Phonological feature domains and the content of epenthetic vowels
(An argument for representations)

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GLOW Conference on Features v

Overview of this talk
• The interaction between vowel epenthesis and vowel harmony and umlaut
• Dominant/recessive vowel harmony vs. root control
• Some problems for accounts without a worked-out theory of representations
• A theory of segmental integrity
• An extension of the theory to certain derived environment effects

Icelandic u-umlaut

(1) barn `child-ACC SG.' börn-um `child-DAT PL.'
dag `day-ACC SG.' dög-um `day-DAT PL.'
vatn `water-ACC SG.' vötn-um `wate-DAT PL.r'
tala `I speak' töl-um `we speak'
baka `I bake'bök-um `we bake'
kaldal `cold-ACC SG. MASC.' köld-um `cold-DAT.SG.MASC.'

(2) dag-ur `day-NOM SG.'
(/dag/+r/) snarp-ur `rough-MASC NOM SG.'
(/snarp/+r/) (3) b a r n u m
\ | [-back]
[+round] Winnebago (Dorsey’s Law)

(4) xorojike `hollow’
hojisana `recently’
hirupini `twist’
maašarac `you promise’

Turkish: vowel harmony (front harmony)

(5) nom.sg. gen.sg. nom.pl.
   ev ev-in ev-ler `house’
   ip ip-in ip-ler `rope’
   klz klz-in klz-lar `girl’
   para para-nIn para-lar `money’
eski `old'
inci `pearl'
ince `thin'
balık `fish'
Ilık `tepid'

Turkish: exceptions to vowel harmony

hangi `which'
miras `inherit'
orkinos `tunny fish'
fiskos `gossip'
billur `crystal'
zaruri `necessary'

Turkish epenthetic vowel: exception to the exception

*pIrIngi
*pIrIs
pirens `prince’
sehir `arrow’ (/sehr/)
tIransit `transit’
ogul `son’ (/ogl/)

Typology of vowel harmony systems

(9) a. Dominant/recessive vowel harmony

<table>
<thead>
<tr>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>x2</td>
<td>x3</td>
</tr>
</tbody>
</table>

(10) b. Root-controlled Vowel Harmony

<table>
<thead>
<tr>
<th>F1</th>
<th>F2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>x2</td>
<td>x3</td>
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</tbody>
</table>

Turkish vowel harmony

rope PL Six NOM PL (=hexagonals)

girl PL Eight NOM PL (=octogonals)

Non-existent languages

- Languages with affix-controlled vowel-harmony

Turkish*

rope PL Six NOM PL (=hexagonals)

girl PL Eight NOM PL (=octogonals)
Languages in which the epenthetic vowel is the only one not to undergo vowel harmony. (In such a language there would be e.g. two [y]'s, one underlying, the other epenthetic. The underlying /y/ would be subject to harmony/umlaut, whereas the epenthetic vowel would not be sensitive to it)

Icelandic*

(13) barn `child-ACC SG.'
    barn-[u]m `child-DAT PL.'
    barn-[y]r `child-NOM SG.'
    (/barn/+t/)

deg `day-ACC SG.'
    deg-ym `day-DAT PL.'
    deg-[y]r `day-NOM SG.'
    (/deg/+t/)

Problems: rule-based accounts

- It is not clear how the restriction of ‘root-control’ should be implemented
- Icelandic is a classic case of opacity. There are two rules (UMLAUT and EPENTHESES). If they are applied in this order we get Icelandic. But since we have no way to distinguish between target and trigger in the rule, we could also get Icelandic*.

Problems: constraint-based accounts (correspondence theory)

- It is still unclear how ‘root-control’ should be described. Simple cases such as ip-ler could be described by a ranking Faithful(root)>>Faithful(affix). But this ranking is stipulatory and furthermore still does not explain the more complex cases of altI-gen-ler, etc

(14) Factorial typology:

<table>
<thead>
<tr>
<th>Rule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident(root), Ident(affix) &gt;&gt; Harmony</td>
<td>No harmony</td>
</tr>
<tr>
<td>Ident(root)&gt;&gt;Harmony&gt;&gt;Ident(affix)</td>
<td>(Almost) root-controlled harmony</td>
</tr>
<tr>
<td>Harmony &gt;&gt; Ident(root), Ident(affix)</td>
<td>Dominant/recessive harmony</td>
</tr>
<tr>
<td>Ident(affix)&gt;&gt;Harmony&gt;&gt;Ident (root)</td>
<td>(Almost) affix-controlled harmony; blocked by stipulation.</td>
</tr>
</tbody>
</table>

- Since Icelandic u-umlaut is a case of opacity, it is problematic for ‘classical OT’. This problem may have been solved with the introduction of Sympathy theory (Karvonen and Sherman 1997)

(15)

a. SONCON Complex onsets rise in sonority, complex codas fall in sonority.

REALIZE-M For every morpheme in the input, the output must contain at least one segment of that morpheme.

IDENT- O Corresponding segments in ⊗ candidate and output must have corresponding feature values.

DEP- IO Every segment in the output must be present in the input

ANCHOR-R Any segment at the right edge of the input has a correspondent at the right edge of the output.

MAX- IO Every segment in the input must be present in the output

UMLAUT *[a C0 + C0 y]

IDENT Corresponding segments in input and output must have corresponding feature values.
In a theory of correspondence that bases itself on the segment (that works with featural identity) we predict the non-existence of Icelandic*. This theory is not uncontroversial however. If we were to allow MAX and DEP constraints for individual features, Icelandic* would again become a possibility, just as it is in rule-based theory.

However, identity-based correspondence theory faces problems of its own. Why isn’t every language like Winnebago, if the only force blocking feature spreading is faithfulness? (As soon as an independent force is discovered, the problem of Icelandic* may arise again.)

### A theory of morphological domains for segments

(16)  

<table>
<thead>
<tr>
<th></th>
<th>Integrity</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>a root node may not dominate features outside its morphological domain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>The morphological domain of a segment (root node) S is</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. the morpheme, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. the smallest word, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. the largest word to which S belongs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(17)  

\[
[[[a,l,t,l] g ee p_j] \quad l e i r_k]
\]

\[
i \quad j \quad k
\]

(18)  

<table>
<thead>
<tr>
<th>Candidates</th>
<th>INTEGRITY</th>
<th>HARMONY</th>
</tr>
</thead>
<tbody>
<tr>
<td>[[altI] gen] ler</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>[[[altI] gen] ler</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

(19)  

| Harmony >> Integrity, Faith | Dominant/Recessive VH |
| Faith >> Harmony (Integrity) | No harmony |
| Integrity >> Harmony >> Faith | Root controlled VH |

In a parameter model, we may say that Integrity is switched on (root control) or off (dominant/recessive)
**Epenthetic vowels have no morphological domain; epenthetic material is outside of any domain**

(20) 

<table>
<thead>
<tr>
<th>/barn/+/um/</th>
<th>INTEGRITY</th>
<th>UMLAUT</th>
<th>FAITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>barnum</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>börmun</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(21) 

<table>
<thead>
<tr>
<th>/dag/+/r/</th>
<th>INTEGRITY</th>
<th>UMLAUT</th>
<th>FAITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>dögrur</td>
<td>!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dögrur</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(22) HARMONY >> INTEGRITY, FAITH  
All vowels trigger harmony  
FAITH >> HARMONY (INTEGRITY)  
No vowels trigger harmony  
INTEGRITY >> HARMONY >> FAITH  
Only underlying vowels trigger harmony

**Strict cyclicity effects**

(23) **Strict Integrity (SI):**  
A segment may only dominate features that are strictly within its domain.  
A feature F is strictly within the domain of a segment S, if the domain of F is D1 and the domain of S is D2 and D2 is larger than D1.

(24) Winnebago

<table>
<thead>
<tr>
<th>/xrojike/</th>
<th>SI</th>
<th>HARMONY</th>
<th>FAITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>xorojike</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>xorojek</td>
<td>!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xerojike</td>
<td>!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

(25) 

<table>
<thead>
<tr>
<th>/hangi/</th>
<th>SI</th>
<th>HARMONY</th>
</tr>
</thead>
<tbody>
<tr>
<td>hangi</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>hengi</td>
<td>!</td>
<td></td>
</tr>
</tbody>
</table>

(26) 

<table>
<thead>
<tr>
<th>/prens/</th>
<th>SI</th>
<th>HARMONY</th>
</tr>
</thead>
<tbody>
<tr>
<td>pirens</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>plrens</td>
<td></td>
<td>!</td>
</tr>
</tbody>
</table>

(27) 

<table>
<thead>
<tr>
<th>/kedi/</th>
<th>KEEP-ASSOCIATION</th>
<th>SI</th>
<th>HARMONY</th>
</tr>
</thead>
<tbody>
<tr>
<td>kedi</td>
<td></td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>kedi</td>
<td></td>
<td>!</td>
<td></td>
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</tbody>
</table>