Context

Yoruba (Atlantic–Congo) vowels display categorical correspondence for RTR/ATR across the phonological word (1).


<table>
<thead>
<tr>
<th>ATR</th>
<th>RTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>i</td>
</tr>
<tr>
<td>mid</td>
<td>e</td>
</tr>
</tbody>
</table>

Yoruba displays a clear relationship between inventory shape and neutral harmony.

(2) Yoruba non-low vowel inventories

<table>
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<td>high</td>
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</tr>
</tbody>
</table>

(a) Ekiti Yoruba

(b) Standard / Ò̀fì Yoruba

(3) Yoruba cross-dialectal variation in high vowel harmony

Ekiti Ò̀fì Standard Yoruba

<table>
<thead>
<tr>
<th>ATR</th>
<th>RTR</th>
</tr>
</thead>
</table>
| eβitē eβitē eβitē | ‘harbor’
| eβurō eβurō eβurō | ‘bitter-leaf’
| œ̀rîk2 œ̀rîk2 œ̀rîk2 | ‘name’
| ilûb2 ilûb2 ilûb2 | ‘yam flour’

What motivates and constrains variation in neutral harmony?

Modified Contrastive Specification

MCS (Dresher, Piggott & Rice 1994; Dresher 2003, 2009, 2013)

- Distinctive features and sounds are categorized hierarchically and the feature ordering is cross-linguistically variable
  - features have different scopes/domains in different languages
- Contrastivist Hypothesis (Hall 2007): phonological activity is limited by feature scope

(4) Ò̀fì and Standard Yoruba contrastive feature hierarchies

```
[+high]   [+RTR]   [+RTR]
|  i      |  u      |  i      |
[−high]   [−RTR]   [−RTR]
|  i      |  u      |  o      |
```

(high) > [RTR]

Alternate feature orderings of [RTR] and [high] produce different feature specifications on /i, u/

Motivating either blocking (Standard) or transparent skipping (Ò̀fì Yoruba).

(5) Ò̀fì and Standard Yoruba contrastive feature specifications

```
<table>
<thead>
<tr>
<th>i, u</th>
<th>e, o</th>
<th>ø, ɔ</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+high]</td>
<td>−high</td>
<td>−high</td>
</tr>
<tr>
<td>−RTR</td>
<td>[+RTR]</td>
<td>−RTR</td>
</tr>
</tbody>
</table>
```

(a) Ò̀fì Yoruba

(b) Standard Yoruba

Problems for MCS

Binary contrastive feature hierarchies fail to account for more complex inventories

(6) Yoruba low /a/-/i/: harmonic (visible) across all Yoruba dialects

| ark | *ark | ‘crown’
| ipa | *ipà | ‘peanut’
| aho | *aho | ‘ruins’
| òyà | *òyà | ‘cheerfulness’

Asymmetries in high / low vowels result in asymmetric orthogonal feature specifications on harmonically paired mid vowels (7)

- results in incomplete/incorrect harmony outputs (8–9)

(7) Featurally incongruent harmony pairs in Standard Yoruba

<table>
<thead>
<tr>
<th>/i, u/</th>
<th>/c, ɔ/</th>
<th>/c, ɔ/</th>
<th>/a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+RTR]</td>
<td>−low</td>
<td>[+RTR]</td>
<td>−low</td>
</tr>
<tr>
<td>[−RTR]</td>
<td>[+low]</td>
<td>[−RTR]</td>
<td>[+low]</td>
</tr>
</tbody>
</table>

(8) MCS cannot distinguish hi/mid ATR and mid/lo RTR outputs

<table>
<thead>
<tr>
<th>ATR</th>
<th>RTR</th>
</tr>
</thead>
</table>
| eβi | *ibɔ | ‘heep of yams’
| epɔ | *ipe | ‘oil’
| ɔpɔ | *adɔ | ‘liver’

(9) Binary feature hierarchies fail to produce /e/→[ɛ] mapping in Yoruba

<table>
<thead>
<tr>
<th>/ɛ</th>
<th>/d/</th>
<th>/pà/</th>
</tr>
</thead>
<tbody>
<tr>
<td>[RTR]</td>
<td>[−RTR]</td>
<td>→ [+RTR]</td>
</tr>
<tr>
<td>[hi/lo]</td>
<td>[−high]</td>
<td>[−low]</td>
</tr>
<tr>
<td>[i*/à]</td>
<td>[dɔ]</td>
<td>[i*/à]</td>
</tr>
</tbody>
</table>

MCS method revisions

The harmony pairing problem is a predictable outcome of binary contrastive feature hierarchies

- privative features provide the correct results (10, 11)

(10) Privative MCS produces featurally congruent harmony pairs

<table>
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<th>/c, ɔ/</th>
<th>/a/</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+RTR]</td>
<td>−low</td>
<td>[+RTR]</td>
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</tr>
<tr>
<td>[−RTR]</td>
<td>[+low]</td>
<td>[−RTR]</td>
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</tr>
</tbody>
</table>

(11) Privative feature hierarchies produce correct /e/→[ɛ] mapping

<table>
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<tr>
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<th>/d/</th>
<th>/pà/</th>
</tr>
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</tr>
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<td>[−low]</td>
</tr>
<tr>
<td>[i*/à]</td>
<td>[dɔ]</td>
<td>[i*/à]</td>
</tr>
</tbody>
</table>

Summary

MCS applied to harmony systems:

- natural motivation for inventory asymmetry-driven neutral harmony
- an overall good typological fit
- allows for both economical representations and grammatical models
- produces featurally-incompatible harmony outputs

- privative contrastive feature hierarchies