Class 5: Optimality Theory, part II

To do
• Topic proposal or bibliographic exercise due Thursday

Overview [after discussion of project]: Last week we talked in detail about how the theory works. This time, the focus will be on using it. Plus, target vs. process; correspondence theory.

1. Exercise: a bleeding example from English
   ○ Translate your previous rule analysis into OT

   (reminder: /z/, Ø → i / [+strid] [+strid], [–son] → [–voice] / [–voice] __)

   pʰi-z ‘peas’
   tʰou-z ‘toes’
   dal-z ‘dolls’
   pʰæn-z ‘pans’
   dɑg-z ‘dogs’
   læb-z ‘labs’
   salld-z ‘solids’
   wɜrv-z ‘waves’
   mɪt-s ‘mitts’
   blook-s ‘blokes’
   kʰaf-s ‘coughs’
   sɑlɪd-z ‘solids’

   glæs-ɨz ‘glasses’
   fɪz-ɨz ‘fizzes’
   bæŋf-ɨz ‘branches’
   bæd-ɨz ‘badges’
   wɪʃ-ɨz ‘wishes’

   ○ Could the counterbleeding candidate *[glæs-is] win under any ranking of these constraints?
2. Very short feeding example
Catalan (Indo-European lang. from Spain, France, Andorra w/ 11.5 million speakers [Lewis 2009]; Mascaró 1976)

<table>
<thead>
<tr>
<th>son</th>
<th>‘they are’</th>
<th>bin</th>
<th>‘twenty’ (/bint/, cf. [bintiu] ‘21’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>poks</td>
<td>‘few’</td>
<td>pans</td>
<td>‘breads’</td>
</tr>
<tr>
<td>som poks</td>
<td>‘they are few’</td>
<td>bim pans</td>
<td>‘twenty breads’</td>
</tr>
</tbody>
</table>

- Let’s develop a rule analysis together.
- Give an OT analysis.
- Could the counterfeeding candidate *[bin pans] win under any ranking of these constraints?

3. Counterfeeding that we can capture
ARomance metaphony case from Walker 2005

*Lena* (dialect of Asturian, a language from Spain with about 100,000 speakers)

<table>
<thead>
<tr>
<th>fi-a</th>
<th>‘daughter’</th>
<th>fi-u</th>
<th>‘son’</th>
</tr>
</thead>
<tbody>
<tr>
<td>nén-a</td>
<td>‘child (fem.)’</td>
<td>nin-u</td>
<td>‘child (masc.)’</td>
</tr>
<tr>
<td>tsób-a</td>
<td>‘wolf (fem.)’</td>
<td>tsúb-u</td>
<td>‘wolf (masc.)’</td>
</tr>
<tr>
<td>gát-a</td>
<td>‘cat (fem.)’</td>
<td>gét-u</td>
<td>‘cat (masc.)’</td>
</tr>
</tbody>
</table>

- Develop a rule account
- What’s the problem with translating this into OT (hint: [gét-u] is the problematic word)?
- Any ideas for playing with our faithfulness constraints to get this?
4. **Opacity**

- We now have our first empirical difference between SPE and OT: SPE straightforwardly predicts counterfeeding and counterbleeding, and OT doesn’t.
  - any purported case of counterfeeding or counterbleeding is a good **term-paper topic**
- There are versions of OT that do better with opacity (e.g., Kiparsky’s Stratal OT).

5. **We need a better theory of faithfulness**

  o Trick question: fill in the constraint violations:

<table>
<thead>
<tr>
<th>/tui/</th>
<th>IDENT(round)</th>
<th>IDENT(back)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a [ty]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- In Prince & Smolensky 1993, an output candidate contains the input form—you can see what’s been inserted or deleted.
  - This is retrospectively known as the containment approach (output contains the input).
  - Changing features gets tricky, and metathesis gets very hard.

6. **The correspondence relation**

McCarthy & Prince 1995 proposed replacing containment with **correspondence**.

- Every segment in the input bears a unique index (maybe every feature, mora, syllable… whatever the parts of a representation are).
- Units of the output also bear indices (instead of the output containing input material).
- An input segment and an output segment are in correspondence iff they bear identical indices.

<table>
<thead>
<tr>
<th>/tui2i3/</th>
<th>IDENT(round)</th>
<th>IDENT(back)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a [t1y2]</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b [t1y3]</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

- These indices define a relation between input segments and output segments:

<table>
<thead>
<tr>
<th>input</th>
<th>output</th>
</tr>
</thead>
<tbody>
<tr>
<td>/t/</td>
<td>[t]</td>
</tr>
<tr>
<td>/u/</td>
<td>[y]</td>
</tr>
</tbody>
</table>

That is, the relation = \{(/t/, [t]), (/u/, [y])\}

- /p1a2t3o4k5/ → [p1a2t3o4k5] means Corr(/p1/, [p1]), Corr(/a2/, [a2]), etc., where Corr(x, y) means “x corresponds to y”.
- These are also output candidates for that input: [p5a1t4o2k3], [p1a1t1o1k1], [p6a7t8o9k10].
  - But they’re so outrageously bad we wouldn’t normally bother including them in a tableau.
- When you see a candidate in a tableau without indices, you can assume that the correspondence relation is the obvious one.
- When it’s not clear what the obvious correspondence relation is, spell it out.
7. **Constraints on the relation**

- The purpose for adding this relation to each input-output pair is so that constraints can use it.
- Faithfulness constraints (sometimes also called *correspondence constraints*) are constraints that care about various aspects of the correspondence relation.
- Here are the most important ones proposed by McCarthy & Prince:

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX-C</td>
<td>Every consonant in the input must have a correspondent in the output. Every vowel in the input must have a correspondent in the output. <em>(maximize the preservation of material in the input)</em></td>
</tr>
<tr>
<td>MAX-V</td>
<td>Every consonant in the input must have a correspondent in the output. Every vowel in the input must have a correspondent in the output. <em>(maximize the preservation of material in the input)</em></td>
</tr>
<tr>
<td>DEP-C</td>
<td>Every consonant in the output must have a correspondent in the input. Every vowel in the output must have a correspondent in the input. <em>(every segment in the output should <em>depend</em> on a segment in the input.)</em></td>
</tr>
<tr>
<td>DEP-V</td>
<td>Every consonant in the output must have a correspondent in the input. Every vowel in the output must have a correspondent in the input. <em>(every segment in the output should <em>depend</em> on a segment in the input.)</em></td>
</tr>
<tr>
<td>IDENT(F)</td>
<td>If two segments are in correspondence, they must bear identical values for feature [F]. This constraint doesn’t care about whether segments have correspondents or not; only about making sure feature values match if two segments do correspond.</td>
</tr>
</tbody>
</table>

- There are also constraints against merging, splitting, and reordering segments. See McCarthy & Prince 1995 for a full list.

8. **Process vs. target**

- Here’s a difference between SPE and OT in typological predictions.
  - SPE might predict that similar rules (processes) should be seen across languages
  - OT predicts that a markedness constraint should trigger diverse repairs across languages.

Some terms, coined by McCarthy, that you might run into:

*Homogeneity of target*  
= languages impose the same well-formedness conditions on outputs

*Heterogeneity of process*  
= languages use different means to satisfy the well-formedness conditions

9. **Case study, if we have time: *NC̆ in Pater 2001; Pater 2003**

- *NC̆ is an abbreviation for *[+NASAL][–VOICE]*.
  - This constraint seems to have an aerodynamic basis (raising the velum after a nasal → velar leak and ‘velar pumping’ → prolongation of voicing)—see Hayes & Stivers 1996.

  - What ways can you think of to “repair” a sequence like *ampa*?
Let’s figure out the ranking for each of the following examples.

- **Japanese**

<table>
<thead>
<tr>
<th>present</th>
<th>past</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kač-u</td>
<td>kat-ta</td>
<td>‘win’</td>
</tr>
<tr>
<td>kar-u</td>
<td>kat-ta</td>
<td>‘cut’</td>
</tr>
<tr>
<td>wak-u</td>
<td>wai-ta</td>
<td>‘boil’</td>
</tr>
<tr>
<td>ne-ru</td>
<td>ne-ta</td>
<td>‘sleep’</td>
</tr>
<tr>
<td>mi-ru</td>
<td>mi-ta</td>
<td>‘look’</td>
</tr>
<tr>
<td>ʃin-u</td>
<td>ʃin-da</td>
<td>‘die’</td>
</tr>
<tr>
<td>jom-u</td>
<td>jon-da</td>
<td>‘read’</td>
</tr>
</tbody>
</table>

- **“Puyo Pongo” Quichua**

  | ʃiŋki | ‘soot’ | ʃunšina | ‘to stir the fire’ |
  | ñuŋga | ‘ten’   | ñindi    | ‘sun’             |
  | pampalína | ‘skirt’ | ñukaní fi | ‘we’ |
  | hambi | ‘poison’ | pundʒa | ‘day’ |
  | wasi-ta | ‘house’ | kan-da | ‘you’ |
  | ajtʃa-ta | ‘meat’ | atan-da | ‘the frog’ |
  | puru-ta | ‘gourd’ | wakin-da | ‘others’ |
  | ali-ʃu | ‘is it good?’ | kan-ʃu3 | ‘you?’ |
  | lumu-ʃu | ‘manioc?’ | tijan-ʃu3 | ‘is there?’ |
  | mana-ʃu | ‘isn’t it?’ | ʃar-ʃu3 | ‘does he have?’ |

- **Magindanaw**

  | pəm-báŋun | ‘is waking up’ |
  | pən-dila  | ‘is licking’   |
  | pəŋ-ɡəbá  | ‘is destroying’|
  | pəb-pása  | ‘is selling’   |
  | pəd-síqup | ‘is smoking’   |
  | pəd-tánda | ‘is marking’   |
  | pəq-kúpjə | ‘is wearing a kupia’ |
• Standard Malay

/məN+pilih/ məmilih ‘to choose’
/məN+tulis/ mənulis ‘to write’
/məN+kasih/ məŋasih ‘to give’

/məN+bəli/ məmbəli ‘to buy’
/məN+dapat/ məndapat ‘to get, to receive’
/məN+ganti/ məŋganti ‘to change’

*note also in Malay*

dənpat ‘four’
untuk ‘for’
muŋkin ‘possible’

• Kelantan dialect of Malay—I haven’t been able to track down the real data, but it should look schematically like this:

/məN+pilih/ məpilih ‘to choose’
/məN+tulis/ mətulis ‘to write’
/məN+kasih/ məkasih ‘to give’

/məN+bəli/ məmbəli ‘to buy’
/məN+dapat/ məndapat ‘to get, to receive’
/məN+ganti/ məŋganti ‘to change’

○ Can we explain why it’s always the nasal that deletes (not the following C)?

• English

ɪmˈpɑsəbəl ‘impossible’
ɪntˈɛmpəɹət ‘intemperate’
ɪŋkˈælkjələbəl ‘incalculable’

ɪmbəb ‘imberb’
ɪndisənt ‘indecent’
iŋɡlɔɹiəs ‘inglorious’

Some apparently unattested “solutions”:
• Epenthesis /np/ → [nəp]
• Devoice the nasal /np/ → [m]¹

¹ If *NC8 is really a constraint against the extra articulatory effort of spreading the vocal folds to prevent voicing, then a devoiced nasal is an even worse violation of that same constraint, so it makes sense that this is unattested.
10. If we have time: language-internal example of heterogeneity of process
Kwanyama (a.k.a. OshiKwanyama; Niger-Congo language with 421,000 speakers in Angola, and an unknown number in Namibia—again from Pater)

*Loans:*

- sitamba ‘stamp’
- pelenda ‘print’
- oinga ‘ink’

*Prefixes:*

- /eN+pati/ e:mati ‘ribs’
- /oN+pote/ omote ‘good-for-nothing’
- /oN+tana/ onana ‘calf’

○ What’s the ranking? Let’s do some tableaux

Next time: OT analysis practice session

References
Mascaró, Joan. 1976. *Catalan Phonology and the Phonological Cycle.* MIT.