Central thesis

In this talk we aim to contribute to the understanding of the understanding of sonority. We support a multidimensional view within an Element-based framework. In particular, we argue for the role of the element |A| in determining sonority. We show that assuming that this element can be found also on the sonorants /ŋ/ and /r/ gives a more elegant account of sonority.

1 The theory of sonority

(1) A taxonomy of sonority theories can be built on two parameters:

- Sonority is rooted in the phonetics vs. sonority is derived from the cognitive organisation ([±phonetics])
- Sonority is a uniform scale vs. sonority consists of a number of (possibly conflicting) factors ([±uniform])

(2)

<table>
<thead>
<tr>
<th></th>
<th>+uniform</th>
<th>-uniform</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ phonetic</td>
<td>1 phonetic factor (e.g. ‘loudness’)</td>
<td>several phonetic factors (e.g. enhancing perceptability)</td>
</tr>
<tr>
<td>- phonetic</td>
<td>1 representational factor (e.g. complexity)</td>
<td><strong>the present proposal</strong></td>
</tr>
</tbody>
</table>

(3) Traditionally, sonority is represented in terms of a scale:

- low vowels > mid vowels > high vowels > liquids > nasals > obstru-
  ents
(4) **Definition 1 (Contiguity of Reference)** Phonological generalisations refer to a contiguous substring of the sonority scale.

(5) We argue that Contiguity of Reference is undesirable, hence that sonority is not a uniform phenomenon. In particular, we follow Scheer (2004), who claims that sonority is a function of three parameters:

1. the constituent dominating the segment (O or N)
2. the presence vs. absence of manner elements |?| and |h|
3. the role of |A| in the expression (head, operator or absent)

(6) It has been argued by other authors as well that |A| makes a segment more sonorous (e.g. Ritter (1997), Hermans (2003), van der Torre (2003))

(7) The assumption that presence vs. absence of |A| can play a role in defining sonority, is almost trivial for vowels:

\[
\begin{align*}
|i| &= |I| \\
|e| &= |I| \cdot |A| \\
|o| &= |U| \cdot |A| \\
|a| &= |A|
\end{align*}
\]

The higher the proportion of |A|, the more sonorous.

The proportion of |A|, the more sonorous.

(8) **Example 1: stress attraction** In Gujarati, if a word contains an [a], this is stressed (else some other vowel is stressed, with extra avoidance of schwa) (de Lacy, 2002). This can be seen as a preference for stress on |A|

| [uṭāru]       | ‘passenger’   |
| [sāme]        | ‘in front’    |
| [tāḍʒetar]    | ‘recently’    |
| [sinemā]      | ‘movie theatre’ |
| [pəhēļu]      | ‘first’       |
| [jūrop]       | ‘Europe’      |
| [kʰaniso]     | ‘shirts’      |

(9) **Example 2: reduction** In Bulgarian, we find the following reductions of vowels in unstressed position:

- i, e → i
- a → ŏ
- o, u → u

This can be understood as loss of the |A| in non-prominent positions. There thus is a one-to-one relation between |A| and prosodic prominence

| rōɡuf  | ‘of horn’ |
| rugāt  | ‘horned’  |
| sēlu   | ‘village’ |
| sīlā   | ‘villages’ |
| rābuto | ‘work’    |
| robētnik | ‘worker’  |
The theory of sonority

There are various interpretations of the role of the element $A$ in consonants. Here we diverge from Scheer (2004), and follow Smith (2000), Swets & van Oostendorp (2003) and van der Torre (2003) instead. The basic claim is that $A$ is part of $/r/$ and $/\eta/$ (in Dutch dialects), but not of other sonorant consonants.

**Nuclear positions favour $h/\eta/$**

<table>
<thead>
<tr>
<th>Standard Dutch</th>
<th>Wieringen Dutch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[hɔnt]</td>
<td>[hɔnt]</td>
<td>‘dog’</td>
</tr>
<tr>
<td>[dansɔ]</td>
<td>[dansɔ]</td>
<td>‘to dance’</td>
</tr>
<tr>
<td>[tɔnt]</td>
<td>[tɔnt]</td>
<td>‘tooth’</td>
</tr>
</tbody>
</table>

$h/\eta/$ shuns non-prominent positions

[$\eta$] avoids onset positions in many languages of the world. This can be seen as an instance of $A$ avoiding dependent/consonantal (Onset) positions.

**Nuclear positions favour $h/r/$**

<table>
<thead>
<tr>
<th>Standard Dutch</th>
<th>The Hague Dutch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[ɔnder]</td>
<td>[ɔnda]</td>
<td>‘under’</td>
</tr>
<tr>
<td>[dixtɔr]</td>
<td>[dixtɔ]</td>
<td>‘poet’</td>
</tr>
</tbody>
</table>

$h/r/$ shuns non-prominent positions

Latin | Sestu Campadinian |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[rosa]</td>
<td>[arɔza]</td>
</tr>
<tr>
<td>[rana]</td>
<td>[arana]</td>
</tr>
<tr>
<td>[luc]</td>
<td>[luZi]</td>
</tr>
</tbody>
</table>

Further motivation for $A$ on $/r, \eta/$

If $/r, \eta/$ indeed contain the element $A$ we expect there to be interaction between these segments, and low vowels, e.g. in the form of a lowering effect of these consonants on preceding vowels.

**Lowering effects of $h/\eta/$**

An instance of a lowering effect of $/\eta/$ can be found in Alabama English (Veatch, 1991): in words like spring, finger, thing, etc. the vowel is realized as $[æ]$. According to Veatch, Alabama Lowering is “an unnatural, anticoarticulatory effect”.

Similarly, Zhang (2006) introduces the following constraint in his analysis of Shiaoxing:

- $[^{[\eta][+\text{high}]}]: \eta$ cannot occur before any $[^{[+\text{high}]}]$ (semi-)vowel

**Lowering effects of $h/r/$**

It is well-known that in Canadian English, the distinction between e.g. merry and marry is lost, due to lowering of the former. Non-rhotic varieties of English similarly provide evidence for the presence of $A$ on $/r/$: they have intrusive r when the preceding vowel is not high:

- j’étais déjà[r] ici
2 Tonogenesis in Limburg

(20) Tonal contrasts in modern Limburg

| [wáːtʰə] ‘water’ | [páːtʰə] ‘father (clerical)’ |
| [móːdəɾ] ‘mother’ | [móːdə] ‘fashion’ |
| [miːn] ‘my, neuter’ | [miːn] ‘coal mine’ |
| [rɛːt] ‘crevice’ | [rɛːt] ‘reed’ |
| [káːl] ‘nonsense’ | [káːl] ‘to talk’ |
| [máːn] ‘man’ | [páːn] ‘pan’ |

(21) Tones: representations

Level high tone (‘Schleifton’) Falling tone (‘Stoßton’)

(22) Long low and mid vowels: falling tone

WGM *eː < *eː: [brɛːf] ‘letter’
WGM *eː < *eː: [lɛːf] ‘sweet’
WGM *oː: [hɛːt] ‘hat’
WGM *ai < *ai: [smiː] ‘snow’
WGM *au < *au: [bruːt] ‘bread’
WGM *aː: [drɔːt] ‘thread’

(Data are from the tonally conservative dialect of Maasbracht.)
(23) **Long high vowels and diphthongs: level high tone**

- WGM *iː* [wiːt] ‘far’
- WGM *uː* [vuːl] ‘dirty’
- WGM *ai* [klɛːt] ‘dress’
- WGM *au* [bɔːum] ‘tree’

(24) **Short vowel + η or r: falling tone**

- vúi ‘to catch’
- bái ‘afraid’
- bríi ‘to bring’
- stóii ‘stood’
- bár ‘severe’
- vár ‘far’
- hár ‘wire gauze’

(25) **Short vowel + any other consonant: level high tone**

- kóp ‘head’
- vóx ‘fluid’
- wít ‘white’
- máń ‘man’
- mál ‘mole’
- véi ‘skin’

(26) **Generalisation**

- Low and mid vowels : high vowels
- \( /r, η/ : \) other consonants

(27) **Expressing the generalisation** This generalisation is easily expressed in our framework:

- A Low tone must be linked to an \(|A|-bearing element.

(28) **This rejects the representation on the left-hand side, but accepts the one on the right-hand side.**

<table>
<thead>
<tr>
<th>wrong</th>
<th>well-formed</th>
</tr>
</thead>
<tbody>
<tr>
<td>H L (μ)</td>
<td>H L (μ)</td>
</tr>
<tr>
<td></td>
<td>(μ) (μ)</td>
</tr>
</tbody>
</table>

(29) **It is not possible to express the same generalisation in terms of a scale:**

- low vowels > mid vowels > high vowels > \(r\) > \(η\) > m, n > obstru-
Either we have to give up Contiguity of Reference (which makes the whole enterprise devoid of content) or we have to change the order of the segments on a language-particular basis:

- low vowels > mid vowels > r > y > high vowels > l > m, n > obstruents

Desideratum: A theory of visibility

- At first sight, this approach makes strange predictions e.g. a language that allows mid and low vowels, /r/, /y/ in the peak, but not high vowels
- We need a theory of visibility: prosodic heads can only see those place elements that are segmental heads
- Subsyllabic constituents and segments are able to see further details.
- A theory of visibility is needed in any case

Long high vowels and diphthongs do get a falling tone if the next syllable has undergone Schwa Apocope (cf. (22))

\[
\begin{align*}
\text{lín} & \quad \text{‘line’} & < *\text{lím} \\
\text{prúím} & \quad \text{‘plum’} & < *\text{prúm} \\
\text{kléín} & \quad \text{‘small’} & < *\text{kleín} \\
\text{vróíw} & \quad \text{‘woman’} & < *\text{vróúw} \\
\end{align*}
\]

The same is true for short vowels followed by a sonorant consonant. (cf. (25)).

\[
\begin{align*}
\text{háí} & \quad \text{‘hall’} & < *\text{há} \\
\text{héí} & \quad \text{‘hell’} & < *\text{hé} \\
\text{kñí} & \quad \text{‘chin’} & < *\text{kñ} \\
\text{spñí} & \quad \text{‘spider’} & < *\text{spñ} \\
\text{stýí} & \quad \text{‘voice’} & < *\text{stý} \\
\text{sñí} & \quad \text{‘sum’} & < *\text{sñ} \\
\text{tróíñ} & \quad \text{‘drum’} & < *\text{tróñ} \\
\text{víáíñ} & \quad \text{‘flame’} & < *\text{víáñ} \\
\end{align*}
\]

Given the relevance of Schwa Apocope an alternative solution seems possible (Boersma p.c.): the sonorants /r/ and /y/ attract a falling tone because they were always followed by a schwa.

The Alternative solution does not work for /r/

a. Forms attested in Middle Dutch and Middle High German

- báí \quad \text{‘severe’}
- dói \quad \text{‘male bee’}
- táí \quad \text{‘tar’}
Conclusions

b. Forms that were non-existent in Middle Dutch and Middle High German
   bōr (de wolf) (proper name)
   hōr ‘wire gauze’

(36) Alternative solution seems to work for /ŋ/ since in the Limburg dialects the relevant words were the result of schwa apocope:
   slōj ‘snake’ < *slōn
   tōj ‘(pair of) tongs’ < *tōn
   tōj ‘tongue’ < *tōn
   jōj ‘boy’ < *jōn

(37) We still maintain that /ŋ/ attracts low tone since in neighbouring German dialects are also velar nasals which are not the result of schwa drop in -/ŋn/. These are the result of velarisation (as in Wieringen, cf. (11))

(38) Velarisation of a nasal is always accompanied by a falling tone (Welter, 1933). Some examples from the region to the west of Aachen
   fiŋ ‘fine’ < *fīn
   wiŋ ‘wine’ < *wiːn
   brūŋ ‘brown’ < *brūn
   bēŋ ‘leg’ < *bēn
   ēŋ ‘one’ < *ēn
   klēŋ ‘small’ < *klein

3 Conclusions

- We have provided evidence for a multidimensional theory of sonority, and implemented this in a representational framework
- In particular, we argue that the sonorants [r, ŋ] both carry the element [A]
- This makes them more sonorous
- Certain questions remain, e.g. what explains the asymmetry between [A] on the one hand, and [I], [U] on the other.

Bibliography


