Scales, $|A|$, and Limburg Tonogenesis

Ben Hermans & Marc van Oostendorp

Meertens Instituut / Royal Netherlands Academy of Arts and Sciences, Amsterdam

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Sonority

Sonority plays an important role in the literature:

- on phonotactics
- on tone-bearing units
- ...

but the formalisation of the concept is still a matter of debate
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The theory of sonority
   Theoretical background
   Consonants and $|A|$
   Further motivation for $|A|$ on /r, η/

Tonogenesis in Limburg
   Tones in Limburg
   Tonogenesis
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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])
### A taxonomy of theoretical views

<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>

In this talk, we assume a [-phonetic] approach, and argue for a [-uniform] account.
The [$\pm$uniform] dimension

- Traditionally, sonority is represented in terms of a scale:
  - low vowels $>$ mid vowels $>$ high vowels $>$ liquids $>$ nasals $>$ obstruents
- One implication of scales such as this is what we call *Contiguity of Reference*:
  - Phonological generalisations refer to a contiguous substring of the sonority scale.
- We argue that Contiguity of Reference is undesirable, hence that sonority is not a uniform phenomenon
Representational approaches

- A representational [+uniform] approach is Harris (1990): the more elements a segment has, the more sonorous it is.
- This implies Contiguity of Reference.
A, I, U theory

- We represent a [-uniform] approach based on Element Theory.
- 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)
- It has been argued by other authors as well that this element makes a segment more sonorous (e.g. Ritter 1997, Hermans 2003, Van der Torre 2004)
Asymmetries within the set of elements

- We concentrate on presence vs. absence of $|A|$
- We thus establish a subscale $|A| > \emptyset$
- That presence vs. absence of $|A|$ can play a role in defining sonority, is almost trivial for vowels:
  \[
  [i] = |I| \quad [u] = |U| \\
  [e] = |I| \bullet |A| \quad [o] = |U| \bullet |A| \\
  [a] = |A|
  \]
- The more $|A|$, the more sonorous
Example: 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|

<table>
<thead>
<tr>
<th>Gujarati</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>[utáru]</td>
<td>‘passenger’</td>
</tr>
<tr>
<td>[sáme]</td>
<td>‘in front’</td>
</tr>
<tr>
<td>[tádžetəɾ]</td>
<td>‘recently’</td>
</tr>
<tr>
<td>[sinemá]</td>
<td>‘movie theatre’</td>
</tr>
<tr>
<td>[pəhélu]</td>
<td>‘first’</td>
</tr>
<tr>
<td>[júrop]</td>
<td>‘Europe’</td>
</tr>
<tr>
<td>[kʰəmíso]</td>
<td>‘shirts’</td>
</tr>
</tbody>
</table>
Example: reduction

- In Bulgarian, we find the following reductions of vowels in unstressed position:
  - i, e → i
  - a → ə
  - 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

$\text{róguf}$ ‘of horn’ | $\text{rugát}$ ‘horned’
$\text{sélú}$ ‘village’ | $\text{silá}$ ‘villages’
$\text{rábutə}$ ‘work’ | $\text{rəbótnik}$ ‘worker’
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Consonants and |A|

- There are various interpretations of the role of the element |A| in consonants.
- The basic claim is that |A| is part of /r/ and /ŋ/ (in Dutch dialects), but not of other sonorant consonants.
Nuclear positions favour /ŋ/

<table>
<thead>
<tr>
<th>Standard Dutch</th>
<th>Wieringen Dutch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[hɔnt]</td>
<td>[hɔŋt]</td>
<td>‘dog’</td>
</tr>
<tr>
<td>[dɑnsə]</td>
<td>[dɑŋsə]</td>
<td>‘to dance’</td>
</tr>
<tr>
<td>[tɑnt]</td>
<td>[tɑŋt]</td>
<td>‘tooth’</td>
</tr>
</tbody>
</table>

- Many continental West-Germanic dialects display a process of velarisation.
- This can be seen as an instance of attraction of |A| to prominent (Nuclear) positions.
/ŋ/ shuns non-prominent positions

- [ŋ] 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 /r/

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

- A similar process can be found in Standard German
- This can be seen as an instance of attraction of |A| to prominent positions: |A| moves to the nuclear peak
/r/ shuns non-prominent positions

<table>
<thead>
<tr>
<th>Latin</th>
<th>Sestu Campadinian</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[rosa]</td>
<td>[ar:ova]</td>
<td>‘rose’</td>
</tr>
<tr>
<td>[rana]</td>
<td>[ar:ana]</td>
<td>‘frog’</td>
</tr>
<tr>
<td>[luce]</td>
<td>[lu3i]</td>
<td>‘light’</td>
</tr>
</tbody>
</table>

- A similar effect can be found in Mbabaram
- This can be seen as an instance of |A| avoiding dependent/consonantal (Onset) positions
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Conclusions
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 /ŋ/

- An instance of a lowering effect of /ŋ/ 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:
  - *[ŋ][+high]: [ŋ] cannot occur before any [+high] (semi-)vowel
- Both Alabama and Shiaoxing can be analysed as |\text{A}| spreading
Lowering effects of /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 $\text{|A|}$ on /r/: they have intrusive r when the preceding vowel is not high:
  - j’étais déjà[r] ici
  - UEAFA[r] officials
- These phenomena find a parallel in the fact that after high vowels hiatus is resolved by the insertion of a homorganic glide:
  - the key[j] is
  - the zoo[w] is
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Limburg speaking area in the Netherlands and Belgium
Tonal contrasts in modern Limburg

- [wáːtər] ‘water’
- [móːdər] ‘mother’
- [míːn] ‘my, neuter’
- [réːt] ‘crevice’
- [kál] ‘nonsense’
- [máːn] ‘man’
- [páːtər] ‘father (clerical)’
- [móːdə] ‘fashion’
- [mîːn] ‘coal mine’
- [réːt] ‘reed’
- [káː] ‘to talk’
- [páːn] ‘pan’
Tones: representations

Level high tone ('Schleifton')

Falling tone ('Stoßton')
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Long low and mid vowels: falling tone

WGM *eː < *eː [brɛːf] ‘letter’
WGM *eː < *eo [lɛːf] ‘sweet’
WGM *oː [hɔːt] ‘hat’
WGM *ɛː < *ai [sɲɛ] ‘snow’
WGM *ɔː < *au [brʊɛt] ‘bread’
WGM *aː [drɔːt] ‘thread’

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

| WGM *iː | [wiːt] | ‘far’ |
| WGM *uː | [vuːl] | ‘dirty’ |
| WGM *ai | [klɛɨt] | ‘dress’ |
| WGM *au | [bɔːum] | ‘tree’ |
### Short vowel + η or r: falling tone

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>vǎỳ</td>
<td>'to catch'</td>
</tr>
<tr>
<td>bǎỳ</td>
<td>'afraid'</td>
</tr>
<tr>
<td>brǐỳ</td>
<td>'to bring'</td>
</tr>
<tr>
<td>stóỳ</td>
<td>'stood'</td>
</tr>
<tr>
<td>bâr</td>
<td>'severe'</td>
</tr>
<tr>
<td>vær</td>
<td>'far'</td>
</tr>
<tr>
<td>hór</td>
<td>'wire gauze'</td>
</tr>
</tbody>
</table>
Short vowel + any other consonant: level high tone

kóp | ‘head’
vóx | ‘fluid’
wít | ‘white’
máń | ‘man’
mól | ‘mole’
vǽl | ‘skin’
Generalisation

Low and mid vowels : high vowels
/r, ɻ/ : other consonants
Expressing the generalisation

- This generalisation is easily expressed in our framework:
  - A Low tone must be linked to an $|A|$-bearing element.

- 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 \</td>
<td>L \</td>
</tr>
</tbody>
</table>
Expressing the generalisation (2)

- It is not possible to express the same generalisation in terms of a scale:
  - low vowels > mid vowels > high vowels > r > l > η > m, n > obstruents
- 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 > η > 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/, /ŋ/ 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
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A small, but relevant detour: Schwa Apocope

- Long high vowels and diphthongs do get a falling tone if the next syllable has undergone Schwa Apocope.

\begin{align*}
\text{lîîn} & \quad \text{‘line’} & < & \ast\text{lîîn}e \\cr
\text{prú́m} & \quad \text{‘plum’} & < & \ast\text{prú́m}e \\cr
\text{kléín} & \quad \text{‘small’} & < & \ast\text{kléín}e \\cr
\text{vró́w} & \quad \text{‘woman’} & < & \ast\text{vró́w}e
\end{align*}
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Short vowel plus sonorant consonant

- The same is true for short vowels followed by a sonorant consonant.

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>hál</td>
<td>'hall'</td>
<td>&lt; *hale</td>
</tr>
<tr>
<td>héł</td>
<td>'hell'</td>
<td>&lt; *hele</td>
</tr>
<tr>
<td>kín</td>
<td>'chin'</td>
<td>&lt; *kine</td>
</tr>
<tr>
<td>spín</td>
<td>'spider'</td>
<td>&lt; *spine</td>
</tr>
<tr>
<td>stým</td>
<td>'voice'</td>
<td>&lt; *steme</td>
</tr>
<tr>
<td>sóm</td>
<td>'sum'</td>
<td>&lt; *some</td>
</tr>
<tr>
<td>tróm</td>
<td>'drum'</td>
<td>&lt; *trame</td>
</tr>
<tr>
<td>vlám</td>
<td>'flame'</td>
<td>&lt; *vlame</td>
</tr>
</tbody>
</table>
An alternative solution to our account

Given the relevance of Schwa Apocope an alternative solution seems possible (Boersma p.c.):

- the sonorants /r/ and /ŋ/ attract a falling tone because they were always followed by a schwa.
  - Not true for /r/.
  - True for /ŋ/; all instances of velar nasal have -/ŋə/ as their source.
Alternative solution does not work for /r/

- Forms attested in Middle Dutch and Middle High German
  - bář ‘severe’
  - dár ‘male bee’
  - tær ‘tar’
- Forms that were non-existent in Middle Dutch and Middle High German
  - bór (de wolf) (proper name)
  - hór ‘wire gauze’
Alternative solution seems to work for /η/.

- Forms which were the result of schwa apocope:
  - sláŋ ‘snake’ < *slaŋe
  - táŋ ‘(pair of) tongs’ < *taŋe
  - tóŋ ‘tongue’ < *tonge
  - jóŋ ‘boy’ < *jonge
Why we still maintain that /η/ attracts low tone

- There are also velar nasals which are not the result of schwa drop in -/ngə/
- These are the result of velarisation (as in Wieringen)
Why we still maintain that /ŋ/ attracts low tone

- Velarisation of a nasal is always accompanied by a falling tone (Welter 1933).
- Some examples from the region to the west of Aachen
  - fíŋ ‘fine’ < *fiːn
  - wíŋ ‘wine’ < *wiːn
  - brýŋ ‘brown’ < *bruːn
  - běŋ ‘leg’ < *bɛin
  - éŋ ‘one’ < *ɛin
  - kléŋ ‘small’ < *kleɪn
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, η] 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.