Class 7: Optimality Theory, part II

To do
- Malagasy HW (last week’s material) due tomorrow.
- Reading questions on K&K ch. 8 excerpt, Anderson 1984 ch. 9, Kaplan 2008 excerpt due Tuesday
- Bibliographic exercise due any time next week
- I’ll post an assignment on this week’s material; due next Friday.

Overview: Last time we talked in detail about how the theory works. This time, the focus will be on practicing using it. Plus, target vs. process; correspondence theory.

1. Exposition: the tableau
- Someday, we’ll all check our analyses with software that evaluates the infinite candidate set.¹
  - In the meantime, we illustrate an analysis with a tableau² showing a small subset of candidates that have been chosen to demonstrate aspects of the constraint ranking.
  - (The danger here is obvious—what if you didn’t think of some important candidate?)

- This tableau shows a ranking argument:
  - NoCODA prefers a (the winner), whereas DEP-V prefers b.
  - If that’s the only difference between the candidates—no other constraint prefers a over b, or there is one but we know it’s ranked below DEP-V—then NoCODA must outrank (>>) DEP-V.

<table>
<thead>
<tr>
<th>/at+ka/</th>
<th>NoCODA</th>
<th>DEP-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>[a.tɔ.ka]</td>
<td>*</td>
</tr>
<tr>
<td>b</td>
<td>[at.ka]</td>
<td>*!</td>
</tr>
</tbody>
</table>

Parts of the tableau:
- input
- output candidates (not all structure is necessarily shown)
- constraints (highest-ranked on left)
- asterisks
- exclamation marks
- shading
- pointing finger (you can use an arrow)

¹ See Jason Riggle’s page for some software along these lines: http://hum.uchicago.edu/~jriggle/riggleDiss.html
² French for ‘table’. The singular tableau is pronounced [tablɔ] in French; a typical English adaptation is [tæблɔ]. The plural tableaux is also pronounced [tablɔ] in French, [tæблɔ] or [tæблɔz] in English.
2. **How do I know which candidates and constraints to include in my tableaux?**

This procedure works reasonably well:

- Start with the winning candidate and the fully faithful candidate.
- If the winning candidate ≠ the fully faithful candidate...
  - Add the markedness constraint(s) that rule out the fully faithful candidate.
  - Add the faithfulness constraints that the winning candidate violates.
  - Think of other ways to satisfy the markedness constraints that rule out the fully faithful candidate. Add those candidates, and the faithfulness and markedness constraints that rule them out. How far to take this step is a matter of judgment.
- If the winning candidate = the fully faithful candidate...
  - ...then you are probably including this example only to show how faithfulness prevents satisfaction of a markedness constraint that.
    - Add that markedness constraint.
    - Add one or more candidates that satisfy that markedness constraint.
    - Add the faithfulness constraints that rule out those candidates.

- Let’s try it for /atka/ → [at\textipa{\textbar}ka].

- You try it for /bid/ → [bit].

- One of the candidates below is unnecessary in arguing for the constraint ranking. Why?

<table>
<thead>
<tr>
<th></th>
<th>*CC</th>
<th>DEP-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>/at+ka/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a [at\textipa{\textbar}ka]</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b [atka]</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c [at\textipa{\textbar}k\textipa{\textbar}a]</td>
<td>**!</td>
<td></td>
</tr>
</tbody>
</table>

- A candidate is **harmonically bounded** if it could not win under any constraint ranking.
3. **Comparative tableaux**

- An innovation of Alan Prince. They convey the same information, but in a different form.

<table>
<thead>
<tr>
<th>/at+ka/ → [atoka]</th>
<th>*CC</th>
<th>DEP-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>a [atoka] vs. [atka]</td>
<td>W</td>
<td>L</td>
</tr>
<tr>
<td>b [atoka] vs. [atoka]</td>
<td>W</td>
<td></td>
</tr>
</tbody>
</table>

Each line compares the winner to one losing candidate, and shows whether each constraint prefers the winner (W) or the loser (L).

- Comparative tableaux are nice because you can easily see if your ranking is correct: the first non-blank cell in each row must say $W$.

  - We also see easily why [atoka] is irrelevant to the ranking—explain.

4. **Exercise: Metaphony (just the two easy cases—we’ll do hard ones later)**

- Walker 2005 discusses Romance dialects/“dialects” in which suffix vowels spread their [+high] feature to the stem.

  - Develop OT accounts of these two metaphony systems (they can have different rankings, since they’re different languages).

_Foggiano/Pugliese_ (Ethnologue classifies as dialect of Italian). Vowel inventory: [ i,e,ε,a,u,o,ɔ]

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pét-e</td>
<td>‘foot’</td>
<td>pít-i</td>
</tr>
<tr>
<td>mójʃ-a</td>
<td>‘soft (fem.)’</td>
<td>múʃ-u</td>
</tr>
<tr>
<td>kjén-a</td>
<td>‘full (fem.)’</td>
<td>kjín-u</td>
</tr>
<tr>
<td>grész-a</td>
<td>‘big (fem.)’</td>
<td>grüss-u</td>
</tr>
</tbody>
</table>

_Veneto_ (~ 6 million speakers in Italy/Slovenia/Croatia and Brazil). Same vowel inventory.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>véd-o</td>
<td>‘I see’</td>
<td>te víd-i</td>
</tr>
<tr>
<td>kór-o</td>
<td>‘I run’</td>
<td>te kúr-i</td>
</tr>
<tr>
<td>prét-e</td>
<td>‘priest’</td>
<td>prét-i</td>
</tr>
<tr>
<td>bél-o</td>
<td>‘beautiful (masc. sg.)’</td>
<td>bél-i</td>
</tr>
<tr>
<td>mód-o</td>
<td>‘way’</td>
<td>mód-i</td>
</tr>
<tr>
<td>gát-o</td>
<td>‘cat’</td>
<td>gát-i</td>
</tr>
</tbody>
</table>
5. Exercise: our bleeding example from English

○ Translate our previous rule analysis into OT

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

pʰi-z ‘peas’ dəq-z ‘dogs’ mɨt-s ‘mitts’ glæs-iz ‘glasses’
tʰou-z ‘toes’ læb-z ‘labs’ bлюк-s ‘blokes’ fɪz-iz ‘fizzes’
dəl-z ‘dolls’ ɬəlɪd-z ‘solids’ kʰaf-s ‘coughs’ bɾæntʃ-iz ‘branches’
pʰæn-z ‘pans’ wɜːv-z ‘waves’ bædʒ-iz ‘badges’

Could the counterbleeding candidate *[glæs-is] win under any ranking of these constraints?

6. Very short feeding example

Catalan (Indo-European lang. from Spain, France, Andorra w/ 11.5 million speakers [Lewis 2009]; Mascaró 1976)

son ‘they are’ bint ‘twenty’
poks ‘few’ pans ‘breads’
som poks ‘they are few’ bim pans ‘twenty breads’

Let’s develop a rule analysis together.

Give an OT analysis.

Could the counterfeeding candidate *[bin pans] win under any ranking of these constraints?
7. If we have time: counterfeeding that we can capture

Another Romance metaphony case from Walker 2005

\textit{Lena} (dialect of Asturian, a language from Spain with about 100,000 speakers)

\begin{itemize}
  \item fí-a ‘daughter’
  \item nén-a ‘child (fem.)’
  \item tsób-a ‘wolf (fem.)’
  \item gát-a ‘cat (fem.)’
  \item fí-u ‘son’
  \item nín-u ‘child (masc.)’
  \item tsúb-u ‘wolf (masc.)’
  \item gét-u ‘cat (masc.)’
\end{itemize}

- 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?

8. Opacity [more on this in Week 5!]

- 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 \textbf{term-paper topic}
- In Week 6 we’ll see a version of OT that does better with opacity (Kiparsky’s Stratal OT).

9. We need a better theory of faithfulness

- 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</td>
<td>[ty]</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 \textit{contains} the input).
  - Changing features gets tricky, and metathesis gets very hard.
10. 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...).
• 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>/t₁u₂i₃/</th>
<th>IDENT(round)</th>
<th>IDENT(back)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>[t₁y₂]</td>
<td>*</td>
</tr>
<tr>
<td>b</td>
<td>[t₁y₃]</td>
<td>*</td>
</tr>
</tbody>
</table>

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

```
/t/ → [t]  
/u/ → [y]  
/l/ → [l]
```

- /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: [p₃a₁t₄o₂k₃], [p₁a₁t₁o₁k₁], [p₆a₂t₈o₉k₁₀].
- 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.
- Sometimes it’s not clear what the obvious correspondence relation is; in that case, spell it out.

11. 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>(don’t delete) Every consonant in the input must have a correspondent in the output. Every vowel in the input must have a correspondent in the output. (maximize the preservation of material in the input)</td>
</tr>
<tr>
<td>MAX-V</td>
<td>(don’t delete) Every consonant in the input must have a correspondent in the output. Every vowel in the input must have a correspondent in the output. (maximize the preservation of material in the input)</td>
</tr>
<tr>
<td>DEP-C</td>
<td>(don’t insert) Every consonant in the output must have a correspondent in the input. Every vowel in the output must have a correspondent in the input. (every segment in the output should depend on a segment in the input.)</td>
</tr>
<tr>
<td>DEP-V</td>
<td>(don’t insert) Every consonant in the output must have a correspondent in the input. Every vowel in the output must have a correspondent in the input. (every segment in the output should depend on a segment in the input.)</td>
</tr>
<tr>
<td>IDENT(F)</td>
<td>(don’t change feature values) 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.
12. 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

13. Case study, if we have time: *NÇ in Pater 2001; Pater 2003

- *NÇ 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>ka化石-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>jin-u</td>
<td>jin-da</td>
<td>‘die’</td>
</tr>
<tr>
<td>jom-u</td>
<td>jom-da</td>
<td>‘read’</td>
</tr>
</tbody>
</table>

- **“Puyo Pongo” Quichua**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>jinki</td>
<td>‘soot’</td>
<td>juntiná</td>
</tr>
<tr>
<td>tijunga</td>
<td>‘ten’</td>
<td>indi</td>
</tr>
<tr>
<td>pampalina</td>
<td>‘skirt’</td>
<td>ṭukantí</td>
</tr>
<tr>
<td>hambi</td>
<td>‘poison’</td>
<td>pundaga</td>
</tr>
<tr>
<td>wasi-ta</td>
<td>‘house’</td>
<td>kan-da</td>
</tr>
<tr>
<td>ajita-ta</td>
<td>‘meat’</td>
<td>atan-da</td>
</tr>
<tr>
<td>puru-ta</td>
<td>‘gourd’</td>
<td>wakin-da</td>
</tr>
<tr>
<td>ali-tjú</td>
<td>‘is it good?’</td>
<td>kan-djú</td>
</tr>
<tr>
<td>lumutjú</td>
<td>‘manioc?’</td>
<td>tijan-djú</td>
</tr>
<tr>
<td>mana-tjú</td>
<td>‘isn’t it?’</td>
<td>tjarin-djú</td>
</tr>
</tbody>
</table>
• Magindanaw (Austronesian, 1,000,000 speakers in the Philippines)
  pəm-bāŋun ‘is waking up’
  pən-dila ‘is licking’
  pəŋ-gəbá ‘is destroying’
  pəb-pása ‘is selling’
  pəd-sigup ‘is smoking’
  pəd-tánda ‘is marking’
  pəŋ-kúpjja ‘is wearing a kupia’

• Standard Malay
  /maN+pılıh/  məpılıh  ‘to choose’
  /maN+tulis/  mənulis  ‘to write’
  /maN+kasih/  məŋasih  ‘to give’
  /maN+bəli/  məmbəli  ‘to buy’
  /maN+dapat/  məndapat  ‘to get, to receive’
  /maN+ganti/  məŋganti  ‘to change’

  note also in Malay
  ompat  ‘four’
  untuk  ‘for’
  mŋkin  ‘possible’

• Kelantan dialect of Malay—I haven’t been able to track down the real data, but it should look schematically like this:
  /maN+pılıh/  məpılıh  ‘to choose’
  /maN+tulis/  mənulis  ‘to write’
  /maN+kasih/  məŋasih  ‘to give’
  /maN+bəli/  məmbəli  ‘to buy’
  /maN+dapat/  məndapat  ‘to get, to receive’
  /maN+ganti/  məŋganti  ‘to change’

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

• English
  imbəspəl  ‘impossible’
  iŋtrəmət  ‘intemperate’
  ɪŋkəlknəbəl  ‘incalculable’
  imbəb  ‘imberb’
  indisant  ‘indecent’
  ingləjniəs  ‘inglorious’
Some apparently unattested “solutions”:
- Epenthesis \(/np/ \rightarrow [n\text{̣}p]\)
- Devoice the nasal \(/np/ \rightarrow [\text{̣}p]\)^3

14. *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

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Next time:
- What happens when there are multiple places within a form where a rule could apply or a constraint is violated?
- What if applying a rule (satisfying a constraint) creates a new environment for the same rule to apply (creates a new violation of the same constraint)?
- We’ll look at how this should play out in SPE (not always clear) and OT (clear, but are the typological predictions correct?)

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^3 If *NC 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.
References
Hayes, Bruce & Tanya Stivers. 1996. The phonetics of post-nasal voicing.
Mascaró, Joan. 1976. Catalan Phonology and the Phonological Cycle. MIT.