The phonological word in Tilburg Dutch: Government phonology and a city dialect of Dutch

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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 /l/, which is higher than /el/, which in its turn is higher than /e/, does not account for the fact that /l/ and /el/ behave similarly in contrast to /i/ and /el/.

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/laxCC
    C V_long/tenseCC

    int ‘tape’ (Standard Dutch) *int/*lent
    pens ‘paunch’ .. *pens
    lent ‘ribbon, tape’ (Tilburg Dutch) *lent/*lent

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

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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).

$$\begin{array}{c}
\text{N} \\
V_{\text{tense}} \\
V_{\text{lax}}
\end{array}$$

$$\begin{array}{c}
\text{R} \\
/ \\
N \ x
\end{array}$$

(2) *R

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 thesis. The representation of laxness - in terms of elements and headedness - is the main theoretical reason for my claim that the Dutch lax vowels /i, y, 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.).

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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.

(3)  
| promotion of @ |
- demotion of I - suppression of I |

a. i > i  
N | N | N | N |  
x > x | x > x |  
\ | \ | \ | \ |  
I | I | I | @ |  
\ | \ | \ | \ |  
@ | @ | @ | @ |  

(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 /u/ and /e/ 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). 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 2000).

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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.
This can be expressed by way of the following constraint: \textsc{connect} N^1, lax.\textsuperscript{6}

\begin{equation}
\textsc{connect} (N^1, \text{ lax}) =
\begin{align*}
\text{project} (\text{lax, N}): & N^0 \text{ dominates} \text{ [lax]} \rightarrow N^1 \text{ branches} \\
\text{project} (\text{N», lax}): & N^1 \text{ branches} \rightarrow N^0 \text{ dominates} \text{ [lax]}
\end{align*}
\end{equation}

(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 as 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 \textcircled{a}. Recall that the neutral vowel in Dutch, the schwa, is also \textcircled{a}-headed. In this respect schwa is like a lax vowel, except for the fact that a schwa has no other element material than \textcircled{a}. 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 \textcircled{i}, indicating frontness, and the centrality element \textcircled{a}. The representation of the schwa, on the other hand, consists of centrality material only.

\begin{equation}
\begin{array}{ll}
\text{lax vowel} & \text{schwa} \\
\text{(here: /i/) } & \circ \\
\text{ N } & \text{ N} \\
\text{ | } & \text{ |} \\
\text{x } & \text{x} \\
\text{ | } & \text{ |} \\
\text{ I } & \text{ @} \\
\text{ | } & \text{ |} \\
\text{ @ } & \text{ @}
\end{array}
\end{equation}

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

\textsuperscript{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.

\textsuperscript{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) ‘kamær kamer ‘room’

<p>| | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>k</td>
<td>A</td>
<td>m</td>
<td>@</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td></td>
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</tbody>
</table>

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

<p>| | | | |</p>
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>k</td>
<td>A</td>
<td>m</td>
<td>@</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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. 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.

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 /ora/ or /e/,
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 /a, ɔ, ã/ 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). In this representation, lax /i, y, u/ and tense /e, ò, o/ are mid and /e, ò, o/ are low. This is what I call a Mid-Vowel analysis (MV) because /i, y, u/ are considered to be mid vowels. The low vowels /a/ and /A/ are distinguished from the other low vowels by the feature [dorsal].

(10) Mid-Vowel analysis (MV)

<table>
<thead>
<tr>
<th></th>
<th>Tense</th>
<th>Lax</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>y</td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td>ò</td>
</tr>
<tr>
<td>Low</td>
<td>e</td>
<td>ò</td>
</tr>
<tr>
<td>Dorsal</td>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

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 /i, y, o/ are represented as mid, it is not possible to distinguish between, for instance, /i/, /e/ and /a/. That is, if /i/ is mid, it has to contain an A element, just like /e/. However, if we cannot make distinctions among lax vowels by means of headedness, how do we distinguish between /i/ and /e/, or between /u/ and /a/? The problem is illustrated in (11a) and (11b).

(11) a.  i  e  a  o  ò  a

<table>
<thead>
<tr>
<th>x</th>
<th>x</th>
<th>x</th>
<th>x</th>
<th>x</th>
<th>x</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I</td>
<td></td>
<td>U</td>
<td>U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>@</td>
<td>@</td>
<td>@</td>
<td>@</td>
<td>@</td>
<td>@</td>
<td>@</td>
</tr>
</tbody>
</table>

[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 [ó] is represented as [ɔ] and [ɔ] as [ø]. In this respect I follow Boutkan & Kossmann (1996).
The difficulty with the representation in (11a) lies in the fact that if /I/ is mid, /I/ and /E/ would end up with exactly the same representation: (I,A(\@)). If we try to solve the problem by representing /E/ as low, we are left with the same problem, though this time for /e/ and /al/: they would both be (A,(\@)). This is illustrated in (11b).

(11) b. ɪ ɛ a ʊ ɔ a

x x x  x  x  x

|  |  |  |  |  |  |

|  |  |  |  |  |  |

A A A  A A A

@ @ @ @ @ @

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

4.5. A High-Vowel analysis

In the High-Vowel analysis (HV) in (12) lax /i, y, u/ are analysed as high, just as tense /i, y, u/. Lax /e, ð, æ/ are represented as mid just as tense /e, ð, æ/.

(12) High-Vowel analysis (HV)

<table>
<thead>
<tr>
<th></th>
<th>Tense</th>
<th>Lax</th>
</tr>
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<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>i</td>
</tr>
<tr>
<td></td>
<td>y</td>
<td>y</td>
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<tr>
<td></td>
<td>u</td>
<td>u</td>
</tr>
<tr>
<td>Mid</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td></td>
<td>ð</td>
<td>ð</td>
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<tr>
<td></td>
<td>æ</td>
<td>æ</td>
</tr>
<tr>
<td>Low</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>
In (13), an elemental representation of the Tilburg vowel system according to the HV is presented.\footnote{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.}

(13)  
\[
\begin{array}{cccccccc}
  i & y & u & e & o & o & a \\
  x & x & x & x & x & x & x \\
  I & I & I & I & I & I & I \\
  \@ & \@ & \@ & \@ & \@ & \@ & \@ \\
\end{array}
\]

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 /i, y, u/ 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: /u/ is simply (I, \( @ \)), /e/ is (I, \( A \), \( @ \)), and /a/ is (A, \( @ \)).

\footnote{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, y, u/ to be mid vowels, partly because of their alternating behaviour with /e, ø, ø/. 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 /y/ 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 /u/ - /e/, and /ø/ - /ø/.
the vowel /i/ point to a categorisation in one group with the high vowels (Levett 1994:141) while the comparatively frequent substitution in the data points to a classification with ‘mid’ or ‘high, mid’. In some respects /i/ 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), /i/, and /y/ have a vowel height in between the close (/i/, /u/) and the close-mid vowels (/e/, /o/). However, Nooteboom & Cohen (1984:23) consider the /i/ 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 | ɐ | ɔ |

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

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

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 /i/-/e/,-/o/-/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.
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 lax\(^{14}\)
   strep - strepka/ 'stripe'
   strlep - strlepka
   dok - dopkka/ 'dent'
   dvok - dvokka
   slop - slopka/ 'pillow case'
   slup - slupka

b. alternations between long lax and short lax
   bōn - bontjō 'leg'
   met - metjō 'girl'
   pēd - paltjō 'pole'

c. umlaut
   huk - hykskō 'corner'
   hōk - hāskkō 'cage'

(Boutkan & Kossmann 1996:31-2)

\(^{14}\) There is some variation between speakers with respect to the form of the lexeme (eg. /strepage/ or /strlep/).
In addition to arguments based on the lack of /i/ - /i/ alternations and on observations from r-colouring, Van Oostendorp (2000) presents the /e/ - /i/ 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 /i/ and the /e/ to have the same phonological height. Interestingly, arguments in favour of an analysis in which the vowel /i/ 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. /i/ corresponding with /e/ or /e/. 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)  

\[
\begin{array}{ll}
gød & -
goden \\
schip & -
schepen \\
weg & -
weggen
\end{array}

\begin{array}{ll}
'god' & - 'gods' \\
'ship' & - 'ships' \\
'way' & - 'ways'
\end{array}
\]

In (18), both /i/ and /e/ change into /e/ in the plural form. Other irregular, unproductive /i/- /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)  

\[
\begin{array}{llll}
\text{singular} & \text{plural} & \text{diminutive} \\
schep & schepen & schepje \\
wegen & wegen & weggetje
\end{array}

\begin{array}{ll}
'ship' & - 'ships' - 'small ship' \\
'road' & - 'roads' - 'small road' etc.
\end{array}
\]

(Booij 1995:72)

----

\(^{15}\) I will concentrate on the representation of the vowel [i]. Because of diachronic developments the correspondence between Tilburg [u] and [æ] and Standard Dutch [æ] is not so clear, whereas the [y] is more marginal anyway.
Another case of alternations takes place between /i/ and /e/ and between /e/ 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) [ı] alternates with [e] and [i].

(20)  a - a:  para’déis  para’déis  ‘paradise’
e - i:  telə’visi t  tiə’visi  ‘television’
o - o:  poli’tik  poli’tik  ‘politics’
i - i:  direk’tør  direk’tør  ‘director’

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

It appears to be the case that in Standard Dutch a great many alternations between /i/
and /e/ and between /e/ 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 /i/, /y/ and /y/, /u/ and /u/ 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)

<table>
<thead>
<tr>
<th>vowel</th>
<th>/i/</th>
<th>/e/</th>
<th>/a/</th>
<th>/u/</th>
<th>/y/</th>
<th>/o/</th>
<th>/æ/</th>
<th>/ɔ/</th>
</tr>
</thead>
<tbody>
<tr>
<td>height</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>low</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ATR</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

(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 /e/ which consequently change to /i/ and /i/, 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/-/i/ alternation as a purely phonological alternation based on syllable structure alone, as in (23).

(23) ete / at  ‘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[ʃ]bzig  ‘seven’ - ‘seventy’
     räder - R[a]d    ‘bicycles’ - ‘bicycle’
     Gräser - Gr[a]s  ‘grasses’ - ‘grass’
     Gase - G[a]s     ‘gas’ - ‘gasses’
     Flüge - Fl[ʃ]zeug ‘flight’ - ‘airplane’
     Städte - St[a]dt ‘cities’ - ‘city’
     grobe - gr[ŋ]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/ - /i/ alternation in (24) as shortening.

Recapitulating, the case of vowel alternations in German demonstrates that it might be correct to consider /i/and /i/ (and not /i/ 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 /i/ 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/ - /strıpkə/ 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:

\[\text{uninflected form:}\]
\[
\begin{array}{c}
\text{stem: slıpt} \\
R \text{ extrasyllabic} \\
/ \ \ \ | \\
x \ x \ x \\
\ \ / \ | \\
x \ / \ | \\
\ s \ \ l \ \ x \ \ p
\end{array}
\]

\[\text{inflected form:}\]
\[
\begin{array}{c}
(h\text{e}) \text{ slıpt} \text{ ‘he sleeps’} \\
\text{R \ extrasyllabic} \\
/ \ \ | \\
x \ x \ x \\
\ | \ | \ | \\
\ s \ l \ ç \ p \ + t
\end{array}
\]
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 /i, y, u/ have the same phonological height as /e, ø, o/. That is, /i, y, u/ 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 /spol/-/spylt/, 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 /ɪ, ɨ, ʊ/ and /e, ə, o/, as just ‘laxing’. For convenience sake I will repeat the representation of the Tilburg vowel system in (26).

(26)

\[
\begin{array}{cccccccc}
 i & y & u & e & \emptyset & o & a \\
 x & x & x & x & x & x & x \\
 I & I & I & I & I & I & I \\
 U & U & U & U & U & U & U \\
 \end{array}
\]

In the representation in (26) /ɪ/ is not the straightforward lax counterpart of /e/ but the lax counterpart of /i/. Consequently, an alternation such as the one between /strep/- /strupkel/ 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 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 headlessness. 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/, /spół/ - /spyl/, or /koka/ - /kukt/, the lexical base form has /e/ 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 /i/ (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 /i/ and /e/ (and /o/ and /o/; /x/ and /s/), 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 /blm/ - /blmt/. The shortening of the long, lax forms appears to be a regular, phonological process. In the HV analysis presented here, both forms of /strep/ - /stripke/ are listed in the lexicon, just like both forms of a pair such as /huk/ - /hyksk/. Furthermore it is assumed that there is a similarity between the umlaut pairs like /huk/ - /hyksk/ and the tense-lax pairs. Historically a fronting (umlaut) process took place, as attested by the rare alternations such as /huk/ - /hyksk/, 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 (2\textsuperscript{nd} 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 2\textsuperscript{nd} 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 /le/ (I, A) becomes /al/ (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)

\[ \text{wíís} - \text{wíš-\text{-}} \quad \text{'wise - wise (masc.)'} \]

In (28), the second high tone of \(/\text{wíís}/\) is deleted, when a non-high suffix (/-\text{-}\/) 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) \begin{align*}
\text{brít} & - \quad \text{brejó} \quad \text{'broad - broad (adj.)'} \\
\text{zúl} & - \quad \text{zoló} \quad \text{'sole - soles'} \\
\text{brk} & - \quad \text{beko} \quad \text{'creek - creeks'} \\
\text{dýk} & - \quad \text{doko} \quad \text{'dent - dents'} \end{align*}

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) \begin{align*}
\text{i:} & \quad > \quad \text{e} \\
x & \quad x \\
I & \quad I \\
A & \quad A \\
@ & \quad @ \\
\text{brít} & \quad \text{brejó}
\end{align*}

\[\text{\textsuperscript{16}}\] The first items of the list (the ‘base’ lexemes) can also have a tense vowel: \(/\text{dók}/ - /\text{dóka}/; \quad /\text{bek}/ - /\text{beka}/ \text{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.\footnote{The situation of /e/-/i/ 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.} 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’.

\begin{center}
\begin{tabular}{ll}
nemon & nemun 
nimis & nimit 
nimit & nemunt 
\end{tabular}
\end{center}

(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.

\subsection*{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 /i/ are of a different height. They do not mention this explicitly but it is clear that their analysis does not work if /e/ and /i/ 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/-/i/ 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 /xevo/ - /xifo/ ‘give – gives’ and /eta/ - /ita/ ‘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
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 \(0 \rightarrow I \rightarrow A \rightarrow U\).

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

\[
\begin{align*}
ggeben & \quad \text{gibt} \\
A,I & \quad \leftrightarrow \quad I
\end{align*}
\]

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

\[
\begin{array}{ccc}
& s & pl \\
1 & gebe & ggeben \\
2 & gibst & gbt \\
3 & gibt & ggeben \\
imp. gebe/gib & gbt \\
\end{array}
\]

\[
\begin{array}{ccc}
& s & pl \\
& A,I & A,I \\
& I & A,I \\
& I & A,I \\
& A,I/A/I & A,I
\end{array}
\]

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).

\[
\begin{array}{ccc}
& s & pl \\
ssn & I & A,I \\
1 & is & ssn \\
2 & ist & essst \\
3 & ist & sssn
\end{array}
\]

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/~/i/ but also /o/~/o/ and /o/~/y/ alternations fit this pattern after all.

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

(35)  
A verb
I → I, A

\[
\begin{align*}
\text{yift} & \quad \text{yevo} \\
\end{align*}
\]

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.

\subsection*{4.8.3. Comparison of High-Vowel analyses}

Whatever analysis proves best, the general proposal is that in Tilburg Dutch /e–i/ 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 – i/, /o – u/ and /o – χ/ 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).

\[
\begin{align*}
\text{nemon} & \quad \text{nemun} \\
\text{nimis} & \quad \text{nimit} \\
\text{nimit} & \quad \text{nemunt} \\
\end{align*}
\]

(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 */nimis*. 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. 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 /i, y, 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 /i, y, 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 /i, y, 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.

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