for one of them, I will look more closely at the alternations and discuss how these should be represented in a MV and a HV analysis.

4.7. Possible analyses of vowel alternations

4.7.1. A Mid-Vowel analysis of vowel alternations

In Van Oostendorp (2000), tense/lax alternations such as /strep/ - /stri:pəkə/ in (17a) are accounted for by reference to syllable structure only. Shortening of long lax vowels takes place when no room is left for a long vowel in syllable structure. Laxing of tense vowels occurs when syllable structure requires a lax head instead of a tense one. This latter situation arises when the rhyme branches because of affixation. In (25) a representation of shortening and laxing is given (cf. Van Oostendorp 2000).

(25) a. long lax vowel stems:

uninflected form:

stem: slɔ:p

	R	extrasyllabic	
	/ \		
x	x	x	
	\ /		
s	l	ɔ:	p

inflected form:

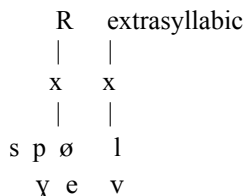
(hei) slɔpt 'he sleeps'

	R		extrasyllabic	
	/ \			
	x	x	x	
s	l	ɔ	p	+ t

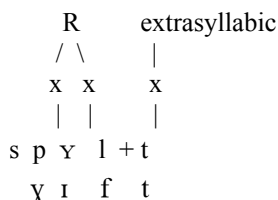
(25) b. tense vowel stems

uninflected form:

stem: spøɫ ‘play’, γev ‘give’

*inflected form:*

(hei) spɣɫ ‘he plays’, (hei) γɪft ‘he gives’



Above it is assumed that a rhyme has maximally two positions; short, lax vowels need to be in a branching rhyme (and a branching rhyme needs a lax head) while tense vowels need a non-branching rhyme (and a non-branching rhyme needs a tense head).

In the stem of the uninflected forms in (25), the long lax vowel and the tense vowel occupy the rhyme completely; because of this, the final consonant is forced into an extrasyllabic position. When the inflectional suffix (/t/) is added the stem-final consonants are forced into the syllable rhyme. Therefore the vowel shortens in (25a) and the vowel turns lax in (25b).

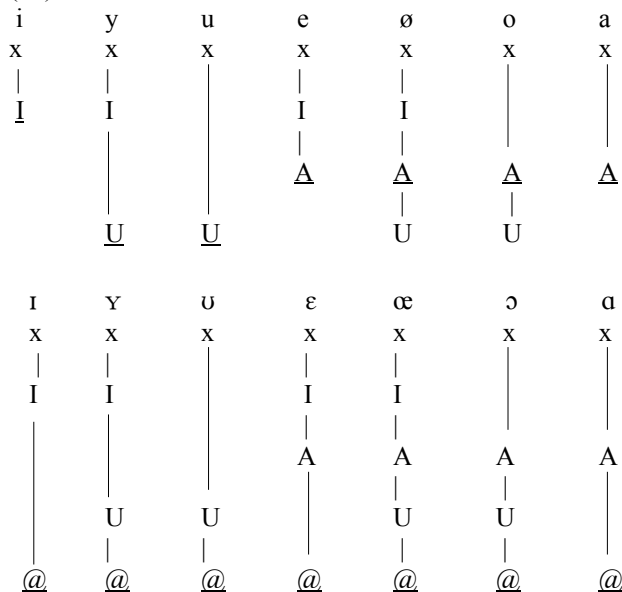
In this analysis it is essential that /ɪ, ɣ, ʊ/ have the same phonological height as /e, ø, o/. That is, /ɪ, ɣ, ʊ/ are analysed as being mid, and thus similar to /e, ø, o/. If this were not so, it would be impossible to analyse an alternation such as /spøɫ /- /spɣɫ/, above, as being based on the feature lax only because a difference in height would also be involved. The advantage of the MV analysis is that it provides us with a regular system of alternations, which is completely predictable on the norms of syllable structure.

4.7.2. A High-Vowel analysis of vowel alternations

Let us now consider the HV analysis in more detail. A consequence of the High-Vowel analysis, is that it is no longer possible to account for the alternations

between /i, y, u/ and /e, ø, o/, as just ‘laxing’. For convenience sake I will repeat the representation of the Tilburg vowel system in (26).

(26)



In the representation in (26) /i/ is not the straightforward lax counterpart of /e/ but the lax counter part of /i/. Consequently, an alternation such as the one between /strep/ - /stripke/ above cannot be a laxing process based on syllable structure. In this analysis, the alternation would involve laxing *and* raising.

This implies that in both analyses of the vowel system of Tilburg Dutch vowel alternations can be dealt with in an adequate manner. In a MV the alternations would be based on laxing, enforced by changes in syllable structure while in a HV the alternations would be based on laxing *and* raising. The character of the alternations themselves thus does not help us to decide which vowel system is to be preferred. We already found out that data from phonetics or language acquisition do not give conclusive evidence of MV or HV either. There is apparently no way to decide. However, as I already demonstrated above, the conception of laxness within GP provides a way out. In GP laxness is considered to imply a certain kind of headless-ness. This causes a reduction of potential vowel distinctions and consequently a MV turns out to be impossible. A High-Vowel analysis is, as it were, enforced by the GP framework. Below I will discuss two kinds of HV, the choice of which has a relation to the issue of the productivity of the alternations in question.

4.8. High-Vowel analyses

4.8.1. High-Vowel analysis I

The first High-Vowel analysis starts from the assumption that, in alternating forms such as /strep/ - /stripke/, /spølə/ - /spɔlt/, or /kokə/ - /kukt/, the lexical base form has /e/, /ø/ or /o/, respectively. In the lax form the A element and headedness are lost through height umlaut resulting in vowel raising and laxing. Concretely, in the diminutive alternation of /strep/ - /stripke/ in Tilburg Dutch, /e/ (I, A) becomes /ɪ/ (I). That is, the head vowel of /strep/ loses its headedness *and* its A element when a diminutive suffix follows or it loses its heading A-element and therefore the vowel becomes lax.

The proposal is that the alternations between /ɪ/ and /e/ (and /ʊ/ and /o/; /ʏ/ and /ø/) are strictly speaking not part of the phonology of Tilburg Dutch. These alternations are quite unlike the true shortening processes, which we have seen in alternations such as /br:n/ - /bɪntjə/. The shortening of the long, lax forms appears to be a regular, phonological process. In the HV analysis presented here, both forms of /strep/ - /stripkə/ are listed in the lexicon, just like both forms of a pair such as /huk/ - /hykskə/. Furthermore it is assumed that there is a similarity between the umlaut pairs like /huk/ - /hykskə/ and the tense-lax pairs. Historically a fronting (umlaut) process took place, as attested by the rare alternations such as /huk/ - /hykskə/, which co-occurred with height-umlaut (or height-harmony), as formulated in (27).

(27) historical processes

- diminutives: raising through the high suffix:
 - . stems without an I element, received an I through ‘spreading’
 - . stems with an I element, lost their A head as the result of assimilation
- verbs (2nd person)
 - . the A element and headedness were lost because of assimilation to the non-A character of the suffix (cf. Boutkan 1990).

In (27) the diminutive suffix or the 2nd person verbal suffix – being non-A – forces the stem to lose its A element. This does not sound very attractive, as we have to refer to the absence of a specific element in order to induce the absence of the same element in some other part of the word. However, this kind of process is not unknown from the literature. Venneman (1986), for instance, discusses the phenomenon of Rückumlaut in German. This is a process in which an element I is lost when a past-tense suffix follows: for instance *brennen* ‘to burn’ becomes *brannte* ‘burned’ or *keren* ‘to turn’ becomes *karte* ‘turned’. This can be analysed as a process where the /e/ (I, A) becomes /a/ (A) after past-tense suffixation: it loses its element I.

A similar process can be found in Maasbracht Dutch, in which a (second) high tone is lost when a certain (non-high) suffix follows. This is illustrated in (28).

(28) Maasbracht Dutch tonal mutation (Alderete 1999)

wí:ʃ - wí:ʃ-ə 'wise - wise (masc.)'

In (28), the second high tone of /wí:ʃ/ is deleted, when a non-high suffix (/ə/) follows. The absence of a certain element, in this case the element H for high tone, is caused by the absence of this element in the following suffix. These examples from German and Maasbracht Dutch demonstrate that an analysis in which the diminutive suffix (or the verbal suffix) without an A element forces the stem to lose its A element, is not impossible and that similar kinds of analyses have been reported for other languages as well.

An additional argument in favour of a HV analysis might be that there are some exceptional alternations, not predicted by the Mid-Vowel analysis. Examples are given in (29).

(29)	brɪ:t	-	brejə	'broad	-	broad (adj.)'
	zʊ:l	-	zələ	'sole	-	soles'
	bɪ:k	-	bekə	'creek	-	creeks'
	dɛ:k	-	døkə	'dent	-	dents' ¹⁶

If we expect tense-lax alternations only to occur when syllable structure demands it, the examples in (29) should not occur. In the current analysis the alternations are exceptional but not impossible. One could analyse these alternations as an exceptional process through which an A element receives head status, with concomitant loss of the lax character for the segment as a whole (as the @ is no longer head it therefore no longer exerts its centralising/laxing influence). A representation is given in (30).

(30)	r:	>	e
	x		x
	I		I
	A		<u>A</u>
	@		@
	brɪ:t		brejə

¹⁶ The first items of the list (the 'base' lexemes) can also have a tense vowel: /døk/ - /døkə/; /bek/ - /bekə/ etc.

There are some historical arguments in favour of a HV analysis. In the literature of historical phonology in Dutch, the working of i-umlaut is well known, not only with diminutives but also in verbal (and possibly nominal) inflection.¹⁷ Cases of height or a-umlaut are also attested. Boutkan (1990:54) states that in some strong-verb classes the stem vowel changes owing to the quality of the vowel in the affix. According to him /e/ automatically changes to /i/ in Proto-Germanic if the next syllable contains /i/ or /j/. Boutkan posits the following Old Dutch forms of the verb ‘to take’.

(31)	nemon	nemun	
	nimis	nimit	
	nimit	nemunt	(Boutkan 1990:54)

In (31) the vowel in the first syllable becomes high when it is followed by a suffix containing /i/. If this is correct, height-umlaut existed in this stage of Dutch.

Van Loon (1986:25, 26) discusses the same process. Old Germanic /e/, followed by /i/ or /j/ (or some kind of nasal) becomes /i/. This is called i-umlaut of Old Germanic /e/. The historical facts are quite complicated and will not be discussed here any further. They may, however, demonstrate that a historical process as suggested in (27) is not unlikely.

4.8.2. High-Vowel analysis II

The second HV analysis is based on a lexical vowel /i/ instead of /e/ (as was the case in the first HV analysis) and the existence of an Apophonic Path. In a recent article by Bendjaballah and Haiden (to appear) the case of vowel alternations in German dialects is discussed. The German alternations are quite similar to those in Tilburg Dutch. Their analysis is crucially based on a representation in which /e/ and /ɪ/ are of a different height. They do not mention this explicitly but it is clear that their analysis does not work if /e/ and /ɪ/ have the same vowel height. They abstract away completely from ATR, as, in their opinion, this property is completely predictable in German.

The two authors discuss the /e/-/ɪ/ alternation in forms such as German *ich gebe - er gibt* ‘I give - he gives’. This is exactly the same alternation as vowel alternations such as /ɣevə/ - /ɣift/ ‘give - gives’ and /etə/ - /ɪt/ ‘eat - eats’ in Tilburg Dutch. They call this alternation in Standard German the Present Tense Umlaut and argue that this opposition is a phonological realisation of a morphological feature and that it is regular in the sense that it follows the morphological pattern of Ablaut, the tense-triggered stem vowel alternation in

¹⁷ The situation of /e/-/ɪ/ alternations in nominal inflection is less clear to me. The historical situation is quite complex; too complex to study in detail here. However, the fact that the same vowels are involved in the nominal and the verbal system, and the fact that in general umlaut processes are argued to occur in older Dutch, appears to plead for a comparable analysis.

German. Ablaut has been argued to be accountable in terms of Apophony Theory by Ségéral & Scheer (1998), cf. also Guerssel & Lowenstamm (1996). Thus the authors claim that the German Ablaut and the German /e-i/ alternations are regular, in that both follow the so-called Apophonic Path of 0 -> I -> A -> U.

Using elemental theory Bendjaballah & Haiden (to appear) represent the /e-/i/ alternation as in (32) (abstracting away from ATR).

(32)	<u>g</u> eb <u>e</u> n	<->	<u>g</u> ib <u>t</u>
	A,I		I

The entire paradigm can be represented in terms of elemental structure of the main vowel. This is represented in (33).

(33)	s	pl	s	pl
	1	<u>g</u> eb <u>e</u>	A,I	A,I
	2	<u>g</u> ib <u>st</u>	I	A,I
	3	<u>g</u> ib <u>t</u>	I	A,I
		imp. <u>g</u> eb <u>e</u> / <u>g</u> ib	A,I/I	A,I

They suggest that not the A,I vowel of the infinitive is the underlying vowel (as is assumed traditionally) but the I, which is present in all forms. This means that I is the lexical element of the verbs (see Halle (1953) and Ségéral & Scheer (1998) for comparable suggestions). Ségéral & Scheer analyse /e-/i/ verbs as I verbs with a parasitic element, A, in the lexical representation.

The authors suggest a morphological trigger for the presence of the parasitic A. They call this F-marking. F-marking adds a morpho-phonological marker, in this case an A element, to the lexical vowel. F-marked stems are selected by plural agreement suffixes, by the infinitival and the 1st person singular suffix – which is, as they admit, a strange collection. They cite Upper Austrian German (a Bavarian dialect in Austria) as a dialect which shows a more direct relation between F and number agreement. In this language plural forms contain the element A whereas none of the singular forms do. An example is given in (34).

(34)	<u>e</u> ssn ‘to eat’		
	s	I	pl A,I
	1	<u>i</u> s	<u>e</u> ssn
	2	<u>i</u> st	<u>e</u> ssts
	3	<u>i</u> st	<u>e</u> ssn

Upper Austrian Bavarian shows the underlying A-I alternation not only in the ‘*essen* – *ist*’ verbs, as Standard German, but also in three other verb classes.¹⁸

¹⁸ Middle High German, the common ancestor of the standard language and Upper Austrian Bavarian behaved in the same way: singular forms require unmarked F, plural and infinitive marked F.

What does this tell us about the morpho-phonological system of Tilburg Dutch? Is it possible that a similar analysis pertains to the Tilburg language? If we abstract from the tense/lax difference the data would be exactly the same. It might be the case that in Tilburg Dutch, as in Upper Austrian Bavarian, the F-marking system is still more elaborately present in the language than in both Standard Dutch and Standard German. In Tilburg Dutch not only /e/-ɪ/ but also /o/-ʊ/ and /ø/-ʏ/ alternations fit this pattern after all.

We may assume, that the /ɣevə/ - /ɣift/ example from Tilburg Dutch receives the analysis in (35).

- (35) I-verb
 I → I, A
 ɣift ɣevə

This means that the element A - the apophonic output - is added to the lexical vowel, for the F-marked forms.

In the next section I will try to motivate my preference for one of the two analyses and will mention some unsolved problems.

4.8.3. Comparison of High-Vowel analyses

Whatever analysis proves best, the general proposal is that in Tilburg Dutch /e - ɪ/ alternations (and the other alternations mentioned) are not of the same kind as the vowel shortening of long, lax vowels. Laxing of the tense vowels in question has everything to do with the syllable structure. However, the /e - ɪ/, /o - ʊ/ and /ø - ʏ/ alternations are not ‘same-height’ pairs and therefore the alternations cannot be accounted for on the basis of syllable structure alone. On the contrary, they point to the remnants of a height harmony system in Tilburg Dutch or to an apophonic alternation.

There are some indications as to which HV analysis might be best suited to account for the data synchronically. This has to do with productivity. The umlaut system discussed above (HV I) could never be a phonologically regular, productive system in Tilburg Dutch because the ‘triggers’ of the raising-umlaut are no longer there. Consider again the Old Dutch forms for the verb ‘to take’, presented above in (31) and repeated below in (37).

- (37) nemon nemun
 nimis nimit
 nimit nemunt (Boutkan 1990:54)

The first vowel becomes high when it is followed by a suffix with /i/. The high vowel in the suffix is the phonological trigger of the raising-umlaut. However, in present day Tilburg Dutch a form such as */nimis/ is /nimt/. In this form there is no longer a phonological trigger. This implies that, if the tense~lax alternation in

Tilburg Dutch is a productive process, it cannot be based on raising-umlaut. On the other hand, apophony is an active phonological process: in certain morphological circumstances vowels change in a strictly predictable fashion.

I cautiously suggest that tense - lax alternations in Tilburg Dutch are no longer completely productive, contrary to the long lax - short lax alternations. The latter alternations may always occur while the tense - lax alternations are more limited in occurrence.¹⁹ This points in the direction of an analysis in terms of umlaut/assimilation of tense - lax alternations.

4.9. Conclusion

In this chapter, the vowel system of Tilburg Dutch has been discussed, and special attention has been devoted to the analysis of the vowels /ɪ, ʏ, u/. This emphasis is caused by the way in which the element theory of GP characterises laxness or ATR. Laxness differs in a principled way from other elements in that it only makes its contribution to a segment when it is the head of the expression whereas other elements also make their contribution when they are not a head but a dependant. This entails that lax vowels have the neutral element @ as the head of the segment. The fact that lax vowels are always headed by the lax or neutral element @ has as important implication that headedness no longer distinguishes between segments, as it may do when segments are tense. This, in turn, means that we cannot make as many distinctions among lax vowels as among non-lax vowels.

If the vowels /ɪ, ʏ, u/ were analysed as mid, as has been done in the MV analysis of Tilburg Dutch (Van Oostendorp 2000), it would not have been possible to make the necessary distinctions among the lax vowels in this language. This is the major reason why I propose a vowel system in which /ɪ, ʏ, u/ are not mid, but high. I contend that arguments from language acquisition or phonetics are not conclusive for a choice between a MV and a HV. The system of vowel alternations in Tilburg Dutch (and maybe in Standard Dutch as well) is not a clear indication either. However, the theoretical framework of GP is able to enforce a choice between these competing analyses on theory-internal grounds: the GP framework forces a decision in favour of a HV analysis. It is demonstrated that this analysis is possible as an instance of Apophonic Path or as an instance of (raising) umlaut. Because of the lack of full productivity of these tense - lax alternations, the umlaut analysis appears to be the best choice.

¹⁹ Boutkan & Kossmann (1996) mention that in adjectival conjugations, on some rare occasions, (only) tense – lax alternations are found (/brɪ:t/ - /brejə/ ‘broad – broad’ (adj.)). As this is the only example I found, I cannot judge how often this kind of alternation occurs.

5 Phonological word domains

5.1. Introduction

In the preceding chapter the alternations between tense and lax vowels in Tilburg Dutch were discussed. I argued that alternations between tense and lax vowels and between long lax and short lax vowels are not of the same type although they occur in the same environment: before inflectional and derivational suffixes. My proposal was that the alternation between tense and lax is accompanied by the raising of the vowel. Thus, one cannot speak of an alternation conditioned by syllable structure alone. The discussion of tense/lax alternations already drew attention to the interaction between morphology and phonology. In this chapter, this interaction will be the main issue. Once again the subject of this chapter is to some extent a consequence of the fact that standard GP theory does not seem to be able to account for the relevant Tilburg Dutch data. The analysis which we expect to be applicable in such a case – the analysis of Closed Syllable Shortening – does not appear to work. I will show, however, how GP theory explains the data referred to and is also able to provide new insights.

In a Tilburg Dutch word such as [yɛ:t] ‘goat’, a long lax vowel corresponds to a vocoid sequence in standard Dutch: [xɛit]. However, in both varieties, we find forms such as [rɛit] ‘drives’, *with* a vocoid sequence. As argued in Chapter 3, in Tilburg Dutch single I and U elements only occupy a consonantal position if forced to do so by the lack of less sonorous elements. Consequently, we do not expect a form such as [rɛit]. In such a form FINAL-C appears to be satisfied by the final [t]. The difference between the final [t] in [yɛ:t] and the one in [rɛit] is that in the first case the coronal obstruent is part of the lexical morpheme while in the other case the [t] is an inflectional morpheme. Apparently, the inflectional character of the obstruent makes it irrelevant with regard to FINAL-C.

Another situation is found in vowel shortening. Affixation of an inflectional coronal obstruent does not seem to affect the elemental make-up of the rhyme - /rɛi+t/ does not become *[rɛ:t] -, as demonstrated above. However, it *does* affect the number of skeletal positions the nucleus is linked to - in other words, the inflectional character of the obstruent does not make it irrelevant for vowel length. Consider the examples in (1).

- (1) a. No change in rhyme before an inflectional coronal
rɛiə ‘to drive’ ik rɛi ‘I drive’ hei rɛit ‘he drives’¹

¹ It is not clear whether the vowels of such words are long or short. Boutkan & Kossmann (1996:83) give for instance /rɛiə/, /lɛiə/ for ‘to drive’ and ‘to suffer’ respectively, whereas Van Rijen (1993:16,18) gives /rɛi:ə/ etc. with long lax vowels. The latter author reserves the

leiə 'to suffer' ik lei 'I suffer' hei leit 'he suffers'

(1 b). Change in rhyme before an inflectional coronal

lu:pə 'to walk' ik lu:p 'I walk' hei lu:pt 'he walks'
 bɛ:nə 'to tie' ik bɛ:n 'I tie' hei bɛnt 'he ties'

The examples in (1a) and (1b) appear to be contradictory. As indicated by the different effects of mono-morphemic versus inflectional [t] on the character of the vocoid in the rhyme (diphthong-like or not)(cf. 1a), an inflected word consists of two word domains; this is of course irrespective of whether the nucleus consists of a diphthong-like structure or of a long lax vowel. If that is indeed the case, shortening is not really what we expect. As an illustration, consider the structural representations and phonetic forms in (2).

(2) a. (rei0)t0 [reit]
 b. (lu:p0)t0 [lu:pt] *[lu:pt]

Following GP theory phonological domains are followed by an empty nucleus. This gives rise to the representations in (2). The verbal forms consist of a morphological stem and an inflectional affix. The form we expect in (2b) is *[lu:pt], with a long vowel in the nucleus because there is no reason for vowel shortening to take place. This is the main problem I try to solve in this chapter.

In order to be able to account for the forms in (2a) and (2b) we have to understand how to deal with the morphology-phonology relation in general. Therefore, section 5.2 is devoted to a discussion of the way in which morphological structure is reflected in phonological structure. The subject of recursiveness in phonology is discussed and connected with the GP view of phonological domains. Finally, this section illustrates these views in the analysis of FINAL-C in inflected words in Tilburg Dutch. Section 5.3 deals with the shortening of long lax vowels. In 5.3.2, vowel shortening before inflectional coronal obstruents is discussed, after which other inflectional suffixes are considered. I will briefly touch on the subject of derivational suffixes and vowel shortening in 5.3.3.

5.2. The reflection of morphology in phonological structure

Before we are able to argue that the affixation of an inflectional segment has no affect because FINAL-C is restricted to the internal domain of the word, we have to agree that a word may consist of more than one domain. The existence of word-internal domains is less evident in Tilburg Dutch than it is in Standard Dutch. In

short stems for the affixed forms (hei reit). For the affixed forms, both references give a short vowel. I follow Boutkan & Kossmann in this thesis.

Standard Dutch, as well as in English, the analytic structure of inflected verbal forms is clear because inflection results in phonological structures which would be impossible in monomorphemic words (e.g. overlong structures, such as found in English *leaped*). In this respect, (analytic) regular verbal inflection in Tilburg Dutch resembles non-analytic or synthetic *irregular* verb forms in English (e.g. *kept*, *wept*, etc.).² However, as we have seen, Tilburg Dutch provides evidence for the analytic structure of regular verbal inflectional forms as well. The working of FINAL-C is a case in point.

For a long time recursive structure was considered to be impossible in phonology (cf. Nespor & Vogel 1986). With the appearance of OT, such absolute statements were replaced by violable constraints, of which NONRECURSIVITY (Selkirk 1996) was one, prohibiting recursive phonological word structures of the type in (3).

- (3) *Recursive Prosodic word:



Such a constraint may be violated, if a higher-ranking constraint requires this. Such a constraint is MIRRORING (Van Oostendorp 2002):

- (4) MIRRORING
The prosodic structure of a word should be isomorphic to its morphological structure

According to MIRRORING the optimal phonological structure of a recursive morphological structure is recursive as well. Consequently, if a morphological word contains another morphological word, its phonological structure should also have a phonological word containing another phonological word. In (5) an example is given of such isomorphism between morphological and phonological structure.

- (5) Morphological structure: [[kanarie]_N s]_N
Prosodic structure ((kanari:)_ω s)_ω
(cf. Van Oostendorp 2002:9)

In a tree-like structure, we would get the representation in (6).

² In Chapter 2, section 2.4, the GP distinction between analytic and non-analytic or synthetic structures has been discussed.

- (6) kanaries/kanari:s
- $$\begin{array}{c}
 \alpha_{N/\omega} \\
 / \quad \backslash \\
 \alpha_{N/\omega} \quad \beta \\
 \text{kanarie} \quad \text{-s} \\
 \text{kanari:} \quad \text{s}
 \end{array}$$

In (5) and (6) morphological and phonological structure is isomorphic: the morphological word corresponds to the phonological word. Furthermore, the structure is recursive: a morphological noun/phonological word is contained within a morphological noun/phonological word.

The Dutch case of [kanaris] ‘canaries (bird)’ resembles the Tilburg case of [reit], introduced above. In the morphological representation, the inflection is adjoined to the morphological word. MIRRORING demands the prosodic structure to be isomorphic to its morphological structure. As the morphological structure shows adjunction of the inflectional morpheme, the phonological structure shows adjunction as well. This is demonstrated in (7).

- (7) Morphological structure: [[rei]]_N t]_N
 Prosodic structure ((rei))_ω t)_ω

In both (5) and in (7) the segmental make-up of the inflectional suffixes – /-s/ in the nominal case of Dutch and /-t/ in the verbal case of Tilburg Dutch – suits the demands of the morphology-phonology interface because in both cases the suffix consists of a coronal obstruent. As mentioned in Chapter 3 coronals are unmarked for place and because of this their internal structure is almost empty. These suffixes are thus suitable for ‘dangling’ adjoined positions.³

In Chapter 2, we have briefly discussed analytic versus synthetic morphology in GP. Analytic morphological structure creates a layered phonological domain, whereas synthetic or non-analytic morphology creates a word structure, consisting of one domain. An example of an analytic structure is English *leaped* (li:p0)_ω d0)_ω, whereas an irregular form such as *kept* is synthetic:(kɛpt)_ω. Clearly, a phonological form such as /reit/ is the result of analytic morphology: ((rei)_ω t)_ω. If we assume that an analytic, adjoined phonological structure should be assumed for inflected forms such as /reit/ ‘(he) drives’ we have to express that FINAL-C is acting on the internal word domain. We have to define the constraint on the lower, internal phonological word: FINAL-C (LOW).

The restriction on the application of a constraint to the internal word domain, is not unusual. As mentioned in Chapter 3, McCarthy excluded function words when he proposed the FINAL-C constraint in 1993, implicitly restricting this constraint to the domain of the phonological word. Tunica was given as an example

³ It is not only an inflectional (or derivational) coronal that can occur in an adjoined, weak position. As we have seen in the previous chapter, tautomorphic coronals also occur in a weak position, although rarely.

of a language where FINAL-C was argued to be relevant to the phonological phrase. Tilburg Dutch appears to be a language where the domain is the internal phonological word.

This is only a brief discussion of the relation between morphology and phonology. For a recent overview of the literature on this subject, see Kula 2002. We have been able to conclude that the distribution of diphthong-like structures in Tilburg Dutch reveals two phonological word domains. FINAL-C (LOW) is argued to be parameterised for the internal word-domain. In the next subsection we will confront this outcome with the case of vowel shortening in Tilburg Dutch.

5.3. Shortening of long lax vowels

5.3.1. Introduction

We have seen above that certain Tilburg Dutch morphological processes do not change the phonological structure of a word (/rei + t /= [reit] and not *[re:t]). However, a change in length of lax vowels as a result of affixation occurs in the dialect of Tilburg Dutch. Inflection, derivation, and compounding may all result in vowel shortening. Tilburg Dutch examples can be found in (8).

- (8)
- | | | | | | |
|-------|---|----------|---|------|---|
| lʊ:pə | - | lʊ:p | - | lʊpt | ‘to walk - (I) walk - (you/he/she) walks’ |
| rœ:mə | - | rœ:m | - | rœmt | ‘to empty - (I) empty - (you/he/she) empties’ |
| hɔ:lə | - | hɔlb:r | | | ‘to attain - attainable’ |
| spʊ:r | - | spʊrbə:n | | | ‘rail - railway’ |

In this chapter I will not be concerned with other phonological processes occurring in combination with affixation, such as tense vowels becoming lax or back vowels becoming front, as in (9a) and (9b) respectively.

- (9) a.
- | | | | |
|-------|---|---------|----------------------------------|
| strep | - | stripkə | ‘stripe - stripe (dim.)’ |
| slop | - | slɔpkə | ‘pillowcase - pillowcase (dim.)’ |
- b.
- | | | | |
|-----|---|--------|--------------------------|
| mən | - | mənəkə | ‘man - man (dim.)’ |
| tʊn | - | tʊnəkə | ‘barrel - barrel (dim.)’ |

In Chapter 4 I argued that the alternations between lax /ɪ/, /ʏ/, and /ʊ/ and tense /e/, /ø/, and /o/ historically were possibly due to an affix, which caused laxing and lowering. Consequently, I do not consider the laxing of tense vowels in (9a) to be synchronically productive and regular, let alone the rare cases of umlaut or fronting in (9b), which are generally agreed to be non-productive synchronically.

The cases, which traditionally fall under *inflection* and which show vowel alternations in Tilburg Dutch consist of cases in which a verbal suffix is added – an inflectional ending /-t/, /-t/ or /-d/ past participle; /-tə/ or /-də/ ending for past tense

suffix and enclitic forms - and cases in which a nominal or adjectival inflectional affix is added. All these cases show quantitative alternations (shortening of long lax vowels), while some also show tense - lax alternations in addition. The cases in which a *derivational* suffix is added generally show quantitative shortening or no change at all. The same is true for compounds. First of all, we will consider the case of inflection, distinguishing between cases with an inflectional /-t/ and cases with other inflectional affixes.

5.3.2. Vowel shortening before inflectional affixes

5.3.2.1. Background

What we need to account for in this section is that affixation of /-t/ affects vowel length, though it does not change the elemental make-up of the rhyme: /rei + t/ does not become *[rɛ:t] but stays [reit] whereas /lʊ:p + t/ becomes [lʊpt] and does not remain *[lʊ:pt̩]. Adopting the same layered structure for [lʊpt] as for [reit], the structure of the Tilburg Dutch inflected word [lʊpt] ('he/she walks'), is expected to be as in (10). If [reit] ('you (s/pl)/he/she drives') consists of two morphological and phonological domains, [lʊpt] ('you (sg/pl)/he/she walks') does so as well.

- (10) Morphological structure: [[lʊ:p]_N t]_N
 Phonological structure ((lʊ:p)_ω t)_ω

Since the two phonological domains are phonetically consonant-final – (lʊ:p)_ω t)_ω – we expect them to be followed by a licensed domain-final nucleus.⁴ However, if the analysis was like this, we would expect *[lʊ:pt̩] instead of the attested [lʊpt] because nothing in the structure enforces vowel shortening, as can be seen in (11).

⁴ It was argued in Chapter 2 that in GP coda consonants are never found word-finally. Phonetically, word-final consonants are assumed to be in onset positions, necessarily followed by empty nuclei since onset positions always have to be licensed by a nucleus position. Consequently, domain-final /p/ and domain-final /t/ in (10) are followed by parametrically licensed empty nuclei.

(11) *lʊ:pt ‘(you/he/she) walks’

(O	R	O	R)ω ₀	O	R)ω ₁
	N				
	/\				
x	x x	x	x	x	x
	\ /				
l	ʊ:	p	0	t	0

The structure in (11) is fine and we do not expect shortening to occur in case of adjunction of a coronal suffix. That is, we don't expect a short vowel in the nucleus, contrary to what we find.

I suggest that the difference in influence of the inflectional affix (/t/) is due to the fact that in Tilburg Dutch domain-final empty nuclei are licensed in the most external word domain only. An empty nucleus which is ω₀-final, is not licensed in this language. Therefore, the ω₀-final nucleus has to be ‘spelled out’ ([lʊ:pət]) or the structure has to be such that the parametric licensing of the domain final nucleus is not necessary.⁵ Modern Tilburg Dutch apparently prefers to license the internal-domain-final empty nucleus by the preceding nucleus. In order to support this claim we need to return to the subject of licensing briefly.

As mentioned in Chapter 2, licensing of empty nuclei is not supposed to go from left to right but from right to left. However, for the analysis of Dutch I follow Rowicka (1996, 1999) who claims and motivates that licensing of empty nuclei is not from right to left but from left to right. In Chapter 2, the notion of Trochaic Government (Rowicka (1996, 1999, also referring to Van der Hulst (ms.)) has been introduced.⁶ Interestingly, Trochaic Proper Government accounts for similar shortening phenomena as the Tilburg data under discussion. For instance, it allows for a straightforward analysis of phenomena affecting vowel length in Turkish, Yawelmani and Mohawk.

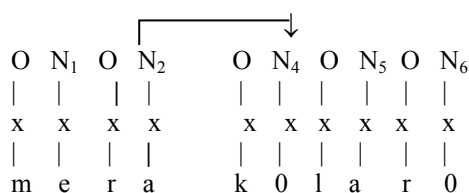
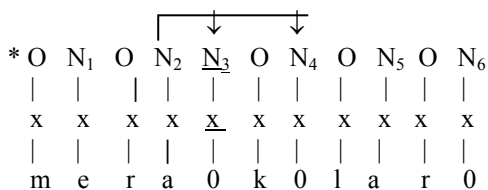
Let us look at the analysis of vowel shortening in Turkish, such as the shortening of the underlined vowel in [merək_llar] ‘curiosity (nom. pl.)’, as compared to [merək_i] ‘curiosity (poss.)’ and [merək] ‘curiosity (nom.)’. Rowicka suggests that a form such as *[merək:klar] is impossible but argues that this is not because of the closed syllable. Rather, the impossibility of this form is caused by the fact that the empty nucleus in between [k] and [l] is not licensed by the preceding nucleus. If the vowel preceding [k] would remain long, there would be two (phonologically) empty nuclei in a sequence (*[merək₀l₀lar]). This is impossible because of the

⁵ That forms with a vowel between internal word and affix are similar to historical predecessors of the Tilburg and Standard Dutch forms, is no coincidence probably. For instance ‘you take’ is *jij* [nɛmt] in Standard Dutch but [du nɛmɔs] in Middle-Dutch (Van Bree 1987:225). One might argue that in the linguistic history of the dialects in question, it was necessary to spell-out the non-parametrically licensed internal domain final nucleus.

⁶ She also suggests we might do away with the parametrical licensing of domain-final empty nuclei.

required adjacency of licenser and licensee. Consequently, Rowicka suggests that the long vowel shortens in order to be able to license the empty nucleus. This is shown in (12).

(12) meraklar ‘curiosity (nom. pl.)’ (as compared to mera:ki)



(Rowicka 1996:285), with some adaptations)

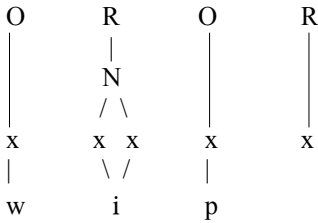
In (12) N₃ (the second nucleus of the long vowel) is deleted so that the head of the long vowel, N₂, may govern and license the empty nucleus in between [k] and [l]. Hayes (1995) discusses a similar case in Fijian in which a long vowel shortens when it is followed by a single, light syllable but not when it is followed by a long vowel or by two light syllables. Rowicka argues that in languages such as Turkish, shortening occurs in order to achieve an exhaustive parse of empty nuclei in Proper Government relations.

5.3.2.2. Shortening before inflectional /-t/

Just as Rowicka proposes that vowel shortening is the result of the necessity to properly govern a word-internal empty nucleus in the above-mentioned languages, I suggest that in Tilburg Dutch the head of the preceding nucleus licenses the internal word-domain-final empty nucleus. This is a consequence of the fact that in Tilburg Dutch only the final, empty nucleus of the largest or highest word domain is parametrically licensed. Since the head of the nucleus (i.e. the first part of the long vowel) cannot license both its immediately following dependent position and the empty position in between the two consonants, the long vowel shortens. In this way, the head of the nucleus can license the empty nucleus. In (13a) the head of the

leaked, esteem-esteemed, etc.), the shortening cases (such as *weep-wept, keep-kept*) are lexically listed and not phonologically derived from the corresponding non-suffixed forms with long vowels (cf. Harris 1994). In GP this is important since the notion of resyllabification is considered to be controversial. If a form such as *wept* would be phonologically derived from *weep + t* there would be a change in constituent structure between the two forms, as becomes clear from (14).

(14) a. wi:p *weep*



b. *wept*



(cf. Harris 1994:80)

In (14b) the stem-final [p] is in the rhymal adjunct position and [t] occupies the word-final onset. Therefore, the long vowel in the nucleus is short and the rhyme has room for [p]. Since both forms are in the lexicon, there is no question as to whether one form has changed (resyllabified) into another.

Even if one did not consider resyllabification to be a problem, one could still not adopt such analysis for the Tilburg Dutch cases, unless one wished to discard GP theory altogether. The phonology of the form [wεpt] shows no morphological domains — it is an acceptable monomorphemic form, just like other monomorphemic English words (*apt*, etc.). They are synthetic forms, in which no internal morphology is visible. Forms such as *weep, keep, wept* and *kept* are independently listed in the mental lexicon. Such an assumption is possible because these past tense forms are not productive and comparatively rare in English. If we return to the Tilburg Dutch forms such as [lʊ:p] / [lʊpt] ('(I) walk / '(you/he/she) walk(s)'), the suggestion that there is no internal morphology in the inflected form is difficult to defend. In the discussion of vocoid final forms we have already observed that there clearly is more than one domain in such an inflected Tilburg Dutch word. For that reason I have adopted Van Oostendorp's notion of MIRRORING, accounting for the fact that adjunction in morphology is reflected in adjunction in phonology. Although we can claim that English forms such as *wept* and *kept* have no internal

morphological and phonological structure, we cannot possibly make the same claim for the relevant forms in Tilburg Dutch.

For the sake of the argument, we will apply the analysis of the English forms to the relevant Tilburg Dutch cases. The possible outcomes are presented in (15). In (15a) we observe a form without visible inflection. Such a form is impossible: the discussion of FINAL-C has demonstrated that there is more than one word domain in Tilburg Dutch and that inflectional affixes (even 0-affixes) are external to the lower phonological word domain. In English, *wept* is a separate lexeme and not a regular past inflectional form and in such a situation a representation such as found in (15a) is fine. Such an analysis is not possible when the form in question is a perfectly regular, derived inflectional form, which is the case in the comparable case in Tilburg Dutch. In (15b) a representation is given of a Tilburg Dutch form with visible inflection (2 s./pl., 3 s.) without resyllabification and in (15c) with resyllabification. I will discuss (15b) and (15c) below.

(15) a. lʊ:p ‘(I) walk’

	O	R	O	R
		/ \		
	x	x x	x	x
		\ /		
	l	ʊ:	p	
(cf.	w	i:	p)	

(15) b. lʊpt ‘you/he/she walks’

	((O	R	O	R)ω ₀	O	R)ω ₁
	x	x	x	x	x	x
	l	ʊ	p		t	
(cf.	w	ɛ	p		t)	

(15) c. lʊpt ‘you/he/she walks’

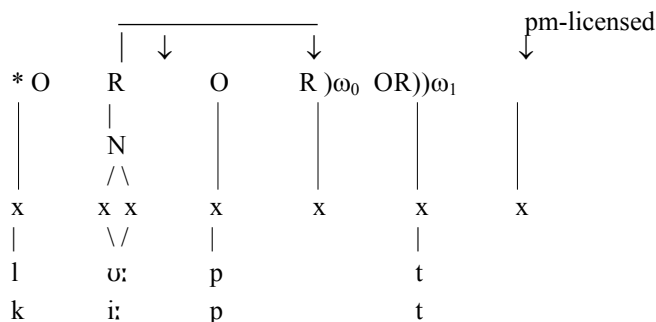
	((O	R)ω ₀	O	R)ω ₁
		\			
	x	x x	x	x	x
	l	ʊ	p	t	
(cf.	w	ɛ	p	t)	

Let us consider (15b) first. If we do not change the structure and assume no resyllabification, the structure is grammatical. The long vowel [u:] might have occurred instead of [u] since the structure is adequate in itself.

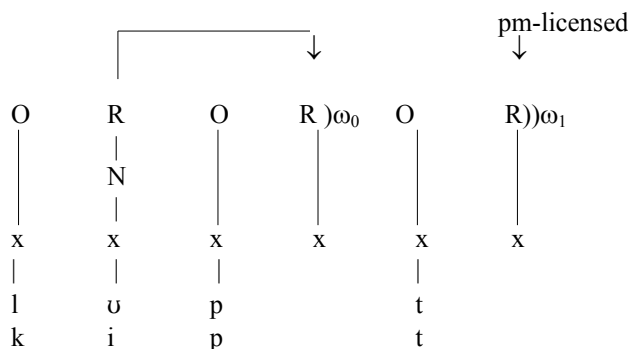
In (15c) I have adopted the analysis for English [wept] for Tilburg Dutch [lupt]. I added word domains given the regularity of the inflectional process. This means that resyllabification is assumed to have occurred, with the inflectional consonant occupying the onset position and the lexical [p] the coda. This implies shortening. The problem is that this results in a word-domain ending in a coda. This is contrary to the constituent structure which we assumed until now. It would imply that word domains may differ as far as their structure is concerned. The fact that this analysis works for English *keep/kept* pairs but not for Tilburg Dutch [lʊ:p]/[lupt] cases is due to the fact that in the English case we are dealing with non-productive, lexicalised forms without internal morphology whereas in Tilburg Dutch shortening is productive and regular. Consequently an analysis based on Closed Syllable Shortening is not an option for the Tilburg Dutch data.

The analysis of vowel shortening before inflectional coronal obstruents is thus based on the concept of Trochaic Shortening and on the assumption that in Tilburg Dutch only the most external word-domain-final empty nuclei are parametrically licensed. It is not unlikely that at some point in the history of English, the *keep/kept* cases were structurally identical to the synchronic Tilburg Dutch [lʊ:p]-[lupt] cases. This helps to solve the problem for the GP analysis of the English examples. If the *keep/kept* cases are remnants of a diachronic stage of the English language, we expect such cases to have resulted from regular and productive processes in that historical stage. In that period a form such as [kept] must be assumed to have internal morphology, just like present day Tilburg Dutch [lupt]. Consequently, it is possible that at some time in the past the analysis of the now irregular and unproductive English cases was identical to that of the Tilburg cases discussed above. That is, we suppose that in both languages the final empty nucleus in the largest word domain was/is parametrically licensed exclusively. A head of a long vowel in the first nucleus cannot license both its dependent position in the nucleus itself and an internal-word-final empty position, as illustrated in (16a). This results in shortening, so that its head can license the empty nucleus, as in (16b).

(16) a.



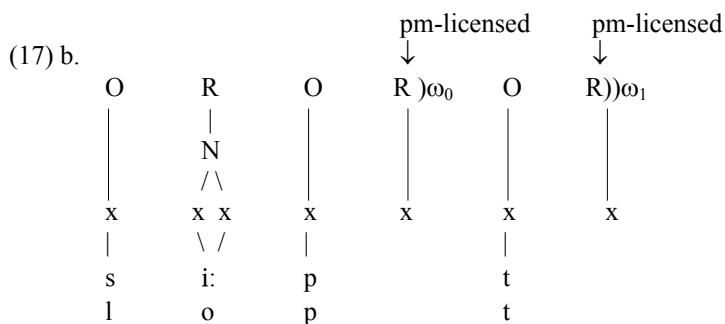
(16) b.



The *regular* past formation in English is similar to the Standard Dutch system. Forms such as *seeps* (or past tense *seeped*) and Standard Dutch *loopt* ‘walks’ have identical analyses in this respect. The analysis is based on Trochaic Licensing. It assumes that in these languages final nuclei are licensed in each phonological word. Whether it is the most internal, most deeply imbedded domain, ω_0 , or the less internal, less deeply imbedded domain, ω_1 , its final empty nucleus is licensed. In (17a) I give examples with their morphological and phonological representation. In (17b) it can be observed that no shortening is expected to occur in a structure in which both domain final empty nuclei are licensed.

(17) a.	English	<i>seeps</i>	[[si:p] s]	(morphological form)
			((si:p0)s0)	(phonological form)
	Standard Dutch	<i>loopt</i>	[[lop] t]	morphological form)
			(lop0)t0)	(phonological form) ⁹

⁹ I have adopted an analysis in which phonetically long and tense vowels in Standard Dutch are phonologically tense and not long (cf. Chapter 4). Because it is argued that tense vowels may not occur in a branching rhyme, the effect is the same as if they were long phonologically.



5.3.2.3. Variation in vowel shortening before inflectional affixes

In the previous subsection we proposed an analysis based on a parameterised licensing of domain final empty nuclei and on Trochaic Licensing in order to account for vowel shortening before inflectional coronal obstruents in Tilburg Dutch. Yet shortening does not always occur with all speakers. In the section on shortening with derivational suffixes and compounds it will be argued that the variation is due to the gradual character of lexicalisation. With inflection the situation is different. Although the picture is not completely clear, it is evident that there is a phonological basis for variation.¹⁰ If the long stem vowel is followed by a stop, a nasal or /l/, the vowel is short when inflection is added. However, when the stem final consonant is a fricative (including the /r/) there is variation. Not much is known about the exact nature of this variation. It seems that both variants are possible in some cases, while only a long vowel form is grammatical in others, as can be observed in (18).

(18)	ble:və	bleft / ble:ft	‘stay – stays’
	hʏ:rə	hʏ:rt / hʏ:rt	‘to hear – hears’
	le:və	le:ft *left	‘to live – lives’
	ve:rə	ve:r *vert	‘to bounce – bounces’

It is interesting that the variation only occurs with a, phonologically, very strictly defined group of fricatives.¹¹

¹⁰ I am concentrating on a subset of the inflectional variation. For more details regarding the richness of the variation in this dialect, I refer to Boutkan & Kossmann (1996).

¹¹ Fricatives show a connection with vowel length, although as far as I know the character of this connection is not clear. Van Oostendorp (p.c.) suggests that the reason for the variation in vowel length among fricatives may be that there are two opposite forces at work: phonologically the form is short, but phonetically the fricative causes gradual lengthening. Depending on the gradation of the phonetic lengthening, the form is perceived as long or short. I will not discuss this subject here but will refer to the cases of Philadelphia tensing

Concluding this section, Trochaic Licensing (Rowicka 1996, 1999) and not Closed Syllable Shortening accounts for vowel shortening in Tilburg Dutch. Shortening in Tilburg Dutch occurs after affixation of a coronal obstruent because in this dialect empty nuclei are not licensed in the final position of the internal, lower word. In Standard Dutch and English the lower word-domain-final nucleus is parametrically licensed. Since the head of the first nucleus does not have to license the lower word-domain-final nucleus vowel shortening does not occur in these languages. The reason for not choosing the well-known Closed Syllable analysis for the cases in which vowel shortening occurs does not lie in the GP reluctance to accept the notion of resyllabification. It is caused by the fact that there is at least one wellformedness constraint operating on the domain of a-word-within-a-word: FINAL-C. The fact that vocoid sequences occur before an inflectional coronal obstruent but not before a lexical coronal obstruent clearly indicates that there is an internal word domain, within which constraints can be active. This means that in Tilburg Dutch, as well as in closely related Standard Dutch, the constraint MIRRORING (van Oostendorp 2002) is highly ranked. Having adopted an analysis in which phonetically word-final consonants are followed by an empty nucleus and a structure, in which morphological domains are mirrored in phonological domains, an analysis based on Closed Syllable shortening becomes highly improbable.

5.3.2.4. Other inflectional affixes and (en)clitics

It is not necessary to discuss all inflectional affixes separately. What is true of a certain affix is true of other affixes with a similar phonological shape (cf. De Schutter 2002). For instance, the shortening which occurs before the inflectional verbal coronal *-t/* is in all due respects the same as the one occurring before the inflectional endings with */-də/* (or */-tə/*) (indicating past and enclitic 2nd person singular en plural) or before the enclitic */dər/*. I have discussed the case of 2nd and 3rd person singular verbal inflection extensively. For the sake of completeness, I present some other cases with inflectional suffixes in (19). These examples show verbal forms in the regular past tense (19a), with the 2nd person enclitic (19b) and in the perfect tense (19c).

(19) a.	vɾɣ:kə	vɾɣktə	‘to work (hard) – worked’
	vɛ:lə	vɛldə	‘to file – filed’
b.	vɛ:mə	vɛndə	‘to find - do you find’
	rɔ:kə	rɔktə	‘to hit - do you hit’

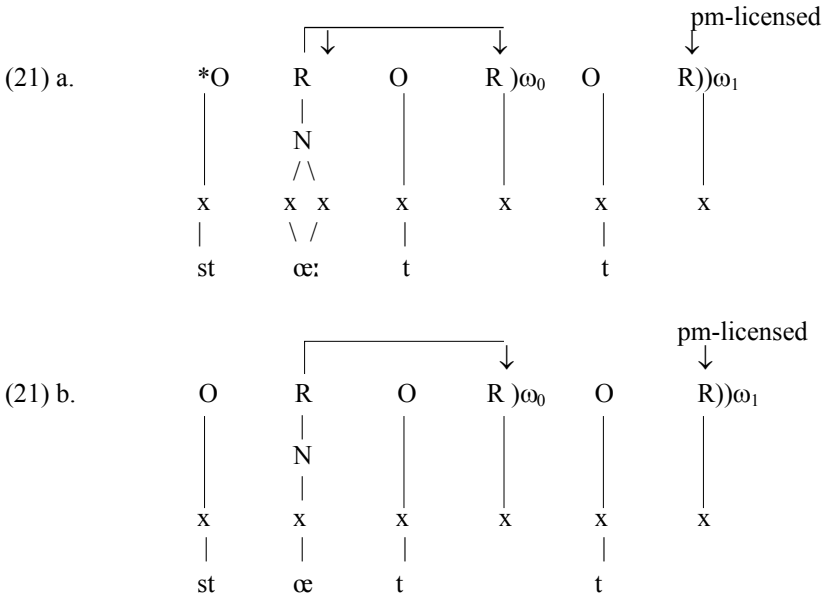
where */æ/* becomes tense before voiced fricatives and front nasals (cf. Benua 1995) and the Scottish Vowel Length Rule (Scobbie a.o. 1999) which concerns a length alternation of */i/* and */ɪ/*.

- (19) c. rœ:mə yərœməd ‘to clear out - cleared out’
 stœ:tə yəstœt ‘to encounter - encountered’

In all these cases, the shortening is evident. One of the examples in (19c) is particularly interesting because the internal domain-final consonant is /t/. If an inflectional /t/ is added – for instance, in the 2nd singular and plural or in 3rd person singular and the imperative – the following situation arises. Take for instance /stœ:t/ ‘I encounter’ (a form with no visible suffix). If such an inflectional /t/ is added we arrive at the structure in (20).

- (20) stœ:t (stœ:t0)t0

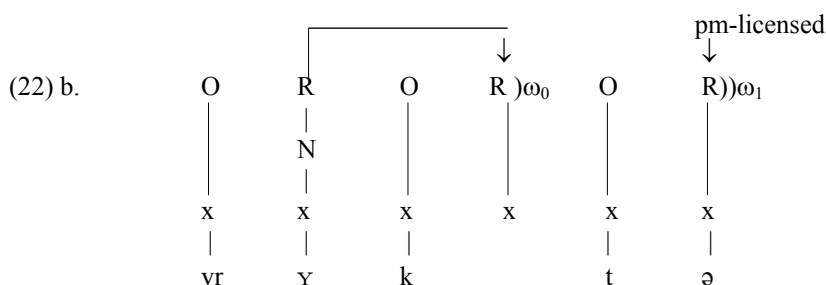
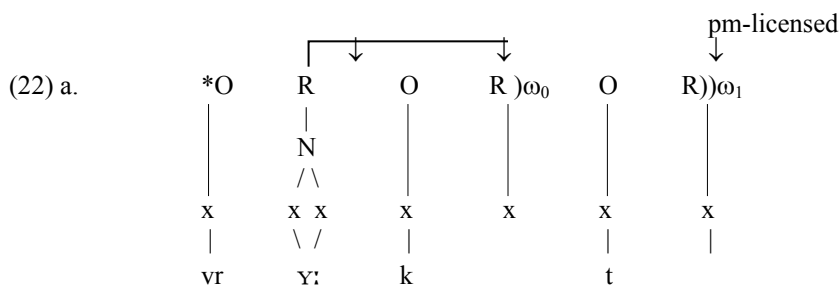
The form in (20) is made up of two word domains, both with a final empty nucleus, just as we expect. We have seen that the empty nucleus at the end of the internal word domain is not parametrically licensed in Tilburg Dutch. Therefore, this licensing has to be done through Trochaic Proper Government by the head of the first nucleus. Consequently, the long vowel shortens, so that it can license the empty nucleus. This is the analysis I have presented above. What makes (20) significant is that the two phonologically final onsets are occupied by the same coronal obstruent. A structural representation is given in (21).



(21a) demonstrates once more that licensing of the unlicensed internal domain-final nucleus cannot be combined with licensing of the dependent position in the first nucleus. In (21b) the vowel in the nucleus is short and consequently the head in the nucleus is able to license the word-final empty position. The result is a phonological

form /stœtt/, with two licensed empty nuclei following the coronals. As a consequence the two coronal obstruents show a geminate structure. Geminates are phonetically never realised in Dutch. Therefore, the pronounced form is [stœt].

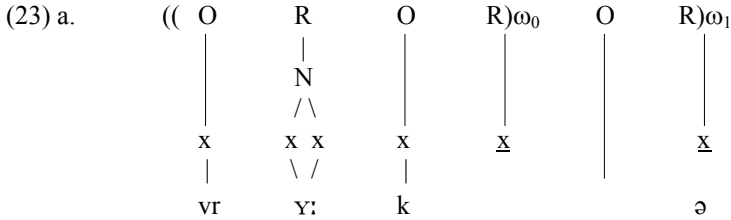
The analysis of the past tense inflected forms with /-də/ and /-tə/ (cf. (19a) and (19b)) is exactly the same as we have seen with present tense 2nd and 3rd person singular and imperative: shortening occurs because the word domain-final empty nucleus should be licensed. This is demonstrated in (22).



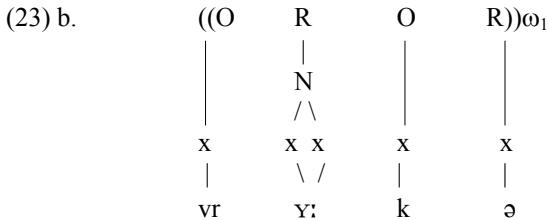
The other inflected forms – such as the past participle – receive the same analysis if they consist of similar suffixes: either /-t/ (in the participle) or /-də/ and /-tə/ (or /dər/).¹² The adjunction of these affixes or clitics has the same consequences for vowel length (in all these cases variation is possible when the stem-final consonant is a fricative).

We will now consider the consequences of the adjunction of vowel initial suffixes, for instance the infinitive suffix /-ə/. The initial structure of an infinitival form is as in (23a).

¹² The enclitic /dər/ ‘there’ causes shortening just as well. However, when the allomorph /ər/ is used, the stem vowel remains long: /ɪk lʊb-dər wɛl evə nɔ:r tu/, /ɪk lʊb-ər wɛl evə nɔ:r tu/ ‘I’ll go over there’.



In (23a) we observe a sequence of two adjacent nuclear positions (underlined). The first skeletal point is deleted because of the OCP, resulting in the structure in (23b) (cf. Charette 1991).



The case presented in (23) is unproblematic. One puzzling case is the shortening which sometimes takes place when an /n/ is added to a verbal stem ending in a vowel. The pattern seems to be rather irregular and phonologically there seems to be no reason for shortening. For instance, while the infinitive of the verb /γɔ:n/ ‘to go’ has a long vowel, the vowel is short in the 1st and 3rd person plural (/γɔ:n/. If the infinitive form of the verb function as an auxiliary, followed by another infinitive, the infinitive stem vowel of /γɔ:n/ is short as well. This is illustrated in (24).

(24)	γɔ:n	‘to go’
	wei/zɣly γɔn	‘we/they go’
	γɔ:n en stɔ:n	‘go and stand’
	zɣ-mə γɔŋ kɛ:kə	‘shall we go look’

We have seen in the examples above that the behaviour of affixes is to a large extent determined by their phonological properties. In other words, it does not matter whether /-tə/ or /-də/ stands for past tense or 2nd person clitic or whether it concerns a noun or a verb. The cases in (24) constitute counterexamples to this generalisation: the same suffix only sometimes causes shortening (γɔn versus γɔ:n). I have no explanation for this.

The shortening in the case of comparatives and superlatives is not in a principled way different from the cases described above, although there is some

variation which I cannot account for.¹³ In the case of comparatives, there are two allomorphs /-ər/ and /-dər/. As expected, the stem vowel is short when the suffix begins with a consonant (25a) and long when it starts with a vowel (25b); in the case of the superlatives the /-st(ə)/ suffix causes shortening, although there is some variation (cf. 25c).

- (25) comparatives
- | | | |
|----|--------------------------|-------------------------------------|
| a. | kle:n / klendər | ‘small / small’ (comparative) |
| | zwɔ:r / zwɔrdər | ‘heavy / heavy’ (comparative) |
| b. | dʊ:f / dʊ:vər | ‘deaf / deaf’ (comparative) |
| | brœ:n / brœ:nər | ‘brown / brown’ (comparative) |
| c. | superlatives | |
| | kle:n / kle:nst | ‘small / small’ (superlative) |
| | hʊ:x / hʊ:xst | ‘high / high’ (superlative) |
| | sxœ:n / sxœ:nst ~ sxœnst | ‘slanting / slanting’ (superlative) |
| | zwɔ:r / zwɔ:rst ~ zwɔrst | ‘heavy / heavy’ (superlative) |
| | lɔ:x / lɔ:xst | ‘low / low’ (superlative) |

This concludes the section on inflectional affixation in which I have argued that vowel shortening in inflectional suffixation is largely due to Trochaic Shortening (Rowicka 1996, 1999), as well as to the absence of parametric licensing of the empty nucleus in final position of the internal word domain. In the next subsection I will consider derivation and compounding.

5.3.3. Shortening of long lax vowels with derivational suffixes

In section 5.2 of this chapter, MIRRORING was discussed. This constraint is more specific than ALIGN (McCarthy and Prince 1993). There are (interface-) constraints, satisfying ALIGN but not MIRRORING (Van Oostendorp 2002). MIRRORING demands the prosodic structure to be isomorphic to its morphological structure. ALIGN does not demand structural isomorphy but only alignment of the relevant edges. We have discussed the structure of an inflected word such as Tilburg Dutch /rɛit/. MIRRORING demands the prosodic structure to be isomorphic to its morphological structure. As the morphological structure contains adjunction of the inflectional morpheme, the

¹³ Diminutive formation conforms to a large degree to the analysis presented here. However, diminutive formation is not purely inflectional and consists of more than semi-empty coronal obstruents or schwa. Since Dutch diminutives are notoriously complex, I will not discuss them any further here.

phonological structure should also show adjunction. The structure is repeated in (26).

(26)	Morphological structure	[[rei] _N	t] _N
	Prosodic structure	((rei) _ω	t) _ω

The isomorphic structure as depicted in (26) is no problem in the case of inflection. The phonologically adjoined position in (26) is occupied by a coronal obstruent. As mentioned in Chapter 3 coronals are unmarked for place and as such they are suitable for ‘dangling’ adjoined positions.

In the case of derivational affixation, the situation is different. There are derivational suffixes which closely resemble inflectional suffixes. Such a case is the suffix /-tə/, which transforms an adjective into a noun. This suffix is phonologically identical to the inflectional suffix for past tense. In those cases suffixation shows the pattern we expect on the basis of the observed behaviour of the similarly shaped inflectional suffixes. Some examples are given in (27).

(27)	yruttə	‘size’	(< yrut ‘big’)
	brittə	‘width’	(< brit ‘wide’)
	huxtə	‘height’	(< hux ‘high’)
	dryxtə/dry:xtə	‘drought’	(< dry:x ‘dry’)

In (27) the suffixed forms have a short stem vowel; there seems to be no variation, except when the initial long vowel occurs before a fricative.

There are also suffixes which have a full vowel. Because of the heavy phonological make-up of these suffixes, they cannot occur in a position adjoined to a phonological word. As an illustration, consider the following representation (adapted from Van Oostendorp 2002).

(28)	spɔ:rzɔ:m/spɔ:rzɔ:m	‘thrifty’ (Tilburg Dutch)
	morphological structure	[[spɔ:r] _N zɔ:m] _N = adjoined structure
	phonological structure	*((spɔ:r) _ω zɔ:m) _ω adjoined structure
		((spɔ:r) _ω zɔ:m) _ω ? = compound structure

The affix in (28) consists of two consonants of which only one is coronal, and a full vowel instead of a coronal obstruent and/or schwa. The suffix is thus too heavy phonologically to occur in an adjoined position although the morphological structure is one of adjunction: [[spɔ:r]_N zɔ:m]_N versus *((spɔ:r)_ω zɔ:m)_ω. This implies that the suffixed form cannot satisfy MIRRORING as this constraint requires the phonological structure to be identical to the morphological structure. It can, however, satisfy ALIGN, the constraint demanding morphological and phonological boundaries to be aligned. This way the morphological structure is still reflected in the phonological structure, although to a lesser degree: an *adjoined* morphological structure is now

reflected in a *compound* phonological one (cf. Van Oostendorp 2002). Other cases with heavy derivational affixes are given in (29).

- | | | | | |
|------|------------------------|-----------------|-----------|-----------------------|
| (29) | lɪrʒə:m | ‘instructive’ | (lɪ:rə | ‘to teach, to learn’) |
| | bəvə(r)bə:r/ bəvə:rbər | ‘navigable’ | (bəvə:rə | ‘to navigate’) |
| | kaməro:dsxap | ‘companionship’ | (kaməro:d | ‘comrade’) |

As is evident from the examples in (29), there is some variation. Sometimes only the short form occurs (/lɪrʒə:m /), sometimes both are possible (/bəvə(r)bə:r/ and /bəvə:rbər/) and sometimes the long form (/kaməro:dsxap /) occurs only.

Compounds in Tilburg Dutch show the same variation as we have seen with derivational suffixes above. Sometimes we find vowel shortening, sometimes not and sometimes both forms appear to be possible. Examples are given in (30).

(30) a. vowelshortening

spurbə:n	‘railway’	(cf. sp:ʊr ‘rail’)
bœkpeɪnt	‘stomach-ache’	(cf. bœ:k ‘stomach’)
klɔrmə:kə	‘to prepare’	(cf. klɔ:r ‘ready’)

(30) b. no shortening

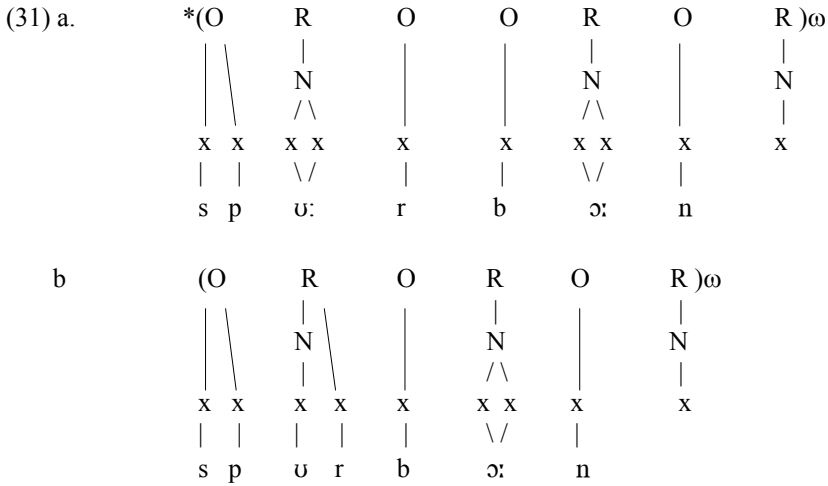
strɛ:kplɒnk	‘ironing-board’	(cf. strɛ:kə ‘to iron’)
sxɪ:fslə:n	‘to hit in such a way that it becomes slanted’	(cf. sxɪ:f ‘crooked’)

(30) c. variation

dœkplɒnk / dæ:kplɒnk	‘diving-board’	(cf. dæ:kə ‘to dive’)
vɪrpuɪnt/ vɪ:rpʊɪnt	‘ferry’	(cf. vɪ:r ‘ferry’)

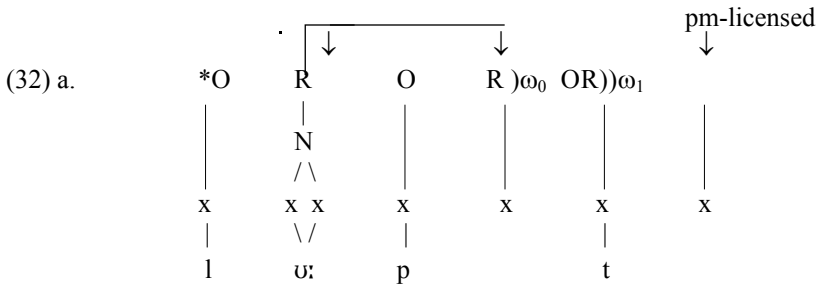
Let us look at the structural representation of a compound with vowel shortening in Tilburg Dutch, such as /spurbə:n/ in (30a). I assume that this form is lexicalised and that the internal word domains have vanished:/(spurbə:n)ə/ ‘railway’ (cf. /spu:r/ ‘rail’).¹⁴ Consequently, the vowel cannot be long because it would result in an impossible structure with two onsets next to each other, as in (31a). As a consequence, the first long vowel is short and the /r/ occurs in the coda position of the first rhyme (31b). This is no problem for the Closed Syllable Shortness analysis: the compound is a lexeme and not a derived word.

¹⁴ The lexicalisation can be inferred from the fact that the meaning of the compound cannot always be deduced from the meaning of the constituting parts.



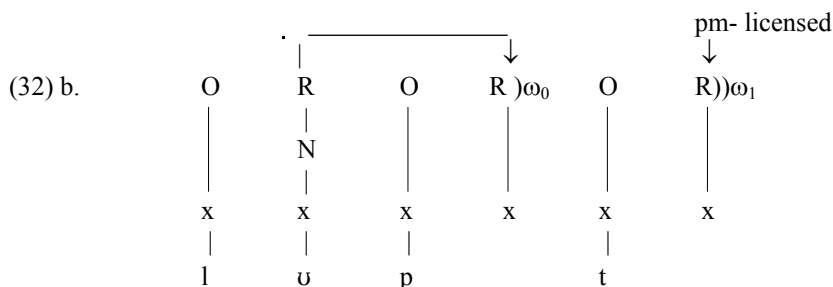
Let us now consider an example in which both forms, with a long and a short lax vowel, are possible, such as /dœkplank - /dœ:kplank/ in (30c). I suggest that this variation has a different motivation from the variation previously found with fricative-final stems. In the fricative-final case, the variation has to do with the phonological/phonetic character of fricatives (cf. footnote 11). The variation in the case of compounds and most derivational suffixes is caused by the fact that lexicalisation is a gradual process and that speakers may vary – and even one speaker may vary. If the first vowel is short, the form is lexicalised and can be represented as in (31b). If the first vowel remains long, the form still consists of two phonological words. The identity of a domain consisting of these two phonological words is not exactly clear (cf. the question mark in (28)).

In a regular ‘adjoined’ inflected word in Tilburg Dutch, the lower word domain final nucleus is not licensed, forcing the first nucleus to shorten. For convenience sake I repeat (13) in (32).

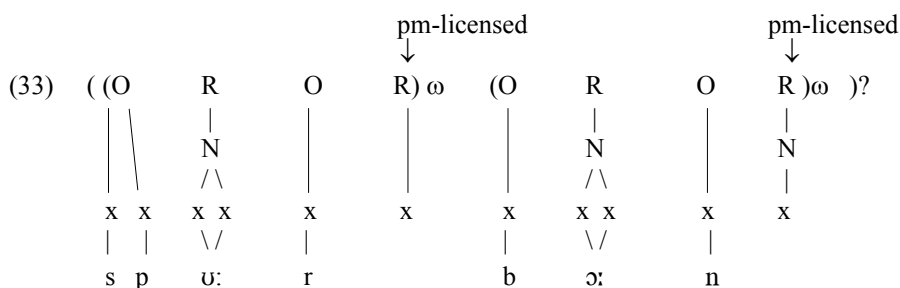


In (32a) the lower domain final nucleus is not automatically licensed. Because of this, it has to receive its licensing from the preceding nucleus through Trochaic Licensing (Rowicka 1996, 1999). If the vowel in the first nucleus is long, this is impossible because it cannot license two dependent empty positions at the same

time. In (32b) the nucleus is no longer branching. It can therefore license the following empty nucleus and, as a result of this, it may remain silent.



If a non-lexicalised compound consists of two individual words, there is no reason to assume that the domain final nuclei are unlicensed. Therefore, shortening is not expected to occur (cf. 33).



This concludes the discussion of length alternation in derivation and compounding.

5.4. Conclusion

In this chapter I have argued that there is a fundamental difference between the apparently similar English word pairs *keep/kept* and the Tilburg Dutch pairs [lʊ:p]/[lʊpt]. In the English case we are dealing with non-productive, lexicalised forms without internal morphology, whereas in Tilburg Dutch the shortening is productive and regular and shows internal morphological and phonological structure. As a consequence the Closed Syllable Shortness analysis, available for the English cases, is not a possible analysis of the Tilburg Dutch cases. An alternative analysis appears to be available. This analysis accounts for the relevant data and also has the advantage of looking critically at theoretical issues within GP. For instance, the chapter portrays the relevance of the question as to the number of word domains and in which respects they may or may not differ.

The analysis of vowel shortening before inflectional coronal obstruents occupies the main part of this chapter. I propose an analysis based on the concept of

Trochaic Shortening of Rowicka (1996, 1999) and on the assumption that in Tilburg Dutch only the most external word-domain-final empty nuclei are parametrically licensed. Because of this, the lower domain final nucleus remains unlicensed unless the preceding nucleus takes over. A head cannot license two dependent positions at the same time. The result is a structure with a short vowel in the nucleus and a trochaically licensed, empty nucleus at the end of the lower word domain.

6 Word-final ambisyllabicity

6.1. Introduction

In the preceding chapters, we have come across two contradictory demands on syllable structure. The first is the claim that coda consonants have to be licensed and governed by a following onset (which in turn always needs to be licensed by a nucleus). The second demand is that lax vowels need to be followed by a tautosyllabic consonant. In the case of a lax vowel in a word-final syllable, the word-final consonant following such a vowel must occupy the onset position of an empty syllable ($CV_{\text{lax}}\cdot C0$) *and* it must follow the lax vowel in the same syllable ($CV_{\text{lax}}C$). The first demand is theory internally motivated (cf. Ch. 2), while the second follows from the special character of laxness (cf. Ch. 4).

Piggott (1999) argues that languages may differ in whether they do or don't have word-final codas.¹ Dutch is a language in which word-final consonants would supposedly be syllabified in onsets and not in codas, even in this view. An argument for this is that word-internal codas are more restricted than word-final consonants: coda consonants must have similar place specifications as the following onsets etc. As an alternative, we could take Polgárdi's (1998) suggestion, that onset licensing is a violable constraint (NUCLEUS). This is not the position taken in this dissertation, as it would weaken the theory of representations in an undesirable way. Instead, it will be proposed that Standard Dutch has word-final ambisyllabic consonants, the first part of which occurs in the coda and the second part in the onset. This is not a weakening of the restrictive theory of representations, adhered to in this dissertation. Word-internally codas appear independently in languages; this implies that the theory has to deal with them and that nothing new has to be added.

In 6.2 I will state the problem. In 6.3 ambisyllabicity is considered: in 6.3.1 I will briefly review the arguments for the assumption that in Dutch lax vowels have to be followed by a tautosyllabic consonant and will go over the resulting effect of ambisyllabicity. In 6.3.2, arguments against the notion of ambisyllabicity will be discussed. An evaluation will follow in 6.3.3. Having defended the notion of ambisyllabicity in general, section 6.4 will be discuss word-*final* ambisyllabicity in Dutch, relating it to the topics of Final Devoicing and Stress. The chapter ends with an appendix, in which the subject of geminate inalterability as it has been treated in the literature, is discussed.

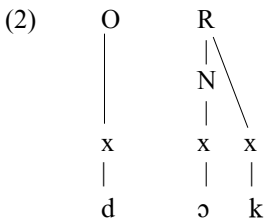
¹ In Chapter 2 Piggott (1999) is briefly discussed.

6.2. The problem

As we will see below, Dutch phonotactics has motivated linguists to assume ambisyllabic, phonetically non-geminate consonants for Dutch. In (1) some examples from Tilburg Dutch are given. Words with a short, lax vowel in the nucleus are ungrammatical when there is no consonant following it in the same syllable. In (1) $CV_{\text{tense}}C$ and $CV_{\text{lax}}C$ are acceptable in syllable final position contrary to the last items in each row, which consist of $*CV_{\text{lax}}$ only.²

- (1) a. dɔk 'dock'
 dok 'idiot, softy,'
 *dɔ
- b. spɛt 'regret' (3 s.)
 spɛ:t 'regret' (noun)
 *spɛ
- c. lɔx 'cumbersome'
 lɔ:ɣ 'layer' (pronounced as lɔ:x)
 *lɔ
- bɔd 'offer' (pronounced as bɔt)
 bɔ:t 'benefit'

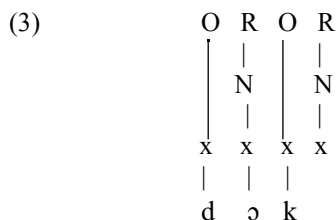
If we follow Van der Hulst (1985) in his proposal that lax vowels have to be followed by a tautosyllabic consonant word-finally, an impossible GP structure would be the result. That is, Dutch phonotactics argues for a structure with a consonant following the lax vowel in the *same* syllable, as in (2).



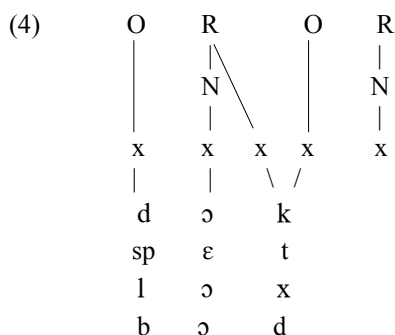
The structure in (2) is fine as far as Dutch phonotactics is concerned. However, it is an unacceptable word-final structure in GP. Because of licensing requirements in

² It is difficult to find examples with a word-final vowel – whether tense or lax – because of the already mentioned FINAL-C constraint. For Standard Dutch we could contrast /la/ 'drawer' and /laf/ 'cowardly' with */la/. In the case of Tilburg Dutch we can only compare the grammatical syllable-final $CV_{\text{lax}}C$ with the impossible $*CV_{\text{lax}}$.

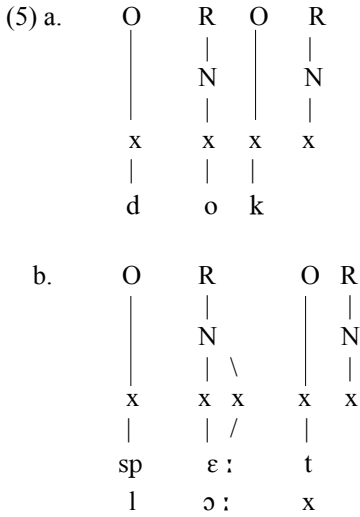
GP theory the word-final consonant must be in an onset, licensed by a following empty nucleus, as can be seen in (3).



(2) and (3) show structures which are required by Dutch phonotactics and GP theory respectively and which appear incompatible. As a solution to this dilemma I propose that the word-final consonants follow a lax vowel in the same syllable and are in the onset of a following empty rhyme. I thus suggest that in such a word-final syllable, a short, lax vowel is always followed by an ambisyllabic consonant, i.e. by a single elemental complex linked to two skeletal positions in two different syllables. The phonological structure of such an ambisyllabic final consonant is that of a geminate consonant. It belongs to the same syllable as the preceding short lax vowel and to the following syllable. Phonetically, consonant-length does not occur in Dutch as a result of which a geminate consonant is phonetically interpreted as a single consonant (cf. Borowski et al 1984, van der Hulst 1985). The proposed phonological representation of the words in question can be found in (4).



In (4) the word-final consonant occupies the coda position in the first syllable as well as the onset position in the second one. It belongs to both syllables at the same time. For words with tense or long, lax vowels in the final syllable this difficulty does not arise. Tense or long, lax vowels do not need to be followed by a tautosyllabic consonant. Consequently, the GP view that word-final consonants are always in the onset does not entail difficulties in this respect. Compare (4), in which the phonological structure of a word-final syllable with a lax vowel is represented, with (5a) and (5b) in which the structure of a word with a tense vowel and the structure of a word with a long, lax vowel in a word-final syllable are represented.



In (5) the final consonant occupies the onset of the final (empty) syllable, just as in (4). However, in (5) this constitutes no problem because there is no short, lax vowel demanding to be followed by a tautosyllabic consonant.

6.3. Ambisyllabicity

6.3.1. Arguments in favour of ambisyllabicity in Dutch

As we have observed in Chapter 4, the question of whether tenseness or vowel length is the phonological characteristic which distinguishes the group of phonetically long/tense vowels from short/lax vowels in Dutch, has been discussed since the 1930s. One of the differences between these two groups concerns phonotactics: short, lax vowels can be followed by one or two non-coronal consonants word-finally, and by one consonant word-internally, while long, tense vowels can be followed by no consonant at all word internally and by maximally one non-coronal consonant word-finally. Another difference is the fact that phonetically long, tense vowels have to occur in an open syllable word-internally, while short, lax vowels do not occur in an open syllable. This last point becomes clear when we look at the examples in (6).

- (6)
- | | | |
|--------|---------|----------|
| hi.at | *hi.at | ‘hiatus’ |
| xa.ɔs | *xa.ɔs | ‘chaos’ |
| kre.ol | *kre.ol | ‘creole’ |

Van der Hulst (1985:60)

The fact that /hi.at/ in (6) is a perfectly acceptable Dutch word, whereas */hi.at/ is not, demonstrates that syllables may not end in a short, lax vowel. This suggests that words such as /kasa/ ‘cash register’, /mɔto/ ‘motto’ or /hɛbə/ ‘to have’ are syllabified in such a way that the first syllable does not end in a short, lax vowel, otherwise the ungrammaticality of */hi.at/ is unexpected. However, the Maximal Onset Principle does not allow a syllabification in which the medial consonant occupies the coda of the first syllable and not the onset of the second one (e.g. */kas.a/). An ambisyllabic representation in which the medial consonant occurs in the coda of the initial syllable and in the onset of the final one, is therefore preferable.

Van der Hulst (1985) argues that the facts of Final Devoicing point in the same direction: ambisyllabic consonants word-medially are not subject to the powerful Final Devoicing constraint.³ He argues that in a word such as /hɛbə/ [b] is voiced which is unexpected if it occurs in the coda of the first syllable only. In such a case, we expect to find [p] instead of a [b] because of Final Devoicing.⁴

Van der Hulst’s third argument to syllabify words such as /kasa/ as CVC.CV is stress assignment. He refers to trisyllabic words the final two syllables of which have the same phonological structure as /kasa/, e.g. /dilema/ ‘dilemma’ or /programa/ ‘program’. Like /kasa/, these trisyllabic words have a short, lax vowel in penultimate position. The interesting thing is that these trisyllabic words have the same penultimate stress pattern as words like /wa’randa/ ‘veranda(h)’ and /a’genda/ ‘diary’. In both cases the penultimate stress is caused by the fact that a pre-final VC syllable is always stressed in Dutch (dialects).⁵ This in turn implies that in words such as /‘kasa/ and in words such as /di’lema/, the pre-final syllable consist of a CVC syllable (/kas/ and /lɛm/, respectively), because of which the syllable in question receives stress.

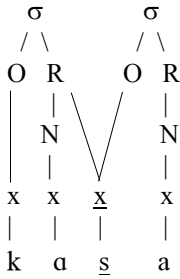
As far as the structure of the ambisyllabic consonants is concerned, Van der Hulst (1985) as well as Borowski et al (1984) give three possible representations for words such as Dutch /kasa/ ‘cash register’. These are given in (7).

³ See below where I will claim that for word-final ambisyllabic consonants the situation is different.

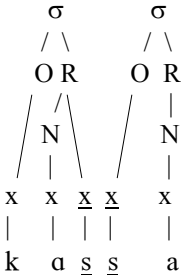
⁴ Final Devoicing – the constraint that syllable-finally all obstruents are voiceless – is almost without exception in Dutch dialects. Later in this chapter I will discuss this subject and its connection to ambisyllabicity thoroughly. For now it suffices to say that obstruents in coda position cannot be voiced.

⁵ I refer to section 6.4.2. in this chapter for a discussion of some problems related to this aspect of stress.

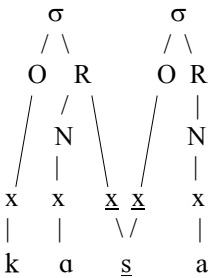
(7) a.



(7) b.



(7) c.



In (7a), the segmental material /s/ and the skeletal slot x belong to two syllables. This representation is similar to the one found in Kahn (1980) for a word such as English *hammer* /hæməʁ/. According to Kahn, such a word is initially syllabified with the /m/ in the onset of the second syllable, while a later rule introduces a connection between the first syllable and the medial consonant (cf. Kahn 1980). I consider (7a) to be an unacceptable structure because it implies that a single segment – that is, segmental material and skeletal point – belongs to two constituents at the same time, which is a case of improper bracketing (Harris 1994). The structure of (7b) shows the same segments (segmental material and skeletal position) in adjacent positions. Such a structure is undesirable since it implies a violation of the OCP, at least when these parts of the long geminate are intra-morphemic (Harris 1994). Following Borowski (1984) one can imagine that such a structure is appropriate if

the two parts of the long geminate belong to separate morphemes.⁶ In the case of Dutch phonetically long, geminate consonants do not even occur in compounds (*kas-sla* ‘lettuce from the greenhouse’ is [kas̩sla] and not *[kass̩la]). Consequently, I follow Van der Hulst (1985), who argues for the structure in (7c), in which ambisyllabic consonants have the same structure as geminates, that is, a structure in which the segmental material is attached to two skeletal positions each of which is linked to a different syllable. Whether the geminate is phonetically long depends on the language in question: in Dutch phonetic consonant length does not exist and as a consequence the geminate is phonetically short.

6.3.2. Arguments against ambisyllabicity

Arguments against ambisyllabicity can be found in Harris (1999). His arguments include theoretical objections and empirical observations. We will first consider the more fundamental, theoretical arguments.

In Harris’ view, the assumption of ambisyllabic, phonetically short consonants is both unnecessary and undesirable. According to the author, there is no sound representation for (short, geminate) ambisyllabicity. He argues that it is undesirable to assume that one consonantal segment belongs to two syllables. On the other hand, an analysis in which ambisyllabic consonants are represented as phonologically geminate consonants (phonetically interpreted as short and single) cannot be correct either. He argues that a language such as English demonstrates this. Medial consonants which are generally presumed to be ambisyllabic are subject to all kinds of weakening processes (e.g. flapping). This is in contradiction to the observation that geminates generally are inalterable and are not expected to be subject to weakening.

Another problem for the concept of ambisyllabicity is the following. Suppose, for a moment, that it is possible to find in a natural language ambisyllabic consonants which are phonetically long and ambisyllabic consonants which are phonetically short. Such a language would not be predicted by a theory of ambisyllabicity. As such, the existence of such a language would constitute a problem for the theory. According to Harris, such a language exists: *Ibibio*. This is why Harris proposes to abandon the concept of ambisyllabicity for phonetically short consonants and uses the foot as an explanatory device for the relevant data instead.

Harris demonstrates that the concept of the foot can account for all the facts which purportedly support the notion of ambisyllabicity. Having done so, he discusses neutralization in *Ibibio* in order to show that there are cases where the notion of ambisyllabicity is impossible to apply. Because in Harris’ view the case of

⁶ However, see Vogel (1977), who claims that no language has a contrast between truly long, geminate consonants and ambisyllabic consonants.

Ibibio is proof of the superiority of a foot-based analysis over an analysis based on ambisyllabicity, the data from this language are discussed in some detail below.⁷

In (8) the distribution of oral stops and related segments in Ibibio is given. In (9) we find some examples.

(8)

Foot-initial		Non-foot-initial		
[C		VCCV	VC(∅)V	VC] before C or pause
\widehat{kp}	b	pp	β	p^{\uparrow}
t	d	tt	r	t^{\uparrow}
k		kk	γ	k^{\uparrow}

(9) a. *Foot-initial*

$\widehat{kp}á$ ‘die’ $bá$ ‘exist’

Non-foot-initial:

b. $díppé$ ‘not hide’ $dí\beta é$ ‘hide oneself’ $díp^{\uparrow}$ ‘hide’

The generalisations illustrated in (8), are as follows. Foot-initially there is a two-way laryngeal contrast among the labial and coronal plosives: plain versus prevoiced (9a). With the exception of the foot-initial site, the Ibibio system demonstrates neutralising pressure: there is no contrast between plain and prevoiced, as shown in (9b). Geminate stops are plain ([$díppé$]); non-geminate stops are subject to vocalisation when they occur before a vowel ([$dí\beta é$]) and are unreleased when word-final before a stop or pause ([$díp^{\uparrow}$]). A confirmation of the necessity of the foot-based condition can be found in examples such as [$i_{(Foot)}bàt-tá$]/* $[i_{(Foot)}\beta àttá]$ ‘she is not coming’, where the /b/ is intervocalic but not lenited because it is foot-initial. According to Harris there are striking parallels between lenition in Ibibio and lenition in Danish and English. The contextual and segmental details of tapping are more or less identical across these languages. Even though the context is intervocalic in both cases, tapping fails foot-initially but can be observed foot-finally, as can be seen in (10).

(10) a. No tapping of coronal obstruents foot-initially:
 English: $bou_{(Foot)tique}$ (‘boutique’)
 Danish: $a_{(Foot)tom}$ (‘atom’)
 Ibibio: $ú_{(Foot)táŋ}$ (‘plaiting’)

⁷ Even though Ibibio, being a tone language, lacks stress, foot structure plays an important role in the domain of weight and as an organizer of segmental distributions.

- b. Tapping of coronal obstruents foot-internally:
 English: (_{Foot}geɾ) Anne ('get Anne')
 Danish: (_{Foot}saeɾ) op ('set')
 Ibibio: (_{Foot}bèɾ) ówó ('push someone')
 (Harris 1999:1889, with some adaptations)

In the examples in (10a) the coronal obstruent /t/ is in foot-initial position. Consequently, it does not change into the lenited variant *[ɾ]. However, in (10b) the coronal obstruent occurs foot-internally. Consequently, it lenites and can be transcribed as [ɾ]. If one claims that in a language such as English (and Danish) tapping is the result of ambisyllabicity, one would have to say that in Ibibio these consonants are ambisyllabic as well. However, this is in conflict with the claim that no language will contrast single ambisyllabic consonants with true long geminates. While the single consonants in Ibibio are subject to lenition, the geminates remain inalterable. In (11) below, the velar and labial obstruents lenite when single ([ɣ] and [β], respectively) but remain unaltered when they are geminates ([kk] and [pp], respectively).

(11) Ibibio geminate consonants

fáák 'wedge'	fááɣá 'not wedged'	fákka' 'remove wedge'
díp 'hide'	díβé 'hide oneself'	díppé 'not-hide'

The case of Ibibio is a clear demonstration of the fact that the head of a foot can support more elements than dependent positions. It is an example of a language in which we only need to refer to different locations within the foot in order to be able to characterise the prosodic conditions on each of the regularities (that is, the different occurrences as plain, prevoiced or lenited consonants) in question. In foot-initial position the consonant is unaltered: it is the strongest position and consequently is occupied by a strong segment. The non-foot-initial position is a weak position and can support fewer elements – weaker segments – than a strong, foot-initial position. This is why in non-foot-initial positions we find lenited or weakened consonants.

The case of Ibibio is a strong argument against ambisyllabicity in Harris (1999). A language with true geminate consonants and ambisyllabic, phonologically geminate but phonetically single, short consonants, would constitute a serious problem for ambisyllabicity. As a matter of fact, if the analysis of Ibibio by Harris were the only possible one, this language would constitute a serious problem for the notion of ambisyllabicity. For this reason, it is of considerable importance to examine this language and Harris's analysis in more detail. We will see that Ibibio does not constitute a counterexample, if the analysis is changed slightly. This will be demonstrated in the next section.

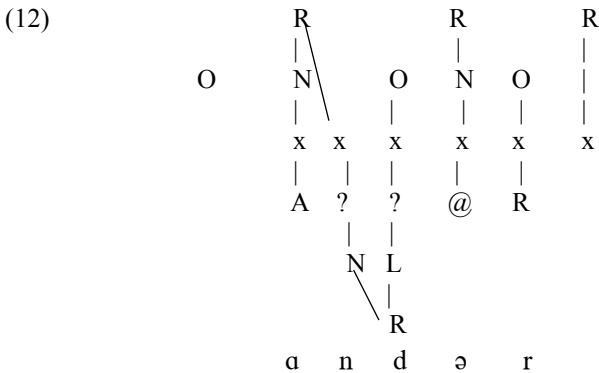
6.3.3. Discussion of ambisyllabicity

The head position of a foot can support more elements than a dependent position. However, I will argue that for the analysis of Dutch the concept of the foot is not sufficient. We *do* need ambisyllabicity, in the sense of Van der Hulst (1985) among others and contrary to what is suggested by Harris. I will demonstrate that in Dutch, in an identical prosodic (foot-internal) context, we find phonetically identical consonants with phonologically distinct behaviour. The only relevant difference is that the vowel preceding the foot-internal consonant is phonologically tense in one case and lax in the other.

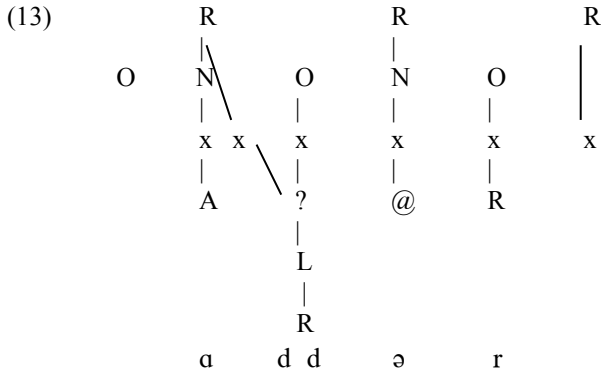
First of all we briefly discuss Harris' fundamental criticism that the assumption of ambisyllabic consonants would weaken the theory. I argue that ambisyllabicity does not weaken the theory because nothing extra is needed to represent it. As a matter of fact, it appears that the representational apparatus we need for ambisyllabic consonants is already present. Partial geminates in coda-onset clusters are frequent cross-linguistically and their representation is not in any fundamental way different from the representation of an ambisyllabic consonant.

It has been argued in Chapter 3 that one of the reasons coda positions are present at all, is that a lax nuclear head on its own is not strong enough to license a following dependent rhyme. Consequently, a coda consonant is present in order to provide the lax nuclear head with enough licensing strength. This is true, irrespective of whether the coda is occupied by a partial or a complete geminate. In both cases we assume that the coda position gets its autosegmental licensing potential from the onset. Since its potential has diminished when going from one position to another, the coda may only autosegmentally license material which is completely or partly shared with the following onset.

Let us consider the following representation of the Dutch word *ander* /andər/ 'other' in (12).



The representation of the Dutch word *adder* /adər/ 'viper', with an ambisyllabic consonant, is structurally exactly the same, except for the fact that not only the coronal place element R, but *all* elements are shared between coda and onset. This is demonstrated in (13).



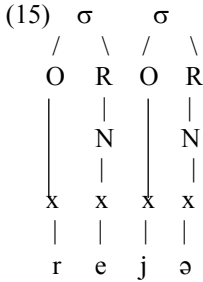
The representations in (12) and (13) do not differ structurally. In both cases, the segmental structure – the elements of the first coda and onset positions – belongs to two positions. In both cases the lax nuclear head forces a coda position to be present. That is, codas are undesirable positions but whether they are filled with same of different material as the onset does not matter.

In the second place, Harris argues that ambisyllabicity is not a necessary concept. Instead, he favours a foot-central approach. For him, lenition, vocalisation and other weakening processes are consequences of the foot-internal status of the targets: foot-internal positions are weak and do not allow the same amount of elements/features as strong positions do. It will be demonstrated here that we cannot do away with ambisyllabicity in Dutch. In Dutch, ambisyllabicity has to be represented as gemination phonologically, even if the ambisyllabic consonant is phonetically single and short. Let us consider the data in (14).

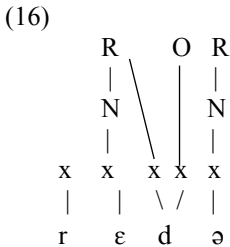
- (14) a. 'rodər / 'rojər 'more red'
 'ladə / 'ləjə 'to load'
- versus:
- b. 'mødər / *'møjər 'mud'
 'ladər / *'ləjər 'ladder'

The question is why lenition occurs in the examples in (14a) and not in (14b). I suggest that the answer is that a single, word-internal consonant is in the foot-internal onset position in (14a) whereas the word-internal consonant is ambisyllabic in (14b). In (14b), the ambisyllabic consonant occurs in the coda consonant of the first syllable and in the foot-internal onset of the second syllable.

We will first consider the representation of the lenited variant of /redə/ [rɛjə] ‘drove (plural)’ in (15).⁸



In (15), [j] - I in elemental terms - is in a weak, foot-internal onset position. Consequently, only a simplex segment, consisting of I, is licensed. In the representation of [rɛdə] *redde* ‘to save’ in (16), the [d] is ambisyllabic. It occurs in the coda and in the onset position. The [d] in the foot-internal onset position is subject to conflicting requirements. On the one hand, it may not contain a great deal of elemental material because of its weak position, and on the other hand it must contain enough elemental material to license the material in the coda position. This is why a glide such as [j] is impossible here: [j] does not contain enough material to license [d] in the coda of the first syllable. Since the element I prefers not to occupy a coda position and since there is nothing wrong with the ambisyllabic [d] in the coda, everything stays as it is.⁹



Comparing this with Harris’ analysis of the English data, we could argue that the fact that the /t/ in /piti/ is subject to lenition makes an ambisyllabicity analysis improbable for English. This is not the case with /^hmədər/ or /^hladər/ in Dutch. Part of the problem may lie in the fact that English words such as [piti] are assumed to contain an ambisyllabic consonant. If such English forms contained geminate

⁸ The fact that /d/ weakens to [j] argues for a different representation of /d/. If /d/ is represented as (h, R, ?, L) we do not expect it to weaken to /j/, which consists of only I. See for instance Scheer (2002) for literature against the element R. Scheer also mentions arguments in favour of the presence of the element I in for instance the consonants /r/ and /l/.

⁹ In Chapter 3 I have demonstrated that the element I prefers not to occupy a coda position.

consonants, this could result in the strange situation where these consonants are subject to change, contrary to the universal observation that geminates are inalterable. However, if words such as /pɪti/ are analysed as /pɪ.ti/ and not as /pɪt.ti/, forms such as [pɪri] or [pɪʔi] are expected to occur. Thus, I propose that Dutch /'mɔdər/ has an ambisyllabic /d/ intervocally, whereas words such as English /'pɪti/ do not have an ambisyllabic /t/ word-medially (and can therefore be represented as /'pɪ.ti/). Consequently, Dutch /'mɔdər/ is structurally represented as /mɔd.dər/ - with two consonantal positions linked to one segment. Dutch /'rɔjər/ on the other hand has the same structure as English /'pɪti/.¹⁰ Therefore, [rɔdər] may occur next to [rɔjər], just like [pɪti] appears alongside [pɪri] (or [pɪʔi]), depending on the variety.

In the appendix, a discussion of inalterability can be found. This concept has been discussed on several occasions in the literature since the 1980s. Van der Hulst (1985) mentions inalterability as an argument for the lack of Final Devoicing in ambisyllabic consonants. Harris (1999) uses it in his argumentation against ambisyllabicity. This discussion is not part of the main text because inalterability of ambisyllabic consonant is not a problematic issue in the framework of head-dependency or licenser/licensee and the concomitant distinction in licensing potential. The view adhered to in this dissertation on Geminate Inalterability, is stated by, among others, Goldsmith (1990) and Harris (1990, 1994). Goldsmith states that rules discussed in the literature under the rubric of inalterability and integrity apply to non-geminates in order to achieve compliance to word-level phonotactics. Geminates do not violate phonotactics because of licensing considerations. As geminates are associated with a coda position and an onset position, they get their licensing from the onset position. Therefore these geminates allow for the presence of segmental material in the coda that otherwise would not have a chance of appearing there.¹¹

Summarising, we have observed that, in the examples in (14), foot-structure appears to be the same in all cases. There is no way we can account for the fact that lenition is possible in the tense-vowel cases while this is impossible in the lax vowel cases on the basis of foot-structure alone. In this sense there is an important difference between English and Dutch: in Dutch we find VCV contexts where the C

¹⁰ In Ibibio the phonological situation is similar to that of Dutch: intervocally and foot-internally we find lenited consonants (such as in [fáá́yá] 'not wedged' (from /fáák/ 'wedge')) as well as non-lenited, ambisyllabic ones, such as in [fákká] 'remove wedge'. [fáá́yá] can be assumed to have a similar structure as Dutch [rɔjər], whereas [fákká] and [mɔdər] 'mud' resemble each other. The only difference in this respect between the two languages is that in Ibibio consonants can be long phonetically, whereas in Dutch plosives do not support phonetic length (intervocalic voiceless fricatives are however longer than their voiced counterparts (cf. I. Slis & M. van Heugten 1989).

¹¹ The view that well-formedness constraints/phonotactics have a lot to do with the so-called geminate inalterability can also be found in Scobbie (1992).

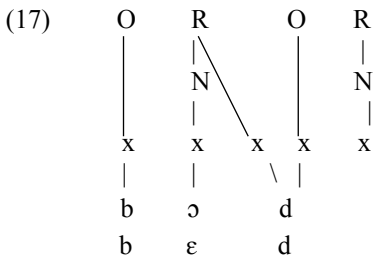
appears to be lenited and VCV contexts where the C is not lenited.¹² Consequently, we cannot do away with ambisyllabicity for the analysis of Dutch.

If Dutch words with a lax vowel in the final syllable end in an ambisyllabic consonant and if this consonant is a geminate, the word-final consonant is expected to behave accordingly. In the next section it will be demonstrated that word-final ambisyllabic consonants in Dutch behave in the same fashion as word-internal ambisyllabic consonants.

6.4. Word-final ambisyllabicity

There are two major problems attached to the proposal that word-final syllables with lax nuclear heads end in ambisyllabic consonants. One of these problems has to do with Final Devoicing. This will be discussed in 6.4.1. The second problem is related to the subject of stress. If word-final ambisyllabic consonants occur, we have to account for the fact that these word-final syllables are not always stressed in contrast with the situation word-internally. This topic will be discussed in 6.4.2. Before going into a discussion of possible problems attached to the analysis, we will go back to the analysis itself.

The structure of words such as [bɔt] ‘offer’ and [bet] ‘bed’ is proposed to be as in (17).



In (17) the lax vowels are followed by an ambisyllabic consonant, that is, by a single elemental complex linked to two skeletal positions and belonging to different syllables. The phonological structure of such an ambisyllabic, final consonant is that of a geminate consonant: it belongs to the same syllable as the preceding short, lax vowel and to the following empty syllable. Phonetically, consonant-length is not relevant in Dutch as a result of which such a geminate consonant is phonetically interpreted as a single consonant. We will now consider why Final Devoicing applies to word-final ambisyllabic consonants while it does not when the ambisyllabic consonants are word-internal.

¹² cf. Zonneveld (1978).

6.4.1. Final Devoicing

Final Devoicing is a characteristic property of Dutch and Dutch dialects including Tilburg Dutch. It can be clearly observed in singular/plural pairs, with most obstruents in Standard Dutch as well as in Tilburg Dutch. Some examples are presented in (18).

- (18) a. Standard Dutch:
- | | |
|-----------------------|--------------------------|
| (ik) les - (wij) lezə | ‘(I) read - (we) read’ |
| rof - rovə | ‘burglary - to steal’ |
| mɛit - mɛidə | ‘girl - girls’ |
| (ik) tɔp - (wij) tɔbə | ‘(I) worry - (we) worry’ |
- b. Tilburg Dutch:
- | | |
|-----------------------|--------------------|
| bet - bɛdə | ‘bed - beds’ |
| mɛ:t - mɛ:ɔdə | ‘maid - maids’ |
| ɪk hɛp - wɛj hɛbə | ‘I have - we have’ |
| ɪk blɛ:f - wɛj blɛ:və | ‘I stay - we stay’ |

In all these cases, a correspondence can be observed between a voiced obstruent in intervocalic position and a voiceless one in a word-final position. This phenomenon is without exceptions.

Féry (2003b) mentions two approaches to Final Devoicing in the literature. First of all, she discusses an approach in which it is argued that the fact that obstruents are in the coda, is responsible for their neutralization. In the second place she mentions the onset-based approach of Lombardi, who claims that obstruents can only be voiced before tautosyllabic sonorants (Lombardi 1991, 1995).

- (19)
- $$\begin{array}{l}
 \sigma \\
 / \quad \backslash \\
 [\text{root}] + \text{son} \\
 | \\
 \text{Laryngeal node}
 \end{array}$$

(Lombardi 1995)

(19) states that obstruents may only be voiced before a tautosyllabic sonorant. Consequently, an obstruent in any other context will be voiceless, also if the obstruent is voiced underlyingly. In the remainder of this chapter, I will adopt Lombardi's approach to Final Devoicing.

In (20), we will consider the relevant examples from (18) - words ending in an underlying voiced obstruent (obvious from the fact that in the plural form, the relevant consonant is voiced).

- (20) Tilburg Dutch:
- | | | | |
|-----|---------------|------|--------|
| bet | underlyingly: | bed | ‘bed’ |
| mɛt | „ | mɛ:d | ‘maid’ |

Structurally, the words in (20) do not end in a syllable-final consonant, but in an onset-consonant, followed by an empty nucleus. Furthermore, as proposed in this chapter, the forms with a short, lax vowel in their final syllable end in an ambisyllabic consonant. Consequently, the word [bet] ‘bed’ has the structure in (21).

- (21) bed.d0 ‘bed’ (cf. mɛ:d0 ‘maid’, if the lax vowel is long)

The fact that in a word such as [mɛ:t], structurally /mɛ:d0/, Final Devoicing takes place, is not surprising because the final consonant is not followed by a tautosyllabic sonorant. On the other hand, with word-internal ambisyllabic consonants no devoicing takes place. I have accounted for this fact by claiming that such a devoicing of the coda consonant is not necessary because the structure is optimal, the coda position being licensed by the following onset; this onset is in turn followed by a vowel and consequently it is expected to be voiced. More complicated is the answer to the question as to why in [bet], a word with a structure such as /bed.d0/, the final consonant is devoiced?

The analysis is somewhat complicated, because different, sometimes contradictory, forces are at work. In (22), I give examples with tense and lax vowels before word-final ambisyllabic consonants. In each case a similar form with a word-internal ambisyllabic consonant is given as well.

- (22) a. consonants following tense vowels:
- | | | |
|---------------------|-----|-----------------------------|
| word-finally | | word-internally |
| /ro.d0/ [rɔt] ‘red’ | vs. | /ro.dər/ [rɔdər] ‘more red’ |
- b. consonants following lax vowels:
- | | | |
|------------------------|-----|-------------------------|
| word-finally | | word-internally |
| /bɔd.d0/ [bɔt] ‘offer’ | vs. | /mɔd.dər/ [mɔdər] ‘mud’ |

The situation of the final consonant in /rod/ [rot] in (22a) is straightforward. The /d/ is followed by an empty nucleus which is not a sonorant by definition. Therefore the coronal obstruent is voiceless in syllable-final position. If we compare this with /ro.dər/ [rodər], there are no difficulties. Following Lombardi’s constraint (cf. 19), obstruents are voiced before a tautosyllabic sonorant. As schwa is a sonorant, the obstruent is thus voiced: [d].

We will now turn to the more interesting case of lax vowels in a word-final syllable, as in (22b). Consider first the polysyllabic word /mɔd.dər/ [mɔdər]. In this case the obstruent in the onset is voiced, [d], because it is followed by a tautosyllabic sonorant. The fact that the coda segment is not devoiced, is because there is no need

to. Its licensing power depends on the following onset and it can remain as it is, in spite of the fact that it is in a prosodically weak position. There is no need for it to change.

The most complicated situation is found in /bɔd.d0/, which is [bɔt] phonetically. Why should the ambisyllabic consonants alter (/d/ versus [t]) if an ambisyllabic consonant in the coda position is already an optimal situation. The solution lies in the fact that the cluster is subject to conflicting demands. On the one hand, the obstruent in the onset should be voiceless, because there is no sonorant following it (only an empty nucleus). On the other hand, the coda, being a prosodically weak position, may hardly license any material of its own. In (23) a representation is given of what such a form would look like if the second part of the ambisyllabic geminate were voiceless - satisfying Lombardi's constraint (cf. 19) - while the first part would remain as it is (just as it does in /mɔd.dər/ [mɔdər]).

(23) *bɔd-t0

In (23), the word-final consonant is voiceless because it is not followed by a sonorant. The resultant structure is undesirable. Because of their prosodically weak status, coda positions cannot license more material than the material occurring in the following onset. If the onset devoices - as it should, according to the definition of Final Devoicing - it has *less* elemental material than its preceding coda. Therefore the optimal outcome is [bɔt], a form in which the coda obstruent adapts to the fact that its licensing onset cannot bear voice. This way, not only is the demand that lax vowels must be followed by a tautosyllabic consonant satisfied (/bɔd.d0/), but also the demand that word- and syllable-final consonants structurally occur in the onset of an empty nucleus (/bɔd.d0/).

It is interesting to note that a similar proposal was made by Spa (1970). He suggests comparable lexical representations for the following singular-plural word-pairs in Standard Dutch in (24).

(24) [wɛp] [wɛbən] 'web, webs' /wɛbb/
 [pɑt] [pɑdən] 'toad, toads' /pɑdd/

(Spa 1970:198-9)

His analysis was presented in another framework, with different mechanisms but the principle is the same. As corroborating fact he points at adjacent consonants, such as two /n/'s in adjacent words, which are reduced to one [n], just as two /d/s or two /b/s are reduced to one [d] or [b] in (24).¹³

¹³ Standard Dutch has interesting word pairs such as [pɑt], [pɑdən] ('path, paths') and [pɑt], [pɑdən] ('toad, toads'). As the lexical representation of 'path' Spa gives /pɑd/, while the lexical representation of 'toad' is /pɑdd/. The first representation would be problematic for me, since /pɑd/ is an impossible structure, for the reasons given above (lax vowels need a tautosyllabic consonant, while word-final consonants structurally occupy a final onset

Before concluding the section on word-final ambisyllabicity, I need to discuss one other important issue: the apparent stress difference between words which structurally end in an ambisyllabic consonant and words which end in two distinct consonants.

6.4.2. Word-final ambisyllabicity and stress

Van der Hulst (1985) argues that stress facts indicate that in words such as *dilemma* the *m* must be ambisyllabic. It has the same stress pattern as words such as *agenda*, in which the *n* is clearly in the coda of its syllable. An analysis along these lines implies that syllables ending in an ambisyllabic consonant must always be stressed. However, this does not appear to be the case. On the contrary, it is often claimed that syllables with a lax vowel and two non-identical consonants are most often stressed, whereas syllables with a lax vowel and a single consonant – syllables ending in an ambisyllabic consonant in my proposal – are not.

In the analysis I propose in this chapter, final syllables with lax vowels and a phonetically single final consonant structurally end in an ambisyllabic and therefore *geminate* consonant. Accordingly, the analysis proposed here predicts that, just as words such as /aˈgen.da/ and /diˈlem.ma/ (‘diary’ and ‘id.’) behave similarly as far as stress is concerned, words with a final syllable with a lax vowel followed by two distinct consonants, behave in the same way as words with a final syllable with a lax vowel followed by a phonetically single consonant. If this is not the case, it constitutes a problem for my analysis. Let us consider the stress facts more closely.

First of all, I consider some bisyllabic Standard Dutch forms. We find many words with a tense vowel in the first syllable and a word-final syllable with a lax vowel and a consonant. Of these bisyllabic monomorphemic words, 190 have word-initial stress, against 120 with word-final stress.¹⁴ This is illustrated in (25) and (26).

position, followed by an empty nucleus). For me, consequently, the lexical representation of ‘path’ and ‘toad’ are the same: /padd/. The difference between the two plural forms is based on the fact that the Dutch equivalent of ‘paths’ is an unproductive, irregular plural form, based on suffixation with an affix, causing umlaut (cf. Chapter 4).

¹⁴ Van der Hulst (1984:218) gives the following table to indicate the four stress types, attested in Dutch bisyllabic, monomorphemic words (tense vowels are labelled long – VV).

	Initial	Final
VC-VC	140	90
VV-VV	170	60
VC-VV	170	30
<u>VV-VC</u>	<u>190</u>	<u>120</u>

- (25) $V_{\text{tense}}-V_{\text{lax}}C$: 190 cases with word-initial stress
structurally
- | | | |
|---------|-----------|-----------|
| ‘divan | ‘couch’ | divan.n0 |
| ‘krisis | ‘id.’ | krisis.s0 |
| ‘bivak | ‘bivouac’ | etc. |
| ‘konɪŋ | ‘king’ | |
| ‘robot | ‘robot’ | |
| etc. | | |

(Van der Hulst 1984:221)

- (26) $V_{\text{tense}}-V_{\text{lax}}C$: 120 cases with word final stress
structurally
- | | | |
|--------|----------------|----------|
| ka’raf | ‘carafe’ | karaf.f0 |
| ba’rək | ‘barracks’ | barak.k0 |
| pa’tat | ‘french fries’ | etc. |
| spi’ɔn | ‘spy’ | |
| ta’bəl | ‘table’ | |
| etc. | | |

(Van der Hulst 1984:221)

If these words really have the same structural representation as words such as *dilemma* - which is the claim made in this chapter - why don't they all have final stress? Why don't they all behave such as /ka’raf/ in (26)? It appears to be the case that *trisyllabic* words, with a penultimate VC syllable, almost always have stress on the penultimate syllable in words with distinct coda-onset consonants and in words with ambisyllabic consonants. However, for reasons, which I do not understand, the pattern is not so uniform in *bisyllabic* words. In (25), examples are given of words which, according to the ‘final ambisyllabic consonant’ analysis presented in this chapter, end in an ambisyllabic consonant but which, in spite of this, have initial instead of final stress. However, the same exceptions can be found with words ending in *distinct consonants*. In (27), some examples are given of words which end in a consonant cluster and which have, in spite of this, initial stress.

- (27)
- | | |
|----------|------------|
| ‘vijand | ‘ennemi’ |
| ‘eland | ‘elk’ |
| ‘eiland | ‘island’ |
| ‘climax | ‘id.’ |
| ‘herberg | ‘inn’ |
| ‘nonsens | ‘nonsense’ |
| ‘asfalt | ‘asphalt’ |
| ‘yoghurt | ‘id.’ |

(Van der Hulst 1984:221)

This indicates that it is not so much a question of whether the two consonants under discussion are the same or different (phonetically single or consisting of a consonant cluster) but whether they occur in a bisyllabic or trisyllabic word, or more specifically, whether they occur in a final or non-final syllable. This might be caused by the stress ‘rules’ themselves. On the other hand, it might have to do with the question of whether the nucleus following the consonants is filled or not.

Another interesting point is raised in Davis (1999). Davis discusses cases in which geminate coda-consonants behave differently from single coda-consonants in the same language. He refers to Hausa, a language in which syllables closed by homorganic nasals behave unlike syllables closed by a geminate consonant. No remark is made in this work about the relevance of the number of syllables, but this would be worth looking at in future research. The problem with regard to the difference in stress between ambisyllabic and distinct consonants in final and pre-final syllables, will be put aside for now.

6.5. Conclusion

One of the aims of this chapter has been to demonstrate that the decision to stick to a restrictive theory and to analyse ‘problematic’ data *within* the framework, leads to interesting results. In Chapter 4, I have provided arguments for the view that lax vowels have to be followed by a tautosyllabic consonant. In Chapter 2 I have given arguments for the GP analysis of a phonetically word-final consonant as a consonant in the onset of an empty nucleus. I have shown that for (Tilburg and Standard) Dutch we may assume that phonetically word-final consonants following lax vowels structurally occur in the onset of an empty syllable. Such a proposal has already been made for such consonants when they follow tense vowels (cf. Oostendorp 2000 and Zonneveld 1993). We now have a similar analysis for phonetically word-final consonants following tense *and* lax vowels. Note that there is nothing special or extra needed for the analysis proposed here.

In this chapter, arguments have been presented for the concept of ambisyllabicity as a phonological structure of two geminate consonants and a phonetic structure of a single one. Ambisyllabicity is not a notion which is generally accepted. Arguments against it can, for instance, be found in Harris (1999). In favour of ambisyllabicity, I have argued that an ambisyllabic structure does not add anything to the theoretical apparatus already present. Furthermore, there are languages, such as Dutch, which cannot do without it. I have suggested that part of the problem with ambisyllabicity might be due to the fact that English word-medial consonants are considered to be ambisyllabic. In this chapter it is claimed that this is a misconception. The usefulness of a GP framework in which the difference between heads and dependents with respect to licensing is so important, is evident. Ambisyllabicity, as a general concept, is understandable from the idea that segments in coda positions cannot license as much elemental material as segments in onset positions. Coda positions are licensed by the following onset positions; codas are dependent and the following onsets are heads. The analysis follows logically from this difference.

In the appendix below, an overview on the subject of inalterability is given, although I do not pretend that it is complete. This discussion is not part of the main text because inalterability follows directly from the licensing differences between phonological heads and dependent positions. Since there is a large body of literature on the phenomenon of geminate inalterability (some of which may be considered to be important predecessors of more recent viewpoints), I have decided not to leave out an overview of this literature completely and to present some important views in the following appendix.

Appendix: inalterability

Inalterability has received a lot of attention in the literature – even more so than the related subjects of ambiguity and integrity, even though all three subjects are generally considered to be relevant for geminates.¹⁵ In this chapter, inalterability has not been treated as a special characteristic of geminates. Inalterability is a mere consequence of the already optimal structure of geminates.

Van der Hulst (1985) uses the characteristic of inalterability to account for the fact that Dutch Final Devoicing, which generally occurs with coda consonants in the language in question, does not occur with ambisyllabic consonants. According to Van der Hulst (referring to Hayes 1984), this is caused by a property typical of long segments: inalterability. Inalterability accounts for the fact that in a word such as Dutch *hebben* ([hɛbən]) the /b/ is not subject to Final Devoicing (Van der Hulst 1985:60).

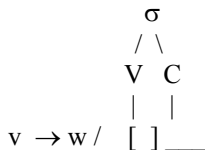
Borowski, Itô and Mester (1984) show that, in Danish, word-medial consonants have coda- and onset properties. Just as in Dutch, Final Devoicing does not occur with these ambisyllabic consonants, in the same way, in Danish, a rule such as Consonant Gradation (making underlying voiceless consonants voiced, and voiced consonant spirants) does not occur in that context. Borowski, Itô and Mester argue that the reason behind this is that these ambisyllabic consonants are geminates, satisfying the Geminate Constraint ('No rule can apply to the melody element of a geminate structure unless both skeleton positions fulfil the structural description of the rule').

Inalterability is also discussed in Hayes (1986a, b) and Schein & Steriade (1986). These authors claim that, in principle, only geminates are subject to inalterability and that this is due to their special structure. They refer to the principle of Strong Satisfaction, which states that geminates do not alter through the working of a rule, if that rule does not mention the entire structure or all of the association lines of the geminate. To account for the inalterability in the ambisyllabic 'case', Hayes uses the so-called Linking Constraint ('*Association lines in structural descriptions are interpreted as exhaustive*' (Hayes 1986b:472)). That is, when a rule must contain association lines in its structural description, that rule only affects those

¹⁵ Ambiguity means that long segments act in some contexts as if they were two segments, in others if they were one; Integrity means that, insofar as they constitute two segments, long segments cannot be split by epenthesis (Hayes 1986a:321).

forms in which the association lines match up exactly. The rules subject to inalterability are those which mention both the CV or skeletal tier and the melodic tier; those rules which escape inalterability are formulated on just one tier. This is not because two tiers are mentioned but because of the association lines mentioned in the structural descriptions of the rules. An example of this is Persian *v*-weakening. In Persian, /v/ weakens to [w] when it follows a short vowel in the same syllable, as may be seen in (28).

(28) Persian *v*-weakening bo-row (<bo-ræv)¹⁶ ‘go!’



This rule does not apply to geminates (/ævvæ/ ‘first’ *[æwæ]/[owæ]). According to Hayes (1986a), this is the case because the association lines of the /v/ melody exceed those permitted by the Linking Constraint (in the rule the *v*-melody is linked with one association line to a consonantal position, whereas in the actual form there are two association lines).

According to Schein & Steriade (1986), the association lines are not the clue, as Hayes suggests; what counts is that a rule cannot apply to a geminate when part of the linked structure of the rule’s target fails to meet a structural description. They call this the Uniform Applicability Condition (UAC):

Uniform Applicability Condition (UAC)

Given a node n, a set S consisting of all nodes linked to n on some tier T, and a rule R that alters the contents of n: a condition in the structural description of R on any member of S is a condition of every member of S (Schein & Steriade 1986:727)

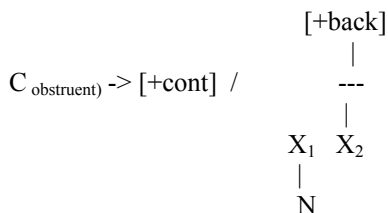
A short example will illustrate this. In Tigrinya an obstruent is spirantised if it follows and is adjacent to a syllable nucleus. Accordingly, all postvocalic velar or uvular stops turn into spirants (indicated by underlining of the segment), as is demonstrated in (29).

(29) mə-btāk̲ ‘to cut’

A formalisation of Tigrinya Spirantisation can be found in (30).

¹⁶ ae > o before w

(30)



X_2 is adjacent to X_1 .

In (30) a [+back] obstruent (in X_2) is spirantised when it directly follows a nuclear position. Spirantisation is subject to geminate blockage, as is illustrated in (31).

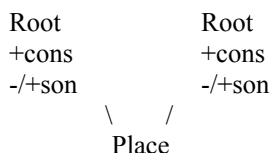
(31) fäkkärä 'boasts'

Spirantisation is blocked in (31) because of the condition that a member mentioned in the rule, is adjacent to a nuclear position. By the UAC this condition must be met by every member of the set. However, of a geminate only one part can be adjacent to the nuclear position. Therefore, the rule is blocked and geminate /k/ does not change.

Even though the analyses of Hayes (1986a, b) and Schein and Steriade (1986) differ on some points, they agree in the sense that, in both analyses, the underlying representations and their relation to the rule in question are crucial. If these do not match, the rule cannot apply. One of the important questions, even if these analyses could work in all cases, would be why this is the case. Why must association lines strictly match? Why must structural descriptions of rules and representations match in such a strict fashion (cf. Scobbie 1992 for a critical discussion of Strong Satisfaction)? What are the essential factors, determining inalterability, besides the technical aspects of association lines and matching or non-matching structures?

Selkirk (1990a) holds a slightly different view: she suggests that a rule does not apply if its output is not well-formed. Her view is therefore in some sense principally different from those just discussed, in that the emphasis is placed on output wellformedness. Selkirk discusses the subject of inalterability of geminates using a framework in which the length of geminate consonants and vowels is represented within segment structure. That is, geminate entities involve two root nodes and some amount of shared feature specification, such as, for instance, the representation given in (32).

(32) Geminate Consonants



In her opinion, inalterability is a consequence of a wellformedness constraint on phonological representations. That is, it is a constraint prohibiting multiple linking in feature structure. The Multiple Linking Constraint therefore prohibits structures such as the one in (33).

- (33)
- | | |
|--------|-------|
| * Root | Root |
| -cons | +cons |
| +son | +son |
| \ | / |
| Place | |

The structure in (33) is impossible because the feature place is doubly linked to roots which are not identical as far as consonantal and sonorant features are concerned. This means that rules which introduce a change in these features in just one half of a geminate are subject to blockage. In (34), it is demonstrated that the sonorantisation of syllable-final consonants in Hausa (Klingenheben's Law) is blocked when the syllable-final consonant is part of a geminate consonant.

- (34)
- | | | |
|---------------------|-------------|--------------------------------------|
| h <u>aw</u> sii | ‘barking’ | (compare: dialectal h <u>ap</u> sii) |
| but: ba <u>bb</u> a | ‘a big one’ | |

A structural representation is provided in (35).

- (35)
- | | | | | |
|-------|-------|----|-------|-------|
| Root | Root | -> | *Root | Root |
| +cons | +cons | | +cons | +cons |
| +son | +son | | +son | -son |
| \ | / | | \ | / |
| F | | | F | |
- (adaptation of Selkirk 1990a:195-196)

Inkelas and Cho (1993) in turn, suggest that geminate inalterability is not caused by the special structure of geminates. According to them, not only geminates behave as ‘inalterable’ but singletons as well – only this is usually not called ‘inalterability’ but ‘exceptionality’. They suggest that they can account for these cases of inalterability without having to introduce special technical conditions (such as Strong Satisfaction, through the Linking Constraint of Hayes or the Uniform Applicability Condition of Schein & Steriade). They develop a theory attributing inalterability to pre-specification. When a single segment is pre-specified for a feature this can make it inalterable to later, default filling in rules. In (36) below, an example is presented of the way in which they analyse a case of geminate inalterability. In Korean /l/ is subject to an allophonic alternation: singletons have dental [l], while geminates are palatal [ʎʎ].

position and an onset position and the coda position gets licensing potential from its head, the onset. This potential has diminished, because of which consonants in codas generally share all or part of the segmental material with the following onset. If this is the case, the situation is optimal. In other words, geminates do not change, that is, are inalterable, because the ambisyllabic structure is already optimal in a prosodic sense.

7 Conclusion

In this dissertation I discuss some topics which are - directly or indirectly – related to the phonological word in Tilburg Dutch. Throughout the book, an important consideration is the useful mutual influence between a restrictive theoretical framework, such as Government Phonology, on the one hand and dialect data from Tilburg Dutch on the other.

After an introductory chapter in which information is provided on the dialectal background of Tilburg Dutch and a second chapter in which relevant theoretical topics are explained, the main subject of Chapter 3 are diphthongs and pseudo-diphthongs. I demonstrate that Tilburg Dutch has an obligation, FINAL-C, to have its words end in a consonant, which itself occupies a structurally consonantal position in the syllable (McCarthy 1993). In other words, word-final segmental material should occur in an onset. This obligation or constraint reveals itself in the fact that in Tilburg Dutch pseudo-diphthongs occur word-finally while the opposite is true of monophthongs. FINAL-C accounts for this complementary distribution: pseudo-diphthongs consist of among others a second part which has only a little sonority: the glide or semi-vowel /i/, y/ or /u/. If we assume that this second part of the pseudo-diphthong actually is a consonant occupying a consonantal position in the syllable, we account for at least part of this distribution. Of course FINAL-C is not the only factor playing a role: topics such as ‘what can and cannot occupy a consonantal position’ and ‘in which position do semi-vowels prefer to occur’ also have an influence. Another topic discussed in this chapter, is the interpretation of possible exceptions to FINAL-C. I claim that function words, interjections and exclamations are not really exceptions, in spite of the fact that they often end in a vowel and thus do not satisfy FINAL-C. We can account for this by assuming that these function words, interjections and exclamations are not really words in the phonological sense. I also discuss the form /au/: it occurs more often word-internally as compared to, for instance, /ei/ – which of course I would not expect. I argue that this is connected to the lack of a close alternate to /au/: whereas /ei/ can alternate with /ɛ:/ without having to undergo major changes in the head-segment of the pseudo-diphthong, for /au/ no such close alternate exists. Some words are argued to be exceptions to FINAL-C: for instance, loanwords from French. These almost all end in /i/. These words are exceptions because I define FINAL-C as being related not only to consonantal *segments* but also to consonantal *positions*. These French loans end in /i/ which is a segment with only a little sonority. However, this segment does not occur in a consonantal position. This subject gives rise to a discussion on sonority and its expression within GP.

FINAL-C is a controversial constraint: after all, it is opposite to the important principle that syllables should preferably *not* end in a consonant. This controversial character makes it all the more important to demonstrate that FINAL-C plays a role in other languages and other phenomena as well. This is why the relevance of FINAL-C is demonstrated in English, the language for which FINAL-C was ‘discovered’ in the first place, as well as in Tunica, Lardil and Germanic dialects, among which is Standard Dutch. The occurrence of pseudo-diphthongs as

compared to that of vowels is demonstrated on a linguistic map of the Dutch language area: it appears that in some dialects there is a clear difference in occurrence of (pseudo-) diphthongs on the basis of whether the segments occur word-finally or word-internally. The conclusion to this chapter is that FINAL-C is an example of how dialect data can feed the theory. That is, in GP there is no concept similar to that of FINAL-C. Thus, this chapter shows that attention should be paid to this concept in GP so that a deeper understanding of this phenomenon can be reached.

In Chapter 4, the representation of the phonological quality of laxness and its consequences for the analysis of the Tilburg Dutch vowel system is the main topic. Lax vowels are often analysed in a very specific way in GP. As a result, headship which can distinguish tense vowels represented by the same elements, cannot fulfil this function in the case of lax vowels. Tense /e/, for instance, can be represented by a combination of two elements: A ('openness') and I ('freeness') - (A, I). The element I is underlined because it is the head of the expression. This means that in this imaginary language, /e/ is an open version of a front vowel. In this same language system we could represent /æ/ as (A, I): a front version of a fundamentally open vowel. For lax vowels centrality is always the most important kind of element and therefore, by definition, the head. Because of this, headship is no longer available for other distinctions (such as place) – it is already used to indicate that the segment in question is lax and not tense. Consequently, fewer distinctions are possible among lax vowels as compared to tense vowels. I demonstrate that because of this very specific view on laxness within GP, as well as because of the structure of the Tilburg Dutch vowel system, the Tilburg Dutch vowels /ɪ, ʏ, ʊ/ cannot be represented as mid. They have to be represented as high. In other words: GP forces me to adhere to, what I call, a High-Vowel analysis – an analysis in which the lax vowels are high and mid and not mid and low. Apparently, this choice for either a High- or a Mid-Vowel analysis cannot be made on the basis of, for instance, information on phonetics or the system of vowel alternations. In this respect the restrictive view of GP on laxness is an advantage: it forces us to seriously consider an analysis which otherwise might not have been considered at all. Upon closer investigation, a High-Vowel analysis is quite plausible- as long as one does not consider tense-lax alternations as 'pure' laxing but as also implying height differences, caused by apophony or umlaut. I discuss two analyses based on apophony and umlaut and finally choose an analysis based on umlaut. I conclude this chapter by confirming again the importance of not looking at data 'neutrally' but with a framework in mind – it often stimulates a fresh view of the same data and sometimes brings forward even better analyses than before.

Chapter 5 deals with morphophonology in Tilburg Dutch. In this chapter we observe in which way the analysis in terms of FINAL-C has relations with the mirroring of morphological structure in phonology. There is more than one phonological level in a Tilburg Dutch phonological word and apparently FINAL-C is only concerned with the lower, most internal word-domain, the domain without any inflectional or derivational affixes. However, at first sight an analysis based on FINAL-C seems hard to combine with a Closed Syllable Analysis of vowel shortening before inflectional or derivational suffixes in this dialect. I argue that the

alternation between long and short lax vowels in Tilburg Dutch is not caused by Closed Syllable Shortening but by the impossibility of a nucleus head licensing more than one dependent position. I combine this with the proposal that languages differ with respect to the domain for which domain-final empty nuclei are licensed. It appears to be the case that, in Tilburg Dutch, only the most external domain-final empty nucleus is licensed. The internal domain-final nucleus has to be licensed in another way. This can be done by the preceding nucleus but not if the vowel in this nucleus is long. This is why the vowel shortens. Once again, we conclude that the framework pushes the analysis in a certain, unexpected, direction. At first sight, an analysis based on Closed Syllable Shortening seems evident but on close scrutiny it does not work. An alternative analysis not only gives the correct results but also helps to improve our understanding and knowledge of licensing mechanisms, empty nuclei, different phonological domains and so forth.

In Chapter 6, we study ambisyllabicity, specifically word-final ambisyllabicity. Whereas in earlier chapters we noticed that the GP conception of laxness has consequences for the analysis of the vowel system, this chapter will try to deal with another result of the special character of laxness within GP. That is, in this chapter I discuss the need for lax vowels to be followed by a tautosyllabic consonant whereas at the same time this consonant has to occur in the onset of a following (empty) syllable - if word-final - in GP. This is contradictory. As a solution to this problem I suggest that words which end in a syllable with a lax vowel, structurally end in an ambisyllabic consonant (followed by an empty nucleus). Of course one can only accept the notion of word-final ambisyllabicity, if one accepts the notion of ambisyllabicity in general. In this chapter I argue that the representation of phonetically single consonants as ambisyllabic, geminate consonants structurally, is a fundamentally correct representation. Many linguists already assume that, in Dutch, a word-final consonant after a tense vowel occurs structurally in the onset of an empty syllable (cf. Van Oostendorp 2000 and Zonneveld 1993). I suggest that we should represent all word-final consonants, including those occurring after a lax vowel, in the onset of an empty nucleus. It is demonstrated that problems which seem to adhere to such a word-final ambisyllabicity analysis can be solved: Final Devoicing – the phenomenon that voice is impossible syllable-finally, can be combined with word-final ambisyllabicity. As far as stress is concerned, I claim that the apparent problem in this domain is not so much related to the word-final structure but rather to a difference between bisyllabic and trisyllabic words in this respect. I do not attempt to account for this difference but merely argue that stress in itself presents no problem for such a word-final ambisyllabicity analysis. In this chapter, GP – with its representation of word-final consonants in onsets of empty syllables – and certain characteristics of laxness enforce a certain analysis which, at first sight, seems improbable. However, the dilemma can be solved, without having to relinquish the theory and without needing to add all kinds of extras.

Of course many questions have remained unanswered. In a certain sense, there might be even more questions than before: after all, sometimes a ‘complicated’ or ‘abstract’ analysis has been chosen instead of a ‘simpler’, descriptively adequate analysis. However, if we want to reach our goal eventually - which in the case of this study is a thorough understanding and detailed analysis of the Tilburg Dutch

data, including an understanding of the 'why's behind phenomena - it is inevitable that with every step forward, we also go one small step backwards.

One of the problems which I notice for instance, is the way empty positions function in GP: sometimes they seem to be a kind of 'medicine for everything'. It seems for instance, that when certain structural constellations are impossible they sometimes do not occur whereas at other times, when a certain structure is ungrammatical, an empty nucleus is used to save the structure.

Another subject in need of more study is laxness. More information about tense/lax /ATR/RTR systems is needed. In particular, if laxness in Tilburg Dutch has such far-reaching consequences for the representation of the vowel system, one would expect that other languages might show the same limitations with regard to the possible amount of distinctions. Connected with this is the question regarding the relation between schwa and laxness on the one hand and laxness and stress on the other hand.

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Samenvatting (Summary in Dutch)

In dit proefschrift bespreek ik een aantal facetten die direct of indirect te maken hebben met het fonologische woord in het Tilburgs. Een centraal punt van aandacht hierbij is de nuttige kruisbestuiving tussen een restrictief theoretisch kader zoals Government Phonology enerzijds en taaldata uit het dialect van Tilburgs anderzijds.

Na een inleidend hoofdstuk, waarin onder meer informatie gegeven wordt over de dialectologische achtergrond van het Tilburgs en een tweede hoofdstuk, waarin de relevante aspecten van de theoretische kaders uiteengezet worden, zal de analyse van diftongen en pseudo-diftongen het belangrijkste onderwerp zijn van hoofdstuk 3. Ik laat zien dat er in het Tilburgs een verplichting bestaat, FINAL-C geheten, om het fonologische woord – in dit geval, het woord zonder inflectionele of andere affixen – te laten eindigen in een medeklinker die zich bevindt in een structurele medeklinkerpositie in de lettergreep (cf. McCarthy 1993). Dit komt onder meer tot uiting in het feit dat in het Tilburgs diftong-achtige constructies vooral aan het wordeinde voorkomen en vrijwel nooit binnen in een woord terwijl dat bij monoftongen juist omgekeerd is. Deze complementaire distributie verklaar ik door te verwijzen naar deze verplichting om in een medeklinker te eindigen. Deze diftong-achtige sequenties bestaan immers onder meer uit een weinig sonoor, medeklinker-achtig laatste deel, de glijklank of half-klinker /i/, /y/ of /u/. Als we aannemen dat dit tweede deel in het Tilburgs dus een medeklinker is, die ook een medeklinker positie in de lettergreep inneemt, is de distributie voor een deel verklaard. Uiteraard is FINAL-C niet de enige factor hierin: thema's zoals 'wat kan er in een medeklinker-achtige positie staan' en 'in welke positie willen half-klinkers het liefste staan' zullen ook een rol spelen in de analyse. Andere onderwerpen die in dit hoofdstuk aandacht krijgen zijn de interpretatie van mogelijke uitzonderingen op FINAL-C in dit dialect. Ik beweer dat het feit dat functiewoorden, uitroepen en interjecties vaak wel op een klinker eindigen en dus niet tegemoetkomen aan FINAL-C, verklaarbaar is uit de veronderstelling dat deze woorden in fonologisch opzicht geen echt woorden vormen. Ook de vorm /au/ wordt besproken: in vergelijking met bijvoorbeeld /ɛi/ komt deze vaker voor een medeklinker, dus binnen een woord, voor. Dit heeft onder meer te maken met het feit dat, in tegenstelling tot /ɛi/ en /œi/, er geen klinker is waarmee /au/ kan wisselen zonder dat er grote veranderingen in het hoofd van de sequentie (de /a/) plaatsvinden. Van een aantal woorden wordt duidelijk gemaakt dat het hier wel uitzonderingen betreft: dit zijn leenwoorden uit het Frans. Deze eindigen op een /i/. Dit zijn uitzonderingen omdat ik FINAL-C definieer als betrekking hebbend op niet alleen medeklinker *segmenten* maar ook medeklinker *posities*. Deze Franse leenwoorden eindigen weliswaar in een /i/ maar deze bevindt zich niet in een medeklinker-positie. Het onderwerp van deze leenwoorden vormt aanleiding tot een discussie over het begrip sonoriteit binnen GP.

FINAL-C is een controversieel idee: het is immers precies tegengesteld aan het belangrijke principe dat lettergrepen het liefst juist *niet* op een medeklinker

uitgaan. Dit controversiële karakter maakt het extra belangrijk met feiten te komen uit andere delen van de Tilburgse fonologie als ook uit andere talen en dialecten waarin FINAL-C een rol lijkt te spelen. Zo wordt FINAL-C in dit hoofdstuk geïllustreerd aan de hand van het Engels, de taal waarvoor FINAL-C destijds ‘ontdekt’ is, het Tunica, het Lardil en Germaanse dialecten zoals Standaard Nederlands, Maasbrachts en Groningen Nederlands. We kunnen op een taalkaart van een aantal Nederlandse dialecten een patroon ontdekken waaraan wederom de werking van deze verplichting op te merken valt: in een aantal dialecten ziet men diftong-achtige constructies vaker optreden aan het eind van een woord dan woordintern. Als conclusie van dit hoofdstuk kunnen we onder andere stellen dat het hier de bestudering van de taalfeiten is, die een impuls geeft aan een theorie. Dat wil zeggen: in GP speelt FINAL-C vooralsnog geen rol. Dit hoofdstuk laat zien dat er ook binnen GP aandacht moet komen voor de vraag naar wat het betekent dat een woord-finaal segment moet staan in een onset positie.

In hoofdstuk 4 is de representatie van de fonologische eigenschap ongespannenheid en de gevolgen hiervan voor de analyse van het klinkersysteem, het voornaamste onderwerp. Ongespannen klinkers worden vaak op een duidelijk omschreven, specifieke manier geanalyseerd in GP. Deze kijk op ongespannenheid kan worden getypeerd door het gegeven dat hoofdigheid, die bij gespannen klinkers onderscheidingen van plaats weergeeft, bij ongespannen klinkers ontbreekt. Gespannen /e/ kunnen we bijvoorbeeld representeren door de combinatie van twee elementen, A (‘openheid’) en I (‘voorheid’), (A,I), waarbij het element I hoofd is en daarom onderstreept. Dit wil zeggen dat (in dit betreffende, denkbeeldige taalsysteem) /e/ een open versie is van een voor-klinker. In dit zelfde taalsysteem zou een /æ/ gerepresenteerd kunnen worden door (A,I): een voor-versie van een fundamenteel open klinker. Bij ongespannen klinkers is centraliteit altijd het belangrijkste en dus het hoofd van de combinatie: hoofdigheid is dus niet beschikbaar om verschillende plaatsen te onderscheiden bij klinkers; het wordt immers al gebruikt om aan te geven dat het een ongespannen en niet een gespannen klinker betreft. Hierdoor zijn bij ongespannen klinkers minder verschillen in plaats te onderscheiden dan het geval is bij gespannen klinkers. Ik laat zien dat door deze specifieke wijze waarop GP ‘ongespannen’ ziet en de structuur van het taalsysteem in kwestie, de Tilburgse klinkers /ɪ/, /ʏ/, en /ʊ/ niet kunnen worden gerepresenteerd als middenklinkers maar dat ze gerepresenteerd moeten worden als hoog. In andere woorden, ik beweer dat de GP theorie me dwingt tot het aannemen van een ‘High-Vowel analyse’, HV, in plaats van een ‘Mid-Vowel analyse’, MV. Aangezien een keuze niet op een andere wijze gemaakt lijkt te kunnen worden – klinkerwisselingen, noch taalverwerving of fonetiek bieden doorslaggevende argumenten voor de ene of de andere analyse – blijkt de restrictieve visie van GP dus een voordeel te zijn. Ik laat zien dat een dergelijke (HV) analyse aannemelijk is, vooropgesteld dat men genoemde klinkerwisselingen niet als pure ongespannen-wording maar als apofonie of umlaut ziet. Voor beide van deze analyses zijn argumenten maar ik kies uiteindelijk toch voor een umlaut analyse voor het Tilburgs. Een conclusie van dit hoofdstuk is onder meer dat het kijken door een specifieke theoretische ‘bril’, bepaalde analyses uitsluit, waardoor verder onderzoek gestimuleerd wordt.

Hoofdstuk 5 heeft als onderwerp morfofonologie. We zien in dit hoofdstuk op welke manier de analyse op basis van FINAL-C te maken heeft met de afspiegeling van de morfologie in de fonologie: er zijn meerdere niveaus binnen een woord en het blijkt dat FINAL-C alleen relevant is voor het binnenste deel van het woord: het woord zonder eventuele inflectionele of derivatieve affixen. Het probleem is dat deze FINAL-C analyse op het eerste gezicht niet te combineren lijkt met een, op zichzelf voor de hand liggende, ‘Gesloten Lettergreep Verkorting’ (Closed Syllable Shortening) analyse van verkorting van lange, ongespannen klinkers voor inflectionele en derivatieve suffixen in dit dialect. Ik beweer dan ook dat de wisseling in het Tilburgs tussen lange en korte ongespannen klinkers niet een gevolg is van ‘Gesloten Lettergreep Verkorting’ maar van de onmogelijkheid van een hoofd van een nucleus om meer dan één afhankelijke positie te ‘fiatteren’. Dit wordt gecombineerd met het voorstel dat talen verschillen met betrekking tot welke domein-finale lege nuclei gefiatteerd worden. Het lijkt zo te zijn dat in het Tilburgs de buitenste domein-finale lege nucleus *wel* maar de binnenste domein-finale nucleus *niet* gefiatteerd wordt. Deze lege nucleus moet dus op andere wijze zijn bestaansrecht krijgen: dit blijkt onmogelijk als de voorgaande klinker lang is. Als de klinker verkort wordt, kan dit wel. Ook hier duwt de theorie me als het ware een andere kant op dan in eerste instantie verwacht wordt: een analyse van klinkerverkorting op basis van ‘Gesloten Lettergreep Verkorting’ lijkt voor de hand liggend maar blijkt niet te werken. Een alternatieve analyse biedt niet alleen uitkomst maar vergroot daarbij inzicht en verder begrip in fiatterings-mechanismen en verschillen tussen woord-domeinen in het Tilburgs en in het algemeen.

In hoofdstuk 6 kijken we naar ambisyllabiciteit. Waar we in een eerder hoofdstuk hebben gezien dat de GP visie op ongespannenheid vergaande consequenties heeft voor de analyse van het klinkersysteem, komen we in dit hoofdstuk in aanraking met een andere consequentie van de bijzondere eigenschappen van ongespannenheid. Ik behandel in dit hoofdstuk namelijk het probleem van de ogenschijnlijk moeizame combinatie van het gegeven dat ongespannen klinkers door een medeklinker gevolgd moeten worden in dezelfde lettergreep met de, door velen aangehangen, GP analyse van fonetisch woord-finale medeklinkers als medeklinkers in een onset positie. Als oplossing voor dit probleem wordt in dit hoofdstuk voorgesteld dat woorden die eindigen op een lettergreep met een ongespannen klinker en medeklinker, structureel, onderliggend eindigen op een ambisyllabische medeklinker, gevolgd door een lege nucleus. Uiteraard kan men slechts woordfinale ambisyllabiciteit als mogelijke structuur accepteren, als men het concept ambisyllabiciteit in het algemeen verdedigbaar vindt. In dit hoofdstuk betoog ik dat de notie ambisyllabiciteit, gerepresenteerd als geminatie, een volledig ‘normale’ notie is en niet controversieel zou moeten zijn. Voor het Nederlands wordt al door diverse mensen (cf. bijvoorbeeld Van Oostendorp 2000, Zonneveld 1993) aangenomen dat een woord-finale medeklinker na een gespannen klinker in de onset staat van een lege nucleus. Ik stel in dit hoofdstuk voor om *alle* woord-finale medeklinkers, ook die na een ongespannen klinker, te representeren in de onset van een lege nucleus. Er valt aan te tonen dat problemen die aan deze woord-finale ambisyllabiciteit-analyse lijken te kleven, oplosbaar zijn: Final Devoicing – het fenomeen dat stemhebbendheid aan het eind van een lettergreep niet mogelijk is – is niet onverenigbaar met woord-finale ambisyllabiciteit, hoewel dit in eerste instantie

wel het geval lijkt te zijn. Van klemtoon beweer ik in dit hoofdstuk dat het probleem niet zo zeer ligt in het uitzonderlijke van deze woordfinale structuur maar dat het meer zo is dat er een verschil is in klemtoon tussen tweelettergrepige en drielettergrepige woorden. Ik kan daar geen verklaring voor geven maar laat zo wel zien dat dit op zichzelf geen probleem is van woord-finale ambisyllabiteit. Ik geef dus in dit hoofdstuk een oplossing voor een probleem dat veroorzaakt wordt door het toepassen van een bepaald theoretisch kader op gegevens uit een dialect, namelijk het probleem van de noodzaak voor ongespannen klinkers om gevolgd te worden door een medeklinker in dezelfde lettergreep in combinatie met de representatie van een woord-finale medeklinker in de onset van een lege nucleus. Ik laat zien dat ik voor de oplossing van dit probleem – de analyse van woord-finale consonanten na ongespannen klinkers als ambisyllabisch – noch de theorie minder restrictief hoeft te maken noch iets anders ‘extra’s’ nodig heb. Ik suggereer daarmee dat ook hier het toepassen van GP op, op het oog, weerbarstige feiten ons niet dwingt tot het verminderen van de restricties van de theorie maar ons juist extra mechanismen biedt, die er weliswaar al waren maar waarvan het bestaansrecht betwijfeld werd, nl. ambisyllabiteit.