AN AUTO-SEGMENTAL LOOK AT HUNGARIAN VOWEL HARMONY

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This paper proposes an AUTO-SEGMENTAL model to account for vowel harmony in Hungarian. A number of anomalies to VH are presented which are only accounted for with great difficulty by the linear model. However, no implications are made concerning the failings of a linear analysis, rather an alternate solution is presented. This solution posits a system for Hungarian which consists of three phonologic levels called tiers. The three tiers in Hungarian are:

- the segmental tier
- the rounding tier (which produces rounding harmony)
- the backness tier (which produces backness harmony)

The model presented here shows how vowel segments are dominated by the feature in the rounding tier which in turn is dominated by the backness tier. Although the data require the postulating of an abstract segment this abstract vowel is not crucial to the success of the AS model (recall that VH under a linear model crucially depended on the existence of abstract segments). Certain details of the model itself and certain data were not examined in great detail if it was felt that this scrutiny could not provide any additional insights. It is hoped, however, that eventually all of these details will be looked at in the detail they deserve. It is noteworthy that the AS model will automatically account for the things that in a linear model had to be marked as exceptions.

The purpose of this paper is to describe Vowel harmony (VH) in Hungarian. The present analysis is based on Clements discussion of VH in an auto-segmental framework. (1980)

Hungarian VH is said to be one of backness and roundness, i.e. all vowels in a word (stem + affixes) agree with regard to the features [back] and [round]:

- e.g. fekete 'black'
- kenyer 'bread'
- felszín 'surface'
- gyönyörű 'beautiful'
között  'among'
órült  'be crazy'
tudom  'I know'
kohó  'foundry'
év  'year'
év+hez  'to the year'
év+en  'in the year'
kör  'circle'
kör+höz  'to the circle'
kör+őn  'in the circle'
bokor  'bush'
bokor+höz  'to the bush'
bokor+ön  'in the bush'

If indeed the situation were as clear as the above examples would indicate there would be no point in proceeding. Since, however, Hungarian exhibits some interesting anomalies not easily explained by the above simple statement then it is useful to examine the anomalies and find a solution to them, one that is compatible to a theory of VH. The alternative is to label these anomalies as irregular, stating simply that they contravene the rules of VH in such and such a way. Clearly there are too many anomalous phenomena to warrant this alternative.

Before presenting the data it will be useful to present a brief sketch of the Hungarian vowel inventory. The Budapest dialect, which forms the national standard, has the following vowel phonemes:

<table>
<thead>
<tr>
<th>LONG</th>
<th>SHORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>i; ü:</td>
<td>u: i</td>
</tr>
<tr>
<td>e: ö:</td>
<td>o: e</td>
</tr>
<tr>
<td>a:</td>
<td>a</td>
</tr>
</tbody>
</table>

Short /e/ surfaces as [ɛ]. The low back vowel, /a/ is [-round] but there is a rule whereby /a/ becomes [+round] when it is [-long]:
\[ a \rightarrow [+\text{round}] \]
\[ [-\text{long}] \]
\[ [\text{anya}:m] \quad \text{'my mother'} \]
\[ [\text{ony}:o] \quad \text{'mother'} \]
\[ [\text{fa}:k] \quad \text{'trees'} \]
\[ [\text{fo}] \quad \text{'tree'} \]

In a number of dialects there is one extra short vowel phoneme which surfaces phonetically as \[ [\varepsilon] \]. The long counterpart to this phoneme has neutralized to \[ [e:] \]. The phoneme inventory for these dialects is as follows:

<table>
<thead>
<tr>
<th>LONG</th>
<th>SHORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:</td>
<td>ü:</td>
</tr>
<tr>
<td>e:</td>
<td>ö:</td>
</tr>
<tr>
<td>(e:)</td>
<td>a:</td>
</tr>
</tbody>
</table>

The relevance of \[ /\varepsilon/ \] will become clear below.

In transcribing Hungarian words I shall use the standard orthography which is very regular. The following orthographic conventions must be noted, however:

1. an accent over a vowel indicates length. Thus: \[ i \] is the long counterpart to \[ i \] etc.

2. \[ y \] following a consonant indicates palatalization on that consonant:
   \[ gy = [d] \]
   \[ ny = [\tilde{n}] ([\text{n}]) \]
   \[ ly = [y] (\text{yod}) \]

3. \[ s = [\xi] \]
   \[ sz = [s] \]
   \[ z = [z] \]
   \[ zs = [\xi] \]
   \[ c = [ts] \]
   \[ cs = [\xi] \]
4. /ɛ/ and /e/ are both transcribed as e
I will only indicate /ɛ/ when it is important to the discussion.

2. The following anomalies exist in Hungarian as regards VH:

1.a. stems containing all front vowels trigger suffixes that contain back vowels:

- híd  'bridge'
- but híd+től  'from the bridge'
- cél  'goal'
- but cél+től  'from the goal'
- férfi  'man'
- but férfi+nak  'to the man'
- férfi+től  'from the man'

compare:
- kilenc  'eight'
- kilenc+ven  'eighty'
- nyolc  'nine'
- nyolc+van  'ninety'
- hír  'a piece of news'
- hír+tek  'news pl.'

b. stems containing front and back vowels and rounded and unrounded vowels:

- radír  'eraser'
- Tibor  'masculine name'
- leány  'girl'
- fazék  'top'
- igaz  'truth'
- október  'October'
- kosztüm  'good suit'
- sofőr  'chauffeur'
- Ágnes  'female name'
- borbély  'barber'
- gyökér  'root'
- fűszer  'spice'
Sometimes the suffix vowels agree with the final vowel of the stem and sometimes with a non-final vowel in the stem. Occasionally a stem in this group can take more than one suffix allomorph:

\[
\begin{align*}
\text{radír}+től & \quad \text{‘from the eraser’} \\
\text{Tibor}+től & \quad \text{‘from Tibor’} \\
\text{oktober}+ben & \quad \text{‘in October’} \\
\text{borbely}+től & \quad \text{‘from the barber’} \\
\text{Ágnes}+től & \quad \text{‘from Agnes’} \\
\end{align*}
\]

Here Clements distinguishes two types of vowels; neutral vowels which neither undergo nor trigger VH and opaque vowels which do not undergo VH but do trigger VH in following suffixes. Thus the 'i' in 'radír' is not affected by the 'a' in the preceding syllable nor does it affect the vowel of the following suffix. This is a neutral vowel. The 'e' in 'oktober' is on the other hand an opaque vowel; it is not affected by the preceding vowels in the stem but it does trigger front harmony in the following suffix (oktoberben).

2.a. Hungarian has three series of vowels: front unrounded, front rounded and back rounded. /a/ patterns with the back rounded vowels and in those dialects that have /œ/, this vowel patterns with the front unrounded. If VH in Hungarian were regular we would expect that all the suffixes should have three allomorphs. However, Hungarian has very few suffixes with the expected three allomorphs:

\[
\begin{align*}
\text{-hoz} \quad \text{-hez} \quad \text{-höz} \quad \text{‘Allative case’} \\
\text{-tok} \quad \text{-tek} \quad \text{-tök} \quad \text{‘2nd pers. pl.’}
\end{align*}
\]

b. There are on the other hand many suffixes that have only two variants:
-ban -ben 'inessive case'
-ra -re 'sublative'
-unk -ünk '1st pers. pl.'
-től -től 'ablative'
-ul -ül 'essive modal'
-nak -nek 'dative'

These variants are triggered by fronting
harmony and rounding harmony is ignored.
Interestingly enough there are no cases of
suffixes that are triggered by rounding
harmony where backness is ignored.

c. There are also many suffixes that ig-
nore harmony altogether and have only one
invariant form:
-ért 'causative final'
-kor 'temporal'
-ig 'terminative'

3. Epenthetic vowels appear in four variants:
   -a- -e- -o- -ö-

These epenthetic vowels most often appear
between stems and certain grammatical
markers, which without the intervening vowels
would result in difficult consonant clusters:
-k 'plural marker'
-t 'accusative marker'

pohár 'glass' poharak
      poharakat
vonat 'train' vonatok
      vonatokat

füj 'bow' fük
ing 'shirt' ígek
gömb 'ice' gömbök
könyv 'book' könyvek
hölgy 'female' hölgyek
leány 'girl' leányok
ágy 'brain' ágyak
tól 'from' tőletek
'from you pl.'

3. Jensen and Vago (see references) propose essentially linear solutions to VH in Hungarian. Their proposals are a few years old and I do not know what their present positions are right now. In any case this is not important here. What is important is that in the linear models that they propose many crucial aspects of the data are left unaccounted for. Jensen quite explicitly states that the anomalies regarding suffixes and I presume with the epenthetic vowels as well, are straightforward: "the correct allomorph is the one that agrees with the rootvowel. These cases are straightforward, regular and not very interesting: (Jensen, J.T., Reply to theoretical Implications of Hungarian Vowel Harmony. pg. 90.)

I cannot agree with this statement. A model for VH must not only account for anomalies in roots and stems but must also account for all aspects of the system unless it can be clearly shown that certain aspects are actually real exceptions to VH. Such is not the case, however, with the data I have presented here. Doubtless J.'s model could be extended to account for the other facts of Hungarian VH, but such a task might prove difficult. To account for VH using a linear model would involve postulating abstract segments throughout the system. I do not intend discussing the failings and virtues of the linear model here, rather I will attempt to present an auto-segmental solution that will account for all the data as I have presented here and leave it for another time and place to compare the linear solution to the auto-segmental one. 4. The auto-segmental model on which the present solution is based is the one discussed and elaborated upon by Clements (see references). I will assume that all of C.'s arguments are valid.
and correct. Briefly the AS model allows for the phonology of a language to have more than one level. The linear model allows for only one level, the segmental level. In Hungarian there need to be at least two levels which for the sake of convenience I will call the SEGMENTAL TIER and the VH TIER. The solution for VH in Hungarian will depend on the shape that stems and affixes take in the lexicon.

5. For the time being let us ignore rounding harmony. I will return to it below but initially the framework for VH will be clearer since rounding harmony poses a few interesting complications. Now assuming temporarily that Hungarian has only backness harmony then a lexical item in the segmental tier will have its vowels unmarked for the feature [back]. This feature will appear in the VH tier and association lines, as Clements says, will already be drawn in the lexicon from the VH tier to the vowels in the segmental tier in order to fill out the incomplete feature specifications of the vowels.

e.g. kellemetlen 'unpleasant'

SEGMENTAL TIER

```
<table>
<thead>
<tr>
<th></th>
<th>-high</th>
<th>-high</th>
<th>-high</th>
<th>-high</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>-low</td>
<td>-low</td>
<td>-low</td>
<td>-low</td>
</tr>
<tr>
<td>long</td>
<td>-long</td>
<td>-long</td>
<td>-long</td>
<td>-long</td>
</tr>
<tr>
<td>round</td>
<td>-round</td>
<td>-round</td>
<td>-round</td>
<td>-round</td>
</tr>
</tbody>
</table>
```

VH TIER

```
[-back]
```

dohányző 'smoker'

SEGMENTAL TIER

```
<table>
<thead>
<tr>
<th></th>
<th>-high</th>
<th>-high</th>
<th>-high</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>+low</td>
<td>+low</td>
<td>+low</td>
</tr>
<tr>
<td>long</td>
<td>+long</td>
<td>+long</td>
<td>+long</td>
</tr>
<tr>
<td>round</td>
<td>-round</td>
<td>-round</td>
<td>-round</td>
</tr>
</tbody>
</table>
```

VH TIER

```
[+back]
```
A neutral vowel which neither undergoes VH nor triggers VH will be fully specified in the segmental tier and there will be no association lines drawn from the VH tier to such neutral vowels: e.g.,

\[
\text{radír} \quad \text{'eraser'}
\]

\[
\begin{array}{cccc}
\text{segmental tier} & r & a & d & i & r \\
\text{VH tier} & \text{[+back]}
\end{array}
\]

An opaque vowel, one which does not accept harmony from vowels to the left but does trigger harmony on the vowels to the right, will be incompletely specified on the segmental tier but will have an association with a feature in the VH tier. This is illustrated in the following diagram:

\[
\begin{array}{cccccc}
\text{o} & \text{k} & \text{t} & \text{o} & \text{b} & \text{e} & \text{r} \\
\text{[+back]} & \text{[-back]}
\end{array}
\]

Suffixes will be incompletely marked in the lexicon and when they get joined onto a stem, an association line is drawn from the nearest feature to the left of the suffix in the VH tier to that suffix:

\[
\text{dohán} \text{y} \text{ž} \text{é} + \text{ban} \quad \text{'in the smoker'}
\]

\[
\begin{array}{cccccc}
\text{d} & \text{o} & \text{h} & \text{a} & \text{n} & \text{y} & \text{z} & \text{é} & \text{+} & \text{b} & \text{a} & \text{n} \\
\text{[+back]}
\end{array}
\]
Since association lines cannot cross the difference between neutral and opaque vowels is very neatly accounted for with this model.

A word like 'Agnes will have two lexical entries:

A g n e s + t o l 'from Agnes'

or
A word like 'ferfi' (man) which contains front vowels but triggers back harmony is associated with [-back] in the VH tier but also has the feature [+back] in the VH tier which is not associated with any vowel in the stem but only gets associated with the vowel of a suffix when one is added:

feřfi+nak 'to the man'

6. So far this framework seems to account for stems quite nicely. The anomalies with the suffixes can be accounted for in the same way. Thus a suffix with only one invariant form has its vowel fully specified in the lexicon and no association lines are drawn to the VH tier:

e.g. öt+kor 'five o'clock'

ö t + k o r
Suffixes with two allomorphs, (and recall that these suffixes only undergo back harmony, not rounding harmony,) are unspecified with regard to the feature [back] which they take from the VH tier:

\[
\begin{array}{ll}
\text{asztal+ul} & \text{'as a table'} \\
\text{szék+ül} & \text{'as a chair'}
\end{array}
\]

\[
\begin{array}{cccc}
\text{a} & \text{sz} & \text{t} & \text{a} & \text{1} & + & \text{u} & \text{l}
\end{array}
\]

\[
\begin{array}{c}
[-\text{high}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{low}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{long}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{round}]
\end{array}
\]

\[
\begin{array}{c}
[+\text{high}]
\end{array}
\]

\[
\begin{array}{c}
[+\text{low}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{low}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{long}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{long}]
\end{array}
\]

\[
\begin{array}{c}
[-\text{round}]
\end{array}
\]

\[
\begin{array}{c}
[+\text{round}]
\end{array}
\]

\[
\begin{array}{c}
[+\text{back}]
\end{array}
\]

\[
\begin{array}{c}
[\text{-back}]
\end{array}
\]

Note that in the group of suffixes with two allomorphs the only possible vowel alternations are:

\[
\begin{array}{l}
\text{u} \sim \ddot{\text{u}} \\
\text{e} \sim \ddot{\text{e}} \\
\text{á} \sim \ddot{\text{e}}
\end{array}
\]

\[
\begin{array}{l}
e.g. \quad \text{ul} \sim \ddot{\text{ul}} \\
\text{ú} \sim \ddot{\text{ú}} \\
\text{ó} \sim \ddot{\text{ó}}
\end{array}
\]

\[
\begin{array}{l}
\text{'essive-medial'} \\
\text{'adjective'} \\
\text{'elative'}
\end{array}
\]

\[
\begin{array}{l}
\text{ban} \sim \ddot{\text{ben}} \\
\text{vá} \sim \ddot{\text{vé}}
\end{array}
\]

\[
\begin{array}{l}
\text{'inessive'} \\
\text{'translativel-factitive'}
\end{array}
\]

In all of the alternations with the exception of the two involving /a/ (/á/), all features except [back] remain constant. The problem with the a ~ e alternations is that /a/ is [+low] and /e/ is [-low]. It is interesting to note, however, that in those dialectes that have /æ/ it is actually this vowel that alternates with /a/. In these dialectes for example the inessive suffix, -ban,
alternates with -\text{\textbar}n\text{\textbar}. Thus in order to make the system regular for the Budapest dialect it might be necessary to postulate abstract segments long and short /\text{\textbar}/ which in all cases get neutralized to /e/. Therefore the difference between forms like the ones below can be accounted for by this system:

\begin{align*}
\text{h\textbarz+\textbarn} & \quad \text{'in the house'} \\
\text{szem+\textbarn} & \quad \text{'in the eye'}
\end{align*}

The form -\text{\textbar}n\text{\textbar} is underlyingly /-\text{\textbar}n/ and has the same feature specifications as does /-\textbarn/ except for the feature back which it receives from the VH tier in any case.

\begin{align*}
\text{h\textbarz+a+n} & \\
\begin{bmatrix}
\text{-high} \\
\text{+low} \\
\text{+long} \\
\text{-round}
\end{bmatrix} & \\
\text{sz\textbarzem+b+\textbarn} & \\
\begin{bmatrix}
\text{-high} \\
\text{-low} \\
\text{-long} \\
\text{-round}
\end{bmatrix}
\end{align*}

There has to be a rule now to raise /\text{\textbar}/ to the correct surface from [e]. It would be interesting to see whether there is any other motivation for postulating these abstract segments. In any case if abstract segments are not acceptable in this analysis, the basic framework will nonetheless remain the same, only some details of suffixes having alternating /a/-/\text{\textbar}/ vowels will have to be reworked.

7. Before moving on to the problem of rounding harmony in Hungarian there is only one more phenomenon as regards suffixes
that needs to be examined. That is the fact that certain suffixes can themselves act as roots and thus may take suffixes. As roots the suffixes that these can take are generally possessive suffixes. They also trigger VH on the following suffixes. Therefore they need to be marked in the lexicon as having a VH tier as well:

\[
\begin{align*}
\text{hajo+ná} & \quad \text{'at the ship'} \\
\text{év+ná} & \quad \text{'at the year'} \\
\text{hajo+ná} & \quad \text{'at me'} \\
\text{év+ná} & \quad \text{'to the ship'} \\
\text{ná} & \quad \text{'to me'} \\
\text{ná} & \quad \text{'to me'}
\end{align*}
\]

Structure diagrams for the above pronoun forms would look like the following:

\[
\begin{align*}
\text{nál} + \text{ám} & \\
\begin{array}{c}
[-\text{high}] \\
+\text{low} \\
+\text{long} \\
[-\text{round}]
\end{array} & \\
\begin{array}{c}
[-\text{high}] \\
+\text{low} \\
-\text{long} \\
[-\text{round}]
\end{array} \\
\text{[+]back]}
\end{align*}
\]

\[
\begin{align*}
\text{nák} + \text{ém} & \\
\begin{array}{c}
[-\text{high}] \\
+\text{low} \\
-\text{long} \\
[-\text{round}]
\end{array} & \\
\begin{array}{c}
[-\text{high}] \\
+\text{low} \\
-\text{long} \\
[-\text{round}]
\end{array} \\
\text{[-]back}
\end{align*}
\]

However, when these are suffixes onto real roots they take their backness form the VH tier of the root and their own VH tier must be eliminated:
It must be noted that compound words do not behave this way. Each root retains its association lines to its VH tier. The model thus needs the power to delete features from the VH tier in a number of specific places. The question of how the deletion takes place and whether the AS model can have this power is still open to scrutiny.

8. Now rounding harmony in Hungarian is far from being as regular as backness harmony. There are stems which contain front round vowels and trigger as we would expect front round harmony:

\[
\text{gömb} \quad \text{'bullet'}
\]
\[
\text{gömb+őtok} \quad \text{'your p. bullet'}
\]

There are, however, stems which contain front round vowels which trigger only front harmony:

\[
\text{könyv} \quad \text{'book'}
\]
\[
\text{könyv+etek} \quad \text{'your pl. book'}
\]

In the two tier model the feature [round] will have to be included in the VH tier. Thus the vowels of any given stem will be marked for the features [high], [low], and [long] on the segmental tier and the features [back] and [round] on the VH tier:
A stem like 'gyöker' (root) presents a problem in that it contains a rounded front vowel but takes front unrounded harmony:

\[
\begin{array}{c}
\text{gyöker}\ +\ e\ k
\end{array}
\]

\[
\begin{array}{c}
\text{gyöker'}
\end{array}
\]

[ö] must be marked [+round] in the segmental tier and can thus only accept the feature [-back] from the VH tier. The association
lines between the two tiers work on the principle that a vowel from the segmental tier will only take only those features from the feature bundle it is associated to in the VH tier as it needs to complete its own feature specifications. This same principle applies to suffixes with two allomorphs. Three allomorph suffixes such as -tok / -tek / -tök are no problem at all since in the segmental tier they are already unspecified as to the features [back] and [round] which they take from the VH tier. With suffixes with two allomorphs the vowel is already marked for the feature [round] in the segmental tier and these suffixes need only take the remaining feature [back] from the VH tier ignoring the feature [round]:

-hoz -hez -höz 'allative'

[-high]
[-low]
[-long]

-nak -næk 'dative'

[-high]
[+low]
[-long]
[-round]

-töl -töl 'ablative'

[-high]
[-low]
[+long]
[+round]

Thus: 'from the ringleader'

f ṣō būn ńō s ë hōz
'from the 'filler'
unit of currency'

'from the doctor'

'from the surface'


to the Greek'

Here too [-nēk] is marked [-round] already in the segmental tier and it ignores the feature [+round] in the VH tier.
Of course the question that immediately comes to mind is whether the theory is not being given too much power when it allows segments to pick and choose features that it needs from the VH tier while ignoring those it does not need.

9. Regardless of the question of power this proposal needs to be slightly altered since as the hypothesis now stands it is not able to fully account for the following:

\[
\begin{align*}
\text{börönd+ötök} & \quad \text{'your pl. suitcase'} \\
\text{börönd+jei+tek} & \quad \text{'your pl. suitcases pl.'}
\end{align*}
\]

In the singular possessed form, 'böröndötök', backness and rounding harmony goes throughout the word. In the plural possessed form, however, only backness harmony is constant while rounding harmony changes. With a two tier system these facts cannot be captured since there will have to be two feature bundles in the VH tier in order to account for 'böröndjeitek' and there need not be any relation between these feature bundles. Thus conceivably we could get a form like 'börönd+jai+tok':

\[
\begin{align*}
\text{bőrőnd} & \quad + \quad \text{j} \quad \text{e} \quad \text{i} \quad + \quad \text{tek} \\
\text{[-high] [-high]} & \quad\quad \text{[-high] [-high]} & \quad\quad \text{[-high]} \\
\text{[-low] [-low]} & \quad\quad \text{[-low] [-low]} & \quad\quad \text{[-low]} \\
\text{[+long] [-long]} & \quad\quad \text{[-long] [-long]} & \quad\quad \text{[-long]} \\
\text{[-back]} & \quad\quad \text{[-back]} \\
\text{[-round]} & \quad\quad \text{[-round]}
\end{align*}
\]

([i] is a neutral vowel. compare: bot+jai+tok \quad \text{'your pl. floors'}
kez+ei+tek \quad \text{'your pl. hands'}

If three tiers are postulated this can be accounted for. Thus there is one segmental tier and two VH tiers, one for rounding harmony and the other for backness harmony. The plural possessed marker
-jei-~jai
(-ei-~ai-)
will be marked in the lexicon as having a rounding harmony tier (-round) and it will get its backness from the backness tier of the stem. In effect the '-jei-n-jai-' is NEUTRAL as regards the rounding tier of the stem:

Segmental Tier
b ₇ r ₇ ₀ n d + j e i + t e k
[[-high] [-high]
[-low] [-low]
[+long] [-long]
]

Rounding Tier [+round]

Backness Tier [-back]

The three tier model can account for other data as well in which a vowel might be neutral as regards one VH tier but accepts harmony from the second VH tier:

gy ₀ k e r + t e k 'your pl. root'

[[-high] [-high]
[-low] [-low]
[-long] [-long]
[+round]
[-round]

[-back]

Similarly vowels of suffixes with only two allomorphs will be neutral as regards the rounding tier but will accept backness from the appropriate backness tier.
Suffixes with one invariant form have vowels which are neutral as regards both VH tiers and suffixes with three allomorphs contain no neutral vowels and take harmony from both tiers. Again under this hypothesis the same principles apply; association lines are drawn to the left from the segmental tier to the two VH tiers and association lines do not cross.

One final comment on this point. There are a number of reasons why the order of the tiers is:

- segmental tier
- rounding harmony tier
- backness harmony tier

rather than some other order. One reason on empirical grounds is that within a unit (word) the range of rounding harmony may be limited to only a part of the unit whereas the range of backness harmony covers the whole unit. Backness harmony can dominate rounding harmony but not vice versa. On the basis of the theory itself too this is the only possible order since any other order would result in association lines getting crossed, which the theory disallows.

10. The last question to be looked at concerns eoenthetic vowels of which there are four '-a- -e- -o- and -ö-'. At the present time it seems that actually these four vowels pattern in two pairs:

- -o- -ö- [-low]
- -a- -e- [+low]
Here again [e] has to be underlying /æ/. This being the case then the two pairs behave much like suffixes with two allomorhhs i.e. the vowel is neutral as regards rounding harmony but does undergo backness harmony. I suspect that the difference between the [+low] and [-low] varieties of epenthetic vowels is morphologically conditioned rather than a phenomenon of VH. In any case this is one thing that still needs to be examined in closer detail. This, however I shall not do at this time.

II. I have examined the data in considerable detail. The result is an AS framework that seems to account for VH in Hungarian in a more concise, less abstract and more thorough fashion that the proposed linear models. Briefly, to recapitulate VH in Hungarian is a three tier process with one segmental tier in which vowels are incompletely specified as regards their features. These features are taken from one or both of the VH tiers. Certain principles are to be observed:

i. association lines are already drawn in the lexicon and they may not cross.

ii. neutral vowels are completely specified in the segmental tier and there are no association lines from a neutral vowel to the VH tiers.

iii. some vowels may be neutral as regards one of the VH tier (backness tier).

iv. association lines are drawn from suffixes to the VH tiers of the stem to the left.

v. some stems may have floating features which only get associated to a following suffix (e.g. hid see above).

vi. features not associated to a segmental string are rule deleted in a derivation.
vii. a certain category of lexical items may lose their original association lines and receive new ones (see above section 7).

Certain details I have tended to overlook in this paper. Among them I have ignored the question of opaque vowels i.e. those that do not undergo VH but do trigger it. I felt that a discussion of these points would only encumber this paper with needless data without giving any new insights. Eventually I hope to examine these points in fuller detail to see whether the model proposed here can account for these and other data as well. One question that interests me is whether or not a lexical item with [+back] in its backness tier needs a rounding tier at all since in Hungarian there is no opposition between back unrounded and back rounded
vowels. This of course is closely connected to the whole question of redundancy in phonology, but also relevant here since /a/, the low back vowel is underlying [-round] and it patterns with the other back rounded vowels. In any case this will not change the basic framework.
REFERENCES


See Also:

