Class 10 (Week 5, T): Inner workings of the grammar I, Harmonic Serialism

To do
- Read Tessier & Jesney 2014 for Thursday (Oct. 29)
- Presenters, if you e-mail me your handout as a PDF by noon Thurs., I can print
- Prepare at least one question or point for discussion on the reading
- Homework due Thursday (Oct. 29)

Overview (after we finish up last time’s handout): What if we revised Classic OT’s assumptions about GEN?

1. Review
   - What are some things you remember about GEN?

2. Harmonic serialism, the basic idea
   - Make standard OT tableau, except candidates differ from input by just one minimal change
     - What does this mean for GEN?


<table>
<thead>
<tr>
<th>/čap/</th>
<th>WORD MUST HAVE STRESS</th>
<th>MAX-C</th>
<th>NO CODA</th>
<th>DON’T ADD STRESS</th>
<th>FEET ARE IAMBIC</th>
<th>DEP-V</th>
<th>DON’T DELETE STRESS</th>
<th>MAX-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>a čap</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b čáp</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c ča.pa</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tbody>
</table>

- There’s also an architecture change:
  - Take the output of that tableau as the input to a new tableau (same ranking) and repeat
  - Stop when the output is the same as the input

Let’s try it:
- One way to define **minimal**: incurs just one faithfulness violation
  - → constraint inventory matters

  o What does this grammar predict for input like /cite/\(^1\)?

  o Why can’t we get *(ča.pá)?

  o What happens if we switch the ranking of **WORD\_MUST\_HAVE\_STRESS** and **NO\_CODA**?

3. **Local optima**

   - In Harmonic Serialism, you can get stuck in a local optimum and not be able to get over hills to global optima
   - even though there’s a better candidate (deeper valley) on the other side of the hill, you can’t get there if it would require taking a step uphill first (and the step needed to get over the hump is too big).

   ![Diagram of phonological dimension](image)

   o Compare to standard OT.

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\(^1\) hypothetical—real examples have clusters that muddy the issue
4. Another footing/stress example: (Pruitt 2010)

The problem

- Hyde 2007—why don’t we see languages like the following:
  - (LL)(LL)L > L(LL)(LL)  because ___________________ >> ___________________
  - (H)(LL)(LL) > (HL)(LL)L  because ___________________ >> ___________________
  - (HL)(LL) > (H)(LL)L  because ___________________ >> ___________________
  
  - i.e., H makes its own foot only to avoid unfooted syllables.
  - This is non-local in that the initial HL needs to know how many Ls follow, to choose between (H) and (HL)
  - Also non-local from the other end: final LLL needs to know what precedes

- By contrast, there do exist languages where H forms its own foot, just if it’s left over at an edge:
  - ('HL)('LL)L > ('H)('LL)('LL)
    could be analyzed as ___________________ >> ___________________
  
  - ('LL)('H) > ('LL)H  because of ___________________

  Pruitt proposes using Harmonic Serialism—let’s see if we can get it for Wergaia, a Pama-Nyungan language from SE Australia with no more speakers:


- GEN can: add a foot node and assign syllables to it (counts as one change)
- GEN can’t: (“strict inheritance”)
  - delete a foot node
  - change which syllables are associated to an existing foot node
- Pruitt uses “easygoing” FOOTBINARITY: a foot must have two syllables or two moras (or both)

- More suggestions
  - Rule out *(σσ)(L),*L(σσ), *L(HL)(H), and *(σσ)H
  - Rule out *(H)(LL) (this is the candidate that requires some non-locality)
5. Terminology review for OT-related theories

<table>
<thead>
<tr>
<th>Parallel Evaluation</th>
<th>Classical OT</th>
<th>Harmonic Grammar</th>
<th>MaxEnt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict Domination</td>
<td>One iteration at a time</td>
<td>Harmonic Serialism (McCarthy 2006; McCarthy 2008)</td>
<td>HS + HG (Pater 2011)</td>
</tr>
<tr>
<td>Candidate weighting</td>
<td>Winner has best weighted sum of violations</td>
<td>Candidate’s probability is proportional to exponentiated weighted sum</td>
<td>Logically possible</td>
</tr>
</tbody>
</table>

6. Global power vs. myopia

- This is the biggest difference in typological prediction between regular OT and Harmonic Serialism
- **Global power** example from Phono Theory II last year: Walker 2010, metaphony in Venetan
  - basic rule: \{é, ó\} → [+high] / __C₀+C₀[+syl] [+high] 
  - constraint version: No [+high] allowed in affix unless also associated to a stressed vowel
  - Venetan data (inventory: [ i,e,ɛ,a,u,o,ɔ])

<table>
<thead>
<tr>
<th>Tense Vs Raise</th>
<th>Kals-ét-o</th>
<th>Kals-ít-i</th>
<th>‘Sock (m. sg/pl)’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Móv-o</td>
<td>Múv-i</td>
<td>‘Move (1 sg/2 sg)’</td>
</tr>
</tbody>
</table>

| Lax or Low Vs Don’t   | Gát-o     | Gát-i     | ‘Cat (m sg/pl)’ |

<table>
<thead>
<tr>
<th>[Hi] Can Spread Through Unstr. V</th>
<th>Órden-o</th>
<th>Órdin-i</th>
<th>‘Order (1 sg/2 sg)’</th>
</tr>
</thead>
<tbody>
<tr>
<td>... unless that V is /a/</td>
<td>Lavór-a-v-a</td>
<td>Lavór-a-v-i</td>
<td>‘Work (1 sg [3sg?] perf/2 sg impf)’</td>
</tr>
<tr>
<td>No spreading unless [+hi] will</td>
<td>Ángol-o</td>
<td>Ángol-i</td>
<td>‘Angel (m sg/pl)’</td>
</tr>
<tr>
<td>Get all the way to the stressed V</td>
<td>Péreg-o</td>
<td>Péreg-i</td>
<td>‘Peach (m sg/pl)’</td>
</tr>
</tbody>
</table>
How would we get spreading in [úrdin-i] but not in [ángol-i] in regular OT?

Why would it be hard in Harmonic Serialism?

**Myopia** example: Kaplan 2011 on Chamorro umlaut (Austronesian, Saipan & Northern Marianas, 94,700 speakers; Ethnologue & Gordon 2005)
- FYI: Kaplan argues in favor of modifying Classic OT to accommodate Chamorro, rather than modifying Harmonic Serialism (or actually OT-CC) to accommodate Veneto.


- a. nána ‘mother’ i nána ‘the mother’
- b. gúma? ‘house’ i gúma? ‘the house’
- c. cúpa ‘cigarettes’ i cúpa ‘the cigarettes’
- d. sóŋsunj ‘village’ i sóŋsunj ‘the village’

You see how we could adopt a similar analysis to Walker’s of metaphony here.
But, umlaut doesn’t apply through an intermediate vowel:

| (2) a. pulónnun  ‘triggerfish’ | i pulónnun  ‘the triggerfish’ |
| b. mundóŋgu ‘cow’s stomach’ | i mundóŋgu ‘the cow’s stomach’ |

Why would this be easy in Harmonic Serialism, difficult in classic OT?

7. One more case of different predictions: saltation

- Term coined by Bruce Hayes, as far as I know, but related to use by Lass (1997).
- White (2012), investigating the learnability of these cases, gathers as many real ones as he can find.
- There are not many!
- But here’s one, from Campidanian Sardinian (Indo-European lang. from Italy with 345,000 speakers):

/p/ → [β] / V__, but [b] undergoes no change (and similarly for other stops)
/su pani/ → [su βai] ‘the bread’
/di payu su binu/ → [di βayu su βiu] ‘I pay you for the wine’ (Bolognesi 1998, pp. 30, 36)

Why is this problematic in OT? Let’s fill in the tableaux to see.

<table>
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<tr>
<th>/di payu/</th>
</tr>
</thead>
<tbody>
<tr>
<td>a  di payu</td>
</tr>
<tr>
<td>b  di bayu</td>
</tr>
<tr>
<td>c  di φayu</td>
</tr>
<tr>
<td>d  di byu</td>
</tr>
</tbody>
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<th>/su binu/</th>
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<td>a  su phiu</td>
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<td>c  su φiu</td>
</tr>
<tr>
<td>d  su βiu</td>
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</tbody>
</table>

Can you do it unproblematically with Harmonic Serialism?
8. A processing view?

- What if nonlocal solutions are possible (see (Crowhurst & Michael 2005) on Nanti for another one) but just harder to apply?
- Consider a model in which...
  - there’s iterated optimization as in harmonic serialism
  - all candidates race for selection as most harmonic, not just the one-step candidates
  - but the one-step candidates have an advantage out of the gate
  - e.g., at first timestep the candidates for /HLL/ are \{HLL, (H)L L, (HL)L, H(LL), \}
  - if (H)LL survives long enough, it spawns \{(H)(LL), (H)(L)L,...\}
  - (H)(LL) can win only if it can catch up to (HL)L before (HL)L crosses the finish line
- Thus, look-ahead is harder for a speaker to implement on-line, and with be less stable diachronically than myopia, all else being equal
  - e.g., extensive memorization could make it easier—but then it won’t be so productive
- Makes experimental predictions?

9. Next time

- Tessier & Jesney 2014: some problems and solutions for Harmonic Serialism in modeling acquisition
- Next time: what if we revised our assumptions about EVAL?

References


