Typologies of the Segment
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Ben Hermans, Meertens Institute
Ben.hermans@meertens.knaw.nl

Issues:
Nasal harmony
Voicing
Prevocalization
Length
I Nasalization (based on Walker 2000 and McCarthy 2004)

A typology of nasal harmony:

(1) Sundanese: glides and all less sonorant segments are blockers

- nāān ‘to wet’
- kumāñā ‘how?’
- bvr̥ŋā ‘to be rich’
- mīʔāsih ‘to love’
- njājak ‘to sift’
- māwur ‘to spread’
- mōlohawk ‘to stare’
- māro ‘to halve’
- nūʔdagaq ‘to pursue’
- njātur ‘to arrange’

(2) Johore Malay: glides are undergoers of harmony, but liquids and all less sonorant segments are blockers

- mīnōm ‘to drink’
- baŋōn ‘to rise’
- māʔāp ‘pardon’
- rōŋjāŋān ‘central focus’
- mājāŋ ‘stalk (palm)’
- mānāwān ‘to capture’ (active)
- mōratappi ‘to cause to cry’
- rōŋjūwāsən ‘supervision’
- mākan ‘to eat’

(3) Kolokoma Ijo: liquids and glides can nasalize, but less sonorous segments cannot

- ōmba ‘breath’
- ānda ‘wrestle’
- wāī ‘prepare sugarcane’
- jājī ‘shake’
- sānī ‘five’
- sānlo ‘gills’
- izōnggo ‘jug’
- abāmu ‘loft’
- otōngbolo ‘mosquito’
- tōng ‘light (a lamp)’
(4) **Applecross Gaelic**: even fricatives nasalize, though obstruent stops never do

/maχar/ [mɑ̃χɑ̃] ‘mother’
/tʰianu/ [tʰiːnʊ] ‘to do, to make’
/frɪaˈv/ [frɪaˈv] ‘root’ (plural)
/ʃeˈvar/ [ʃɛnɛˈvaɾ] ‘grandmother’
/ɑ̃luç/ [ɑ̃huç] ‘neck’
/snə'nɨdˈan/ [snənɪdˈan] ‘thread’
/hb̪āhusk/ [hɪb̪āhʊsk] ‘senseless person, fool’
/st̪ɾaiˈɭ/ [stɾəiɭ] ‘string’
/xb̪ɪʃpaxk/ [xb̪ɪʃpaxk] ‘wasp’

(5) Nasal incompatibility (after Walker 2000)

*NASOBSTSTOP
  *[+nas, -cont, -son]
  »
*NASFRICATIVE
  *[+nas, +cont, -son]
  »
*NASLIQUID
  *[+nas, +approx, +cons]
  »
*NASGLIDE
  *[+nas, +approx, -cons, -syll]
  »
*NASVOWEL
  *[+nas, +approx, -cons, +syll]

**ALIGN and SPREAD**

These two constraints require autosegmental spreading. They are gradient constraints (McCarthy and Prince 1993).
Gradient alignment makes implausible typological predictions. These problems have been identified by Wilson (2003, 2004).

**Because alignment seeks to minimize the number of unspread-to-segments, ranking permutation allows it to produce results that differ wildly from spreading. These are all instances of the too-many-solutions problem.**

*Harmony by blocked epenthesis*

Effect of *+[nas,-son] » ALIGN-R(nasal) » NO-CODA » DEP-V*

<table>
<thead>
<tr>
<th></th>
<th>*[+nas,-son]</th>
<th>ALIGN-R(nasal)</th>
<th>NO-CODA</th>
<th>DEP-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>/kawas/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kawasə</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kawas</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>/mawas/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>māwāsə</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>māwāsə</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>māwāsə</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

This is a language where epenthesis is blocked in forms containing a nasal segment. ‘This is a strange prediction: in reality, no known language allows the presence of a distant harmony trigger and intervening blocker to determine whether epenthesis occurs’
Harmony by selection of short allomorphs

Effect of ALIGN-R(nasal) » SWP (p. 19)

<table>
<thead>
<tr>
<th>/mawasa- {ta, pta}</th>
<th>ALIGN-R(nasal)</th>
<th>SWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>mawa.ta, sa.ta</td>
<td>****</td>
<td>**</td>
</tr>
<tr>
<td>mawa,sap.ta</td>
<td>*****!</td>
<td>*</td>
</tr>
</tbody>
</table>

This is a language where allomorphs are selected by prosodic criteria, except in words with blocked harmony. No known language works like this.

Harmony by alteration of blockers

Another way to improve alignment is to change the features of a potential blocker. For instance /mawasa/ could be changed to mawara. This does not seem to happen.

Harmony by deletion

Gradient alignment can compel deletion of segments. Deletion of segments to promote harmony does not exist.

Effect of ALIGN-R(nasal) » MAX (p. 21)

<table>
<thead>
<tr>
<th>/mawasa/</th>
<th>*[+nas,-son]</th>
<th>ALIGN-R(nasal)</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>mawaa</td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>mawasa</td>
<td></td>
<td><em>!</em></td>
<td></td>
</tr>
<tr>
<td>mawasaa</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

Harmony by reduplicative emergence of the unmarked

ALIGN(nasal) can determine how much is copied, favoring less copying if spreading cannot reach the copied segments.

Effect of ALIGN-R(nasal) » MAX-BR (p. 22)

<table>
<thead>
<tr>
<th>/mapata+RED/</th>
<th>ALIGN-R(nasal)</th>
<th>MAX-BR</th>
</tr>
</thead>
<tbody>
<tr>
<td>mapata-ta</td>
<td>********</td>
<td>****</td>
</tr>
<tr>
<td>mapata-pata</td>
<td>*******<em>!</em></td>
<td>**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/gadaba+RED/</th>
<th>MAX-BR</th>
</tr>
</thead>
<tbody>
<tr>
<td>gadaba-ba</td>
<td>**<em>!</em></td>
</tr>
<tr>
<td>gadaba-daba</td>
<td>**</td>
</tr>
</tbody>
</table>
Harmony by affix repositioning

Gradient ALIGN(nasal) can affect affix placement.

### Effect of ALIGN-R(nasal) » ALIGN-R(suffix) (p. 23)

<table>
<thead>
<tr>
<th></th>
<th>ALIGN-R(nasal)</th>
<th>ALIGN-R(suffix)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mapata+ka/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ka-māpata</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td>māpata-ka</td>
<td>****!</td>
<td></td>
</tr>
<tr>
<td>/gadaba+ka/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ka-gadaba</td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>gadaba-ka</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Harmony by stress shift

It is possible to satisfy ALIGN-R(nasal) by moving stress.

### Effect of IDENTₜ(nasal) » ALIGN-R(nasal) » NONFINALITY (p. 24)

<table>
<thead>
<tr>
<th></th>
<th>IDENTₜ(nasal)</th>
<th>ALIGN-R(nasal)</th>
<th>NONFINALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mawata/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>māwātá</td>
<td></td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>māwāta</td>
<td></td>
<td>****!</td>
<td></td>
</tr>
<tr>
<td>māwāta</td>
<td>*!</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>/gawata/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gawatá</td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>gawáta</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Span-theory

In Span Theory, the segments of a word are exhaustively parsed into spans for each distinctive feature. Each span of the feature [F] has a head segment, and it is the head segment’s value for [F] that determines the pronunciation of the other segments in the span.

Two kinds of constraints favor parsing segments as the head of spans. On the faithfulness side, IDENT and MAX-feature constraints are replaced by FTHDSP, defined in the following way:

\[ \text{FTHDSP}(\alpha F) \text{ McCarthy (2004: 5)} \]

If an input segment \( \xi_I \) is \( [\alpha F] \) and it has an output correspondent \( \xi_O \), then \( \xi_O \) is the head of an \( [\alpha F] \) span.

On the markedness side, span headship is also demanded by certain feature cooccurrence restrictions. A general schema for such constraints is the following:

\[ \text{HEAD}([\beta G, \gamma H, \ldots], [\alpha F]) \]

Every \([\beta G, \gamma H, \ldots]\) segment heads a \([\alpha F]\) span.
Then there is a constraint reducing proliferation of spans. It forbids adjacent spans.

*A-SPAN(F)
Assign one violation mark for every pair of adjacent spans of the feature [F]

Directionality is expressed in terms of constraints on the location of a span’s head:

SPHdL(+nasal)
The head segment of a [+nasal] span is initial in that span. Assign one violation-mark for each non-conforming span.

SPHdR(+nasal)
The head segment of a [+nasal] span is final in that span. Assign one violation-mark for each non-conforming span.

SPHdL(-nasal)
The head segment of a [-nasal] span is initial in that span. Assign one violation-mark for each non-conforming span.

SPHdR(-nasal)
The head segment of a [-nasal] span is final in that span. Assign one violation-mark for each non-conforming span.

Some candidates from /mawasa/ and their pronunciations.

(mawa)(sa) [māwāsa]
(ma)(wasa) [māwasa]
(ma)(wa)(sa) ,, ,, 
(m)(awaša) [mawasə]
(m)(awasa) ,, ,, 
(m)(a)(wa)(s)(a) ,, ,, 
(m)(awas)(a) ,, ,, 

etc.

Some spans not allowed by GEN

(mawa)sa non-exhaustive parsing into [nasal] spans
(ma)wa(ša) same
(ma)(waša) two-headed span
(mawa)(sa) headless span
McCarthy replaces Walker’s constraints with constraints requiring oral spans.

\[ \text{HEAD}([-\text{cont}, -\text{son}], [-\text{nas}]) \]

Every obstruent stop heads an oral span (= \text{OBSTHDOR})

\[ \text{HEAD}([+\text{cont}, -\text{son}], [-\text{nas}]) \]

Every fricative heads an oral span (= \text{FRIChDOR})

\[ \text{HEAD}([+\text{app}, +\text{cons}], [-\text{nas}]) \]

Every liquid heads an oral span (= \text{LIQHDOR})

\[ \text{HEAD}([+\text{app}, -\text{cons}, -\text{syll}], [-\text{nas}]) \]

Every glide heads an oral span (= \text{GLIHDOR})

\[ \text{HEAD}([+\text{app}, -\text{cons}, +\text{syll}], [-\text{nas}]) \]

Every vowel heads an oral span (= \text{VOWHDOR})

Exemplification of this typology (based on Walker 2000)

*How are blocking effects implemented?*

Formally, blocking effects in nasal harmony are the result of ranking *A-SPAN*(nasal) below one of the \text{HEAD}-constraints

Johore Malay-type systems (vowels and glides as undergoers) (p. 7).

<table>
<thead>
<tr>
<th>/mawasa/</th>
<th>OBSTHDOR</th>
<th>FRIChDOR</th>
<th>LIQHDOR</th>
<th><em>A-SPAN</em> (nasal)</th>
<th>GLIHDOR</th>
<th>VOWHDOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mawa)s</td>
<td>*</td>
<td>*</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mawasa)</td>
<td>*!</td>
<td></td>
<td></td>
<td>**!</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td>(ma)(wa)(s)</td>
<td></td>
<td></td>
<td></td>
<td>**!</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td>(m)(a)(w)(a)(s)</td>
<td></td>
<td></td>
<td></td>
<td><strong>!</strong>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By interpolating *A-SPAN*(nasal) at other spots in the fixed (!) hierarchy, we obtain the typology of blockers described by Walker.

*How is harmony implemented?*

In any language where underlying oral segments become nasalized through harmony, FTHHDSP(-nasal) must be ranked below *A-SPAN*(nasal). "In general, the FTHHDSP constraints encourage the proliferation of spans, whereas *A-SPAN* encourages economy of spans. Thus, the presence of harmony is an indication that FTHHDSP is dominated by *A-SPAN*" (p. 8).
How Span Theory solves instances of the too-many-solutions problem (and related problems created by more traditional spreading constraints)

No blocking of epenthesis with *A-SPAN \( \Rightarrow \) NO-CODA (p. 18)

<table>
<thead>
<tr>
<th>/mawas/</th>
<th>FRIC</th>
<th>*A-SPAN(nasal)</th>
<th>NO-CODA</th>
<th>GLI</th>
<th>DEP</th>
<th>VOWHdOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(mawa)(ə)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>(mawa)(ə)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(mawasa)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

The winner and its primary competitor (the second candidate) have identical numbers of adjacent spans, so they tie on *A-SPAN. Consequently, NO-CODA is able to rule out māwās.

*A-SPAN(nasal) and allomorph selection

<table>
<thead>
<tr>
<th>/mawasa-{ta, pta}</th>
<th>*A-SPAN(nasal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(mawa)(ə)(p)(ta)</td>
<td>***</td>
</tr>
<tr>
<td>(mawa)(ə)(ta)</td>
<td>**</td>
</tr>
<tr>
<td>(ga)(ba)(ə)(p)(ta)</td>
<td>****</td>
</tr>
<tr>
<td>(ga)(ba)(ə)(ta)</td>
<td>***</td>
</tr>
</tbody>
</table>

The choice of allomorphs has the same effect on span structure regardless of whether a nasal precedes or not.

Span Theory does not suffer from the alteration problem. This is because lenition has the same effects on *A-SPAN in nasal and oral environments.

*A-SPAN(nasal) and lenition

<table>
<thead>
<tr>
<th>/mawasa/</th>
<th>*A-SPAN(nasal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(mawa)(⁵a)</td>
<td>*</td>
</tr>
<tr>
<td>(mawara)</td>
<td>*</td>
</tr>
<tr>
<td>/gabasa/</td>
<td></td>
</tr>
<tr>
<td>(ga)(ba)(⁵a)</td>
<td>*</td>
</tr>
<tr>
<td>(ga)(bara)</td>
<td>*</td>
</tr>
<tr>
<td>/nadasa/</td>
<td></td>
</tr>
<tr>
<td>(na)(da)(⁵a)</td>
<td>*</td>
</tr>
<tr>
<td>(na)(dana)</td>
<td>*</td>
</tr>
</tbody>
</table>
Span Theory does not suffer from the deletion problem. Performance on *A-Span(nasal) can be improved by deletion, but the effect is the same whether or not the word contains a nasal trigger and blocker.

<table>
<thead>
<tr>
<th>*A-Span(nasal) and deletion</th>
<th>*A-Span(nasal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mawasa/</td>
<td></td>
</tr>
<tr>
<td>(mawa)</td>
<td></td>
</tr>
<tr>
<td>(mawa)sa</td>
<td>*</td>
</tr>
<tr>
<td>(mawa.a)</td>
<td></td>
</tr>
<tr>
<td>/gawasa/</td>
<td></td>
</tr>
<tr>
<td>(gawa)</td>
<td></td>
</tr>
<tr>
<td>(gawa)sa</td>
<td>*</td>
</tr>
<tr>
<td>(gawa.a)</td>
<td></td>
</tr>
</tbody>
</table>

Span Theory does not have the copying problem; copying has the same effect on the span structure of /mapata/ and /gadaba/.

<table>
<thead>
<tr>
<th>*A-Span(nasal) and copying</th>
<th>A-Span(nasal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mapata+RED/</td>
<td>***</td>
</tr>
<tr>
<td>(ma)(pa)(ta)(ta)</td>
<td></td>
</tr>
<tr>
<td>(ma)(pa)(ta)(pa)(ta)</td>
<td>****!</td>
</tr>
<tr>
<td>/gadaba+RED/</td>
<td>***</td>
</tr>
<tr>
<td>(ga)(da)(ba)(da)</td>
<td>***</td>
</tr>
<tr>
<td>(ga)(da)(ba)(da)(da)</td>
<td>****!</td>
</tr>
</tbody>
</table>

Span Theory does not have the problem of affix position:

<table>
<thead>
<tr>
<th>*A-Span(nasal) and affix position</th>
<th>A-Span(nasal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ka)-(ma)(pa)(ta)</td>
<td>***</td>
</tr>
<tr>
<td>(ma)(pa)(ta)-(ka)</td>
<td>***</td>
</tr>
<tr>
<td>(ka)-(ga)(da)(ba)</td>
<td>***</td>
</tr>
<tr>
<td>(ga)(da)(ba)-(ka)</td>
<td>***</td>
</tr>
</tbody>
</table>
Span Theory does not have a problem with stress shift. *A-SPAN(nasal) and NONFINALITY determine whether stress falls on the penult or the ultima, but their effect is the same regardless of whether there is a preceding nasal or oral span.

<table>
<thead>
<tr>
<th>FTHdS普通话(nasal)</th>
<th>*A-SPAN(nasal)</th>
<th>NONFINALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>/mawata/</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>(mawatá)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ma(wá)ta)</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(mawá(ta)</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>/gawata/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(gawatá)</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>(ga(wá)ta)</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(gawá(ta)</td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

**Conclusion**

Span Theory is an interesting (and ingenious) attempt to solve the too-many-solutions problem in autosegmental spreading. The challenge now is to get the effects of Span Theory without [-nasal].
II Voicing (mainly based on Lombardi 1999; Wetzels and Mascaro 2001)

Questions: we will discuss.
1) What is the typology of devoicing and voice assimilation?
2) Do we have [+voice], or do we have Voice?

(1) A typology of σ-Final Devoicing

<table>
<thead>
<tr>
<th>contrast</th>
<th>word-final</th>
<th>word-internal</th>
<th>assimilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. German</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>ei[z]ig</td>
<td>‘icy’</td>
<td>Ei[s]</td>
<td>‘ice’</td>
</tr>
<tr>
<td>wei[s]er</td>
<td>‘whiter’</td>
<td>wei[s]</td>
<td>‘white’</td>
</tr>
<tr>
<td>II. Yiddish</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>ge[z]unt</td>
<td>‘healthy’</td>
<td>hoy[z]</td>
<td>‘house’</td>
</tr>
<tr>
<td>be[s]er</td>
<td>‘better’</td>
<td>zi[s]</td>
<td>‘sweet’</td>
</tr>
<tr>
<td>III. Dutch</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>ij[z]ig</td>
<td>‘icy’</td>
<td>ij[s]</td>
<td>‘ice’</td>
</tr>
<tr>
<td>IV. Berber</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>ak”zar</td>
<td>‘fig’</td>
<td>igmz</td>
<td>‘cap’</td>
</tr>
<tr>
<td>aksar</td>
<td>‘slope’</td>
<td>iswi</td>
<td>‘excrement’</td>
</tr>
</tbody>
</table>

(2) A typology of Word-final devoicing

<table>
<thead>
<tr>
<th>contrast</th>
<th>word-final devoicing</th>
<th>assimilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>?</td>
<td>yes</td>
</tr>
<tr>
<td>IIa. Serbo-Croatian</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>vo[z]</td>
<td>‘train’</td>
<td>bo[g]</td>
</tr>
<tr>
<td>pa[s]</td>
<td>‘dog’</td>
<td></td>
</tr>
<tr>
<td>IIb. Ukrainian</td>
<td>no</td>
<td>yes (only [+voice])</td>
</tr>
<tr>
<td>lo[b]</td>
<td>‘forehead’</td>
<td>sa[d</td>
</tr>
<tr>
<td>sni[p]</td>
<td>‘our’</td>
<td></td>
</tr>
<tr>
<td>III. Russian</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>[s]n’at</td>
<td>‘take away’</td>
<td>kl[u]ba</td>
</tr>
<tr>
<td>IV. Berber</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>ak”[z]ar</td>
<td>‘fig’</td>
<td>igm[z]</td>
</tr>
<tr>
<td>aks[ar]</td>
<td>‘slope’</td>
<td>ra[d]sun</td>
</tr>
</tbody>
</table>

(3) The constraints in Lombardi (1999):
   a. IDENTONSET(VOICE)
   Consonants that are tautosyllabic with a following sonorant segment should be faithful to an underlying voice specification.
   b. IDENT(VOICE)
   Consonants should be faithful to an underlying voice specification.
   c. #VO
   Do not have voice features
d. AGREE  
Obstruent clusters should agree in voicing

(4) Exemplification

<table>
<thead>
<tr>
<th>Obstruent Cluster</th>
<th>AGREE</th>
<th>IDONSVO</th>
<th>*VO</th>
<th>IdVO</th>
</tr>
</thead>
<tbody>
<tr>
<td>tas+laz+dat</td>
<td></td>
<td>**</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>tas+laz+tat</td>
<td>*!</td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>taz+laz+dad</td>
<td></td>
<td>***!</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>tas+laz+dat</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

(5) Typology with ranked constraints

a. AGREE, IDONSVO » *VO » IdVO. Assimilation, σ-final devoicing (Dutch)

b. IDONSVO, IdVO » *VO, AGREE. No assimilation, voice faithfulness (Eng.)

c. IDONSVO » *VO » IdVO, AGREE. σ-Final devoicing, no assimilation (German)

d. *VO » IdONSVO, IdVO, AGREE. Only voiceless obstruents (Hawaiian)

e. IDONSVO, AGREE » IdVO » *VO. Assimilation, no devoicing (Yiddish)

f. AGREE (»), IdVO » *VO » IdONSVO. Bi-directional assimilation of voicelessness (Swedish).

(6) Wetzels and Mascaro ask the following question. Are there languages that devoice obstruents in word-internal codas but maintain a [voice] contrast word-finally? According to Lombardi (1991), Yiddish, Rumanian and Serbo-Croatian are such languages. According to Wetzels and Mascaro this interpretation is not correct. These authors claim that languages of this type have word-internal [-voice] assimilation that cannot be analyzed as cluster devoicing or as syllable-final devoicing.

(7) To account for languages that have word-internal devoicing in coda position (so only word-internal σ-Final devoicing) Lombardi (1991) postulates Final Exceptionality. It entails that, in word-final position a laryngeal feature IS licensed. At this stage, then, Lombardi had the following theory:

Voice Constraint  
σ

Final Exceptionality  
Lar[w]
(8) Yiddish does not have word-final devoicing

<table>
<thead>
<tr>
<th>Yiddish Character</th>
<th>Meaning</th>
<th>Yiddish Character</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>kop</td>
<td>‘head’</td>
<td>fraib</td>
<td>‘I write’</td>
</tr>
<tr>
<td>vajt</td>
<td>‘far’</td>
<td>red</td>
<td>‘I speak’</td>
</tr>
<tr>
<td>bak</td>
<td>‘cheek’</td>
<td>vog</td>
<td>‘weight’</td>
</tr>
<tr>
<td>af</td>
<td>‘(up)on’</td>
<td>briv</td>
<td>‘letter’</td>
</tr>
<tr>
<td>zis</td>
<td>‘sweet’</td>
<td>ajz</td>
<td>‘ice’</td>
</tr>
<tr>
<td>raj</td>
<td>‘noise’</td>
<td>janta3</td>
<td>‘blackmail’</td>
</tr>
</tbody>
</table>

(9) Regressive voice assimilation in Yiddish

Devoicing

\[
\begin{align*}
/\text{fraib}+st/ & \rightarrow /\text{fraipst}/ \quad \text{‘you write’} \\
/\text{briv}+tregor/ & \rightarrow /\text{briftregor}/ \quad \text{‘mailman’} \\
/\text{janta3}+\text{tik}/ & \rightarrow /\text{janta3frik}/ \quad \text{‘blackmailing tactics’} \\
/\text{ajz}+\text{kastn}/ & \rightarrow /\text{ajskastn}/ \quad \text{‘ice box’} \\
/\text{vog}+\text{fol}/ & \rightarrow /\text{vokfol}/ \quad \text{‘scale’} \\
\end{align*}
\]

Voicing

\[
\begin{align*}
/\text{kop}+\text{vejtik}/ & \rightarrow /\text{kobvejtik}/ \quad \text{‘headache’} \\
/\text{bak}+\text{bejn}/ & \rightarrow /\text{bagbejn}/ \quad \text{‘cheekbone’} \\
/\text{vajt}+\text{zevdiik}/ & \rightarrow /\text{vaidzevdiik}/ \quad \text{‘farsighted’} \\
/\text{zis}+\text{varg}/ & \rightarrow /\text{zizvarg}/ \quad \text{‘candy’} \\
\end{align*}
\]

(10) no devoicing before sonorants in Yiddish

<table>
<thead>
<tr>
<th>Yiddish Character</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nud+nik</td>
<td>‘boring person’</td>
</tr>
<tr>
<td>tjob+le$\chi$</td>
<td>‘somewhat deaf’</td>
</tr>
<tr>
<td>ntd+nik</td>
<td>‘the (male) bore’</td>
</tr>
<tr>
<td>ntd+nitsi</td>
<td>‘the (female) bore’</td>
</tr>
<tr>
<td>m$\theta \mathfrak{l}'$</td>
<td>‘ruler-SG’</td>
</tr>
<tr>
<td>m$\theta \mathfrak{l}+im$</td>
<td>‘ruler-PL’</td>
</tr>
<tr>
<td>ken'</td>
<td>‘against’</td>
</tr>
<tr>
<td>ken'+$\mathfrak{e}r$</td>
<td>‘opponent’</td>
</tr>
<tr>
<td>redn'</td>
<td>‘speak’</td>
</tr>
<tr>
<td>redn'+$\mathfrak{e}r$</td>
<td>‘speaker’</td>
</tr>
</tbody>
</table>

(11) For Wetzels and Mascaro the fact that there is no devoicing before sonorants (and that there is a voicing contrast before sonorants) is a problem for Lombardi. The answer is this question: a problem for which Lombardi? It surely IS a problem for the Licensing theory as formulated in (7). But is it also a problem for the OT-theory, as formulated in (5)? We do not think so.
(12) Serbo-Croatian repeats Yiddish

- glu[p] ‘stupid’
- golu[b] ‘dove’
- sa[t] ‘hour’
- ra[d] ‘work’
- preta[k] ‘Friday’
- razlo[g] ‘reason’
- pa[s] ‘dog’
- vo[z] ‘train’
- jo[f] ‘still’
- mu[3] ‘husband’

(13) Regressive devoicing

- sla/d/ak ‘sweet’
- sla[t]ka ‘sweet-FEM’
- dolo/z/ak ‘arrival’
- dola[sk]a ‘arrival-GEN’
- te/j/ak ‘heavy’
- te[j]ka ‘heavy-FEM’

(14) Regressive voicing

- ne/k/ad ‘or’
- ne[gd]a ‘sometimes’
- to/p/ ‘cannon’
- to[bd]ija ‘artillery man’
- sva/t/ ‘wedding attendant’
- sva[db]a ‘wedding’

(15) Contrast before sonorants

- pa[ʒ+n]+a ‘attention’
- drža[v+n]ik ‘statesman’
- dana[ʃ+n]+I ‘pertaining to today’
- lje[t+n]+ik ‘doctor’

(16) According to Wetzels and Mascaro there is independent evidence for [-voice]. Crucial data come from Bakairi.

(17) Distribution of [voice] in Bakairi

```
<table>
<thead>
<tr>
<th>+</th>
<th>-</th>
<th>+</th>
<th>-</th>
<th>+</th>
<th>-</th>
<th>+</th>
<th>-</th>
</tr>
</thead>
</table>
/tɛzekdɔ/  ‘bench’
/pɛkdɔ/  ‘woman’
/pazikan/  ‘ant eater’
```

(18) Unattested Grammatical

- i. - - - - + +
- ii. + + - + + +
- iii. + - - + +
- iv. + - - + + or + -

(19) ‘The general pattern of voicing is the following: word-initially, only voiceless obstruents can appear; in other positions, i.e. intervocally, only voiced obstruents occur, except for one single position, where obstruents may appear as voiceless. This position can be the first or the second intervocalic position in root initial words …, or the first or second position counting from the left edge of the root’.
III Prevoicing (based on Operstein to appear)

This section of the course presents a typology of prevocalization triggered by coronal consonants.

My claim is that prevocalization is an instance of Licensing. In a certain position it can happen that Cor is not licensed. If that is the case it can spread to a position where it IS licensed. The general scheme of prevocalization is as follows:

```
F     Cor
```

\[ V \quad S \]

A Palatalized consonants

(1) Djabugay; the prevowel is triggered by the palatal nasal;

- **dunyu** [duŋu] ‘husband’
- **burrany** [burraŋ] ‘fly-PAST’
- **guniny** [guniŋ] ‘cut-PAST’

(2) Quiavini Zapotec; prevowel before /ɲ/ in coda

- **telebisyoony** [telebisjoŋ] ‘television’
- **x-telebisyoony-a** [ĩtelebisjoŋa] ‘my television’

(3) Maxakalí

a) Prevocalized allophones before nonhomorganic consonants or utterance-finally

- **/p/** /nutcip/ [nuŋtʃip] ‘full of’
- **/m/** /milhim/ [mɪlɪm] ‘wood’
- **/t/** /tapet/ [tæpɛt] ‘paper’
- **/n/** /tômæn/ [ tômæn] ‘tomato’
- **/c/** /-cecka/ [jeʃka] ‘big’
- **/p/** /mäʔäŋ/ [mäʔäŋ] ‘alligator’
- **/k/** /tihik/ [tihiʃk] ‘man’
- **/ŋ/** /ɲümäŋ toc/ [ɲümäŋʃkojc] ‘long handle’

b) Vocalic allophones before homorganic consonants

- **/p/** /-keppa/ [keppa] ‘before’
- **/m/** /mim pe/ [mimpe] ‘bed’
- **/t/** /mattuk/ [mbaatux] ‘toad’
- **/n/** /kômän nôʔôm/ [kÔmâŋ nôʔôm] ‘another co-godmother’
- **/c/** /coc cecka/ [joʃəjkaʔ] ‘big tooth’
- **/p/** /mäʔäŋ cecka/ [mäʔäŋʃekoʃka] ‘large alligator’
- **/k/** /kućakkuk/ [kuʃaukurux] ‘capybara’
- **/ŋ/** /puttucnän kuttut/ [putturɨʃnâtû k-] ‘old bird’
(4) Krajna Polish; prepalatalization in nasal-stop sequence

hańba /xańba/ [xājmba] ‘shame’
bańka /bańka/ [bāŋka] ‘jar’
słońce /swońce/ [swońce] ‘sun’

(5) Developments in Balkan Romance

*scupio > scuip
'habeat > *abja > aibă
d'ffamiam > deffaimă
'coefeam > coif

(6) Daco-Romanian

ij căine ‘dog’
pâine ‘bread’
mâini ‘hands’
aj cănaire ‘road’
cântaire ‘singing’
grainită ‘border’
ej ureiș (= ureche) ‘ear’
oj oîl (=ochi) ‘eyes’
uj minuine ‘marvel’
păduire ‘woods’
genuiche ‘knee’

(7) Developments in French

a) coronals and consonant groups ending in coronals before a palatal glide

potionem > poison ‘poison’
palatium > palais ‘palace’
mansionem > maison ‘house’
*grassiam > graisse ‘fat’
medietatem > moitié ‘half’
corium > cuir ‘leather’
*coprium > cuivre ‘copper’
ebriu > *ieivre > ivre ‘drunk’
ostrem > uistre > huître ‘oyster’

b) palatal /n,ń/ generally prepalatalize when word-final or preconsonantal

consilium > conseil ‘advice’
balneum > bain ‘bath’
nuntium > noinz ‘messenger’
(7') From Old French to Modern French
lj > jl apostolje > apostoile ‘apostle’
oleum > huile ‘oil’
nj > jn Antoniu > Antoine a man’s name
rj > jr memorje > memoire ‘memory’
fj > jf graphiu > graife ‘graft’

(8) Occitan
bāsiāre > baisa ‘kiss’
*ecclesiam > glèiso ‘church’
*bassiare > baissar ‘lower’
*angustian > angoissa ??

(9) Eastern Provençal; palatalized consonants are optionally prepalatalized
[pun¹j] ~ [pu¹n] ‘fist’
[seri¹e'd¹ɔ] ~ [seri¹e'd¹ɔ] ‘cherry’

(10) Archaic Ligurian
riparia > rivaira ‘torrent’
basiu > baiʒu ‘kiss’
ceresea > çereiʒa ‘cherry’
Ambrosiu > Ambröiʒu (a man’s name)
palatiu > paraiʒu ‘palace’
pretiu > preiʒu ‘price’
ad quasi > ascaiʒi ‘almost’
basilikón > baįzaricò ‘church’
heri > *eiɾi > ɾiɛɾi ‘yesterday’ (initial i- through the influence of Italian)
pacem > paiʒe ‘peace’
dece > deiʒe ‘ten’
vocem > vuʒe ~ vuʒe ‘voice’
cruce > cruʒe ~ cruʒe ‘cross’

(11) Developments from Vulgar Latin to Portuguese
primarium > primeiro ‘first’
sapiam > saiba ‘that I know’
rubeum > ruivo ‘red-haired’
calumniam > coima ‘fine’
pluviam > chuiva ‘rain’
cuphiam > coifa ‘cap’

(12) Popular and dialectal Portuguese
daemoniu > demónio > demoino ‘devil’
memoria > memória > memoira ‘memory’
historia > história > historia ‘history’
Timotheu > Timóteo > Temóito a man’s name
(13) Welsh
*brani > brein
*allos > eil
Ambrosius > Emreis
*mabion > meibion
*odion > eidion
*pencerðjeid > pencerðjeid

(14) Breton
*alios > eil ‘other’
*talio > teil ‘dung’
*sasio > heiz ‘barley’

(15) Old Avestan
**aniti > *oni’ti > ōnɔ’ti ‘immobility (?)’
**āskti > *āsk∂ti > āskɔ’ti ‘escort’
**dbi > *dəbi > *dabi > daib

(16) Athens-Piraeus
κουταλάκι [kuta'la:ci] ‘tea-spoon’
Τάκης [ta'cis] ‘Takes’ (proper name)
θέλω να κοιμηθω [θelo na'cimi'tho] ‘I want to go to bed’
σοκάκι [so'ka:ci] ‘alley’ (Turkish sokak ‘street’)
φαλάγγι [fa'la:ji] ‘tarantula’

(17) Guelavía Zapotec; word final glides /j/ and /w/ cause prepalatalization and prelabialization (this will be the only case of labial prevocalization we will consider).
/dzinj/ [dzi:inj] ‘honey’
/bekw/ [be'euw] ‘dog’

(18) Sorowahá; prepalatalized pronunciations of consonants before rising diphthongs.
/adiei/ [a'a'de'i] a woman’s name
/ania/ [a'a'n'a] a man’s name
/uniaua/ [u'u'n'awá] a woman’s name

(19) Uradhi
/akjun/ [æ'kjun] ‘camp’
/akwaŋumu [a'kwaŋumʊŋ] ‘dingo’

(20) Germanic ‘Umlaut’ (!)
**sattjan > *saetjan > OE settan ‘set’
**fulljan > *fylljan > OE fyllan ‘fill’
**dohtri > *doehtri > OE dehter ‘daughter’
B Palatals

Palatals proper:  [ɬ], [ʃ]
Palatoalveolars:  [tʃ], [dʒ], [ʃ], [ʒ]
Alveopalatals:  [c], [ʃ], [ɲ], [ʎ], [tʃ], [dʒ], [ɕ], [ʑ]

(21) Catalan
/tronc/  [ˈtroŋ̚]  ‘log’  →  [ˈtroɲ̌ns]  ‘logs’
/aɲ/  [ˈaɲ̚]  ‘year’  →  [ˈaɲ̌ns]  ‘years’

(22) European Portuguese
malha  [ˈmaʎɔ]  ~  [ˈmaʎɔ]  ‘mesh’
caixa  [ˈkaʃɔ]  ~  [ˈkaʃɔ]  ‘box’
loja  [ˈloja]  ~  [ˈloʃɔ]  ‘boutique’
unha  [ˈuɲɔ]  ~  [ˈuɲɔ]  ‘(finger)nail’
longe  [lɔʒɔ]  ~  [lɔʃɔ]  ‘far’

(23) English borrowings in Welsh
orange  orains
cabbage  cabaitsch
cage  caets
branch  braens
brush  brwiss
varnish  bernais

(24) Afrikaans
groot  [xɾoːt]  ‘large’  grootje  [xɾoːci]
voet  [fuːt]  ‘foot’  voetje  [fuːci]
munt  [mœnt]  ‘coin’  muntje  [mœnci]

(25) Ngeq
/luos/  ‘to release’  [luɔʃ]  
/buaɲ/  ‘to heap up’  [buɛɲ]  
/biac/  ‘to be poor’  [bieʃ]

(26) Texmelucan Zapotec
/lac/  [laɭʃ]  ‘flat’
/laj/  [laʃ]  ‘liver’
/naj/  [nəʃ]  ‘inside’
/mbaɭa/  [mbaʃa]  ‘my compadre’
(27) Ngalkbun
/bojeŋ/ [bɔjeŋ] ‘big’
/macun/ [ma'cun] ‘carpet snake’
/kocno/ [kɔcno] ‘his head’
/nakomtuc/ [nəkɔmətɔc] ‘little boy’

B Alveolars

(28) Sardinian /l/-prevocalization
/'kulpa/ ['ku'lpa] ‘fault’
/'alva/ ['a'lva] ‘beard’
/'maltʃu/ ['ma'ltʃu] ‘male’

(29) Swiss German /r/-prevocalization
wehren [ve'rə] ‘forbid’
sperren [[pe'rə] ‘obstruct’

(30) /s/-prevocalization in Ngeq
/luas/ [luəh] ‘to release’

(31) Standard vs Kedah Malay
balas balajh ‘finish’
bagos bagojh ‘good’
habes habejh ‘to finish’
IV Length (Mainly based on Kraehenman 2003)

In this section we will discuss the issue of consonantal length (geminates); its distribution and its representation.

(1) Representations of geminate consonants

<table>
<thead>
<tr>
<th>moraic theory</th>
<th>root node theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \mu )</td>
<td>( C )</td>
</tr>
<tr>
<td>( \eta )</td>
<td>( C )</td>
</tr>
</tbody>
</table>

(2) It is generally agreed on that geminates have a relatively restricted distribution. This is explained by both representations above. But the two theories make different predictions as to exactly where geminates can possibly occur. Here we will study a particularly difficult case, the geminates of Thurgovian.

(3) Where do geminates occur in Thurgovian? Where do they contrast with singletons?

Initial stops in \( \dot{\sigma} \sigma \)

<table>
<thead>
<tr>
<th></th>
<th>/pp/omfrit</th>
<th>‘French fries’</th>
<th>/p/ohne</th>
<th>‘bean’</th>
</tr>
</thead>
<tbody>
<tr>
<td>ol</td>
<td>/p/ohne</td>
<td>‘bean’</td>
<td>/p/ohne</td>
<td>‘bean’</td>
</tr>
<tr>
<td>V</td>
<td>/tt/urte</td>
<td>‘layer cake’</td>
<td>/t/otter</td>
<td>‘egg yolk’</td>
</tr>
<tr>
<td>V:</td>
<td>__</td>
<td>--</td>
<td>/p/ohne</td>
<td>‘bean’</td>
</tr>
<tr>
<td>S</td>
<td>/tt/rube</td>
<td>‘grape’</td>
<td>/t/raschee</td>
<td>‘dragée’</td>
</tr>
</tbody>
</table>

Medial stops in \( \dot{\sigma} \sigma \)

<table>
<thead>
<tr>
<th>V</th>
<th>Su/pp/e</th>
<th>‘soup’</th>
<th>Stu/p/e</th>
<th>‘living room’</th>
</tr>
</thead>
<tbody>
<tr>
<td>V:</td>
<td>huu/pp/ä</td>
<td>‘to honk’</td>
<td>Huu/p/e</td>
<td>‘hood’</td>
</tr>
<tr>
<td>S</td>
<td>Tol/kk/e</td>
<td>‘smudge’</td>
<td>fol/k/ä</td>
<td>‘to obey’</td>
</tr>
<tr>
<td>C</td>
<td>Hoo/kk/e</td>
<td>‘hook’</td>
<td>Ves/p/er</td>
<td>‘vespers’</td>
</tr>
<tr>
<td>V:</td>
<td>__</td>
<td>--</td>
<td>Bo/k/e</td>
<td>‘bow’</td>
</tr>
<tr>
<td>S</td>
<td>ra/ss/le</td>
<td>‘to rattle’</td>
<td>Ha/s/li</td>
<td>‘a place name’</td>
</tr>
</tbody>
</table>

Final stops in \( \dot{\sigma} \)

<table>
<thead>
<tr>
<th>V</th>
<th>schla/pp/</th>
<th>‘limp’</th>
<th>--</th>
</tr>
</thead>
<tbody>
<tr>
<td>V:</td>
<td>Taa/tt/</td>
<td>‘deed’</td>
<td>Raa/t/</td>
</tr>
<tr>
<td>S</td>
<td>al/tt/</td>
<td>‘old’</td>
<td>Wal/t/</td>
</tr>
<tr>
<td>C</td>
<td>__</td>
<td>Ab/t/</td>
<td>‘abbot’</td>
</tr>
<tr>
<td>3</td>
<td>schla/pp/</td>
<td>-</td>
<td>Raa/p/</td>
</tr>
</tbody>
</table>

(4) Following Kraehenmann:
Medial stops
Intersonorant contexts: contrast maintenance, not only after a non-branching nucleus, but also after a branching nucleus.
Final stops
Word-final consonants at the phrase boundary maintain the length contrast after a non-branching nucleus, as well as after a branching nucleus.

Initial stops
Word-initial stops main the quantity contrast at phrase boundary.

(5) In Kraehenmann’s approach this distributions is explained in a theory of the syllable that does not recognize moras.
- It recognizes N, O, R, C, σ;
- It states that R cannot branch at both levels;
- It postulates an ‘appendix’ at phrase level;
- It states that obstruents are not allowed in nuclear position; only sonorants are allowed in that position.

(6) A geminate consonant after a short vowel (a non-branching nucleus):

\[
\sigma \\
R \\
N \ C \\
X \ X \ X \\
\mid \\
V \ C \ \{\omega \ \rho\}
\]

(7) A geminate consonant after a long vowel (a branching nucleus):

\[
\omega \\
\sigma \\
R \\
N \ C \\
X \ X \ X \ X \\
\mid \\
V \ C \ \{\omega \ \rho\}
\]
(8) Stress in Thurgovian is QS.
a. Stress in trisyllabic words:
[á na nas] ‘pineapple’
[pí ja ma] ‘pyjamas’
[é s kxi mo] ‘Eskimo’

[ha lóó tri] ‘rogue’
[a róó ma] ‘aroma’
[a tóó nis] ‘handsome man’

[kxo má n to] ‘command’
[fe rá n ta] ‘veranda’
[a kén ta] ‘agenda’

[kxá nap pe] ‘sofa’
[né kat tif] ‘negative’
[má rat ton] ‘marathon’
[mó nit tor] ‘monitor’
[kxó mit t e] ‘committee’
[kxá rus sel] ‘merry-go-round’
[mó kxas sin] ‘mocassin’
[hop sass a] ‘up we go’

(9) We now really, really would like to know where the stress is in words in which the medial syllable is closed by an obstruent, followed by a non-homorganic obstruent (in the onset). Unfortunately, no forms of this structure are in Kraehenmann’s book!!