Irreducible parallelism in phonological process interactions

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1. Research questions

Two big frameworks in backdrop: Parallel OT and HS (Prince & Smolensky 1993, McCarthy & Pater 2016).
- Parallel OT: multiple changes apply to input at once: full lookahead.
- HS: changes apply to input one at a time in fixed series: no lookahead.

GOAL 1: Elucidate conditions under which GEN must generate candidates differing from input in multiple respects (irreducible parallelism; McCarthy 2010).

GOAL 2: Provide broad, cross-domain support for irreducible parallelism.

2. Assimilation-epenthesis in Lithuanian (Baković 2005)

Verbal prefix [ap-] assimilates in palatality and voicing to the following obstruent:

(1a) ap-tarhi ‘to discuss’
(2a) ap-fi fern-di tii ‘to obscure’
(1b) ap-rafi ‘to describe’
(2b) ab-guat ‘to deceive’
(2c) ab-ar-deg-fi ‘to get burned’

Assimilation occurs unless it results in a geminate, in which case epenthesis takes place:

(3a) api-barfi ‘*ab-barfi’ ‘to spill on’
(3b) api-barfi ‘*ab-barfi’ ‘to strew’

P-OT can capture these data since it can compare entire outputs:

But HS fails to capture the generalization (Albright & Flemming 2013):

But HS cannot look ahead to Stage 2 to see whether NOGEM is violated.

- Ranking paradox between DEP and AGR — either we always get assimilation or we always get epenthesis.
- HS misses generalization that epenthesis applies only when two assimilations yield a geminate.
- Multiple assimilations must apply in same step so that they can be compared to epenthetic candidate.

Different analysis with Step 1 epenthesis driven by e.g. *pb/ fails to capture typological generalizations about anti-germination (Baković 2005, Pająk & Baković 2010).

3. Irreducible parallelism in conspiracies of procedures

Assume change is a single feature change, insertion or deletion of a feature bundle, or a change in order between two segments.

Schematically, Lithuanian is a conspiracy of procedures:

- Apply Procedure A, consisting of two (or more) single changes in succession...
  - 
  - unless the result is a marked structure...

- in which case apply Procedure B, which does not share the same first change with A.
  - 

Constraints

DRIVERS: Assign violations for some marked structure
- AGR(voi), AGR(pal)

*PROC B: Drivers the application of Procedures A & B
- Drives Procedure A to apply as default

BLOCKER: Assigns violation for marked result of Procedure A
- NOGEM

P-OT:

<table>
<thead>
<tr>
<th>Step</th>
<th>NOGEM</th>
<th>AGR(voi)</th>
<th>DEP</th>
<th>AGR(pal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>/p+d/</td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td>pi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>/p+b/</td>
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<td></td>
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<tr>
<td>e.</td>
<td></td>
<td>pi</td>
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<tr>
<td>f.</td>
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<td>pi</td>
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In Lithuanian

<table>
<thead>
<tr>
<th>Step</th>
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<th>DRIVER B</th>
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<tr>
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- Captures generalization that B applies only when A violates BLOCKER.
- Succeeds since it can compare full results of Procedures A & B.

HS:

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- Ranking paradox between *PROC B and DRIVER B.
- HS misses generalization that B applies only when A violates BLOCKER.
- To capture generalization, Procedure A changes must apply in same stage — that is, they are irreducibly parallel.

4. Additional cases

Language | Driver(s) | Conspiracy of procedures
---|---|---
Mohawk | Feet should be bimoraic | Form monosyllabic foot → lengthen vowel in which case form disyllabic foot.

Maragoli | Realize reduplicant | Resolve hiatus → copy unless result is long epenthetic vowel in which case copy resolve hiatus.

Sino-Japanese | Wd.s should be disyllabic | Synchronize vowel → assimilate place unless result is voiced geminate in which case do nothing.

Gurindji | Segments agree for [nasal] | Spread [nasal] iteratively unless result is NCV in which case delete [nasal].

References