Class 7: Rule+constraint theories?

Overview: We’ll try to make the framework for rule/constraint interaction more explicit (and find problems in so doing).

0. Business
   - Malagasy
   - Anything else?
   - Kie: start the recording

1. Implementing triggering: Sommerstein’s (1974) proposal (underlining is mine)

   “A P-rule R is positively motivated with respect to a phonotactic constraint C just in case the input to R contains a matrix or matrices violating C AND the set of violations of C found in the output of R is null or is a proper subset of the set of such violations in the input to R.” (p. 74)

   - Note that this has to be checked on a case-by-case basis (the “input to R” and the “output of R” differ depending on what form we’re working on)

   “A rule [...] positively motivated by phonotactic constraint C does not apply unless its application will remove or alleviate a violation or violations of C.” (p. 75)

   - Later modified: “a rule applies if its application will remove or alleviate a violation of AT LEAST ONE of its motivating constraints” (p. 87)

   What is “alleviate”?
   - Imagine an underlying form /abstro/
   - Do you think Ø → i should count as helping with *CC in this case?

   Sommerstein’s definition (p. 76):

   - “The DEGREE OF VIOLATION $V_{M,C}$ to which a matrix M violates a phonotactic constraint C is equal to the cost of the minimal structural change necessary to turn M into a matrix satisfying C.

   - “The application to a matrix M of operation A ALLEVIATES a violation in M of phonotactic constraint C just in case the output $M'$ of such application is such that $0 < V_{M',C} < V_{M,C}$.”
2. If time, Latin example (Sommerstein p. 87; slightly edited\(^1\))

<table>
<thead>
<tr>
<th>genitive sg.</th>
<th>nominative sg.</th>
<th>UR</th>
</tr>
</thead>
<tbody>
<tr>
<td>lakt-is</td>
<td>lak</td>
<td>/lakt/ ‘milk’</td>
</tr>
<tr>
<td>kord-is</td>
<td>kor</td>
<td>/kord/ ‘heart’</td>
</tr>
</tbody>
</table>

- **deletion 1**: word-final voiceless stops delete after stops

\[
[-\text{continuant}] \rightarrow \emptyset / [+\text{consonantal}] \\
-\text{voice} \quad -\text{sonorant} \quad -\text{continuant} \\
\]

- **deletion 2**: word-final nasals and voiced stops delete after a consonant

\[
[-\text{continuant}] \rightarrow \emptyset / [+\text{consonantal}] \\
+\text{voice} \quad +\text{consonantal} \\
\]

- both are positively motivated by constraints that are **surface-true** in the language: \(^2\)

- **no final voiced in cluster** * [+consonantal][+consonantal] \(\#\) (p. 82)

- **final obst. restrictions** if \([[-\text{sonorant}][-\text{sonorant}] \#\) then \(1\) is \([+\text{coronal}][+\text{continuant}]\) (p. 82)

  - i.e., [st], [ps], [ks] are OK

\(\text{?}\) With those constraints, try to simplify the deletion rules

---

\(^1\) Thanks to Kaeli Ward for pointing out a change that the rules needed!

\(^2\) Sommerstein refers to a different constraint (16 on p. 79), but that seems to be the wrong one for /lakt/.
• A derivation might look like this (we’ll fill it in):

<table>
<thead>
<tr>
<th></th>
<th>/lakt/</th>
<th>/kord/</th>
<th>/reːks/</th>
</tr>
</thead>
<tbody>
<tr>
<td>violates no final voiced in cluster?</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>violates final obstruent cluster restrictions?</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>if any ‘yes’, tentatively apply deletion</td>
<td></td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>

is the violation alleviated/eliminated? NA

if so, accept the change (else don’t) NA

3. **Multiple available repairs**

• Imagine a Roman, Caecilius, who for some reason ends up with this additional rule:

[ ] → [–voice]

❓ How does our derivation change (assuming Caecilius sounds the same as other Romans)? Do we need to add more information to his grammar?

• Imagine Caecilius’s neighbor, Metella, who for some reason has this rule (plus the normal Latin rules):

[ ] → [+continuant]

❓ How does our derivation change (again, assuming Metella sounds like everyone else)? Do we need to add more information to her grammar?
4. **Partial violation, violation alleviation**
   - As we saw, for Sommerstein a constraint doesn’t have to be surface-true to be part of the grammar
     - You could have a constraint whose violations are only ever alleviated, not eliminated
   
   😊 Can we invent another case or two where a violation could be alleviated without being eliminated? (it’s hard to think of non-silly cases; Sommerstein himself introduces this idea just to keep the possibility open, not because he has any data that require it.)

5. **Implementing blocking: taking inspiration from Sommerstein (he didn’t say this)...**
   Simple example of blocking, as a reminder:
   
   $V \rightarrow \emptyset$ (rule) unless prohibited by *CC (constraint)
   
   - A P-rule R is **negatively motivated** with respect to a phonotactic constraint C just in case the tentative output of R contains a matrix or matrices violating C AND the set of violations of C found in the input to R is null or is a proper subset of the set of such violations in the tentative output of R.
   - A rule that is negatively motivated by phonotactic constraint C does not apply (i.e., the tentative output is discarded) if its application will **create or worsen a violation** or violations of C.
   - The application to a matrix M of operation A **worsens** a violation in M of phonotactic constraint C just in case the output M' of such application is such that $V_{M',C} > V_{M,C}$

6. **What a derivation might look like**
   
   - syncope rule $V \rightarrow \emptyset / C \_C$
   - cluster constraint $^{\#}C / ^{\#}C$

<table>
<thead>
<tr>
<th></th>
<th>/abito/</th>
<th>/ildoku/</th>
<th>/uda/</th>
<th>/brdu/</th>
</tr>
</thead>
<tbody>
<tr>
<td>tentatively apply syncope</td>
<td>(abto)</td>
<td>(ildku)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>does this create/worsen violation of cluster constr.?</td>
<td>no</td>
<td>yes</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>if not, accept the change (otherwise reject)</td>
<td>abto</td>
<td>ildoku</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>[abto]</td>
<td>[ildoku]</td>
<td>[uda]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. **Blocking vs. triggering: Myers’s (1991) persistent rules**

- **Zulu**: Bantu language (which makes it part of Niger-Congo family)
- From South Africa, about 12 million speakers
- An official language of South Africa, one of the most widely spoken and understood languages there
- Some English words that are loans from Zulu: *impala, mamba* [could be from Swahili]
- Some notable Zulu speakers:

  ![Nkosazana Dlamini-Zuma ("NDZ")](image1)
  ![Nokutela Dube](image2)
  ![Lucky Dube](image3)
  ![Benedict Vilakazi](image4)

  - Nkosazana Dlamini-Zuma ("NDZ"): anti-apartheid activist, politician
  - Nokutela Dube: educator, publisher, political organizer
  - Lucky Dube: reggae musician
  - Benedict Vilakazi: poet, novelist

- Zulu has prenasalized affricates, but no prenasalized fricatives. We might propose a constraint:

  $$^* \left[ +\text{continuant} \right] +\text{nasal} $$

- Here is a prefix that creates prenasalized consonants (p. 329):

<table>
<thead>
<tr>
<th>singular</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>uː-bambo</td>
<td>izi-mambbo</td>
</tr>
<tr>
<td>uː-pʰapʰe</td>
<td>izi-mapʰe</td>
</tr>
<tr>
<td>ama-tʰatʰu</td>
<td>ezi-tʰatʰu</td>
</tr>
<tr>
<td>uː-kʰuni</td>
<td>izi-kʰuni</td>
</tr>
</tbody>
</table>

- Assume the underlying form of the prefix is /izin/. Formulate a prenasalization rule.

---

3 Myers actually uses “autosegmental representations”
• Here’s what happens when the prefix attaches to a fricative-initial stem:

<table>
<thead>
<tr>
<th>singular</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>eli-fa</td>
<td>e-n\text{ʃ}a</td>
</tr>
<tr>
<td>u:-fudu</td>
<td>izi-\text{mp}fudu</td>
</tr>
<tr>
<td>u:-sizi</td>
<td>izi-\text{ntsizi}</td>
</tr>
<tr>
<td>u:-zwa</td>
<td>izi-\text{dzwa}</td>
</tr>
<tr>
<td>u:-zime</td>
<td>izi-\text{dzime}</td>
</tr>
<tr>
<td>u:-\text{j}ubu</td>
<td>izi-\text{d\text{j}ubu}</td>
</tr>
<tr>
<td>u:-\text{jikisi}</td>
<td>izi-\text{d\text{jikisi}}</td>
</tr>
</tbody>
</table>

‘new’
‘tortoise’
‘sorrow’
‘abyss’
‘walking staff’
‘groundnut’
‘quarrelsome person’

❔ What would happen if prenasalization were subject to blocking by the constraint above?

• Myers proposes instead a “persistent rule”—it tries to apply at every point in the derivation, so that any time its structural description is created, it immediately gets changed.

\[
\begin{align*}
+\text{nasal} & \rightarrow \text{[+delayed release]} \\
+\text{continuant} & \rightarrow \text{[–continuant]}
\end{align*}
\]

i.e., nasal fricative \rightarrow affricate

❔ Let’s spell out what the derivation would look like.

❔ Can we recast this as a simpler rule that is triggered by the constraint?

8. Interim summary

• We’ve tried to make a rules+constraints theory work, really spelling out the details.
• You should now feel uncomfortable about ignoring conspiracies, yet also uncomfortable about exactly how constraints are supposed to work.
  • Now you know how many phonologists felt through the 1970s and 1980s.
The “conceptual crisis” (Prince & Smolensky 2004, p. 1)
- Since Kisseberth 1970, constraints were taking on a bigger and bigger role. But as we saw there were open questions…

9. Why aren’t constraints always obeyed?
- Korean avoids VV and CC through allomorph selection (narrow-ish transcription):

<table>
<thead>
<tr>
<th>plain</th>
<th>nominative</th>
</tr>
</thead>
<tbody>
<tr>
<td>ton</td>
<td>ton-i</td>
</tr>
<tr>
<td>saram</td>
<td>saram-i</td>
</tr>
<tr>
<td>koŋ</td>
<td>koŋ-i</td>
</tr>
<tr>
<td>namu</td>
<td>namu-ɡa</td>
</tr>
<tr>
<td>pʰari</td>
<td>pʰari-ɡa</td>
</tr>
<tr>
<td>kʰo</td>
<td>kʰo-ɡa</td>
</tr>
<tr>
<td>e*ɪ</td>
<td>e*ɪ-ɡa</td>
</tr>
</tbody>
</table>

- And yet, CC and VV occur in the language

<table>
<thead>
<tr>
<th>plain</th>
<th>locative</th>
</tr>
</thead>
<tbody>
<tr>
<td>namu</td>
<td>namu-e</td>
</tr>
<tr>
<td>kʰo</td>
<td>kʰo-e</td>
</tr>
<tr>
<td>saram</td>
<td>saram-dɨl</td>
</tr>
<tr>
<td>koŋ</td>
<td>koŋ-dɨl</td>
</tr>
</tbody>
</table>

10. What happens if there’s more than one way to satisfy a constraint?

❓ Grammar: {*CC, C → Ø, Ø → i} What happens to /absko/?
- Maybe we need to prioritize the rules that could be triggered (e.g., through ordering).
11. Can different constraints prioritize rules differently?

❔ Grammar: \{ *CC, *C#, C → Ø, Ø → i \} What happens to /ubt/??

12. Relatedly, what happens when constraints conflict?
  • What if one constraint wants to trigger a rule, but another wants to block it?

❔ Grammar: \{ *VV, *?[\_stress V], Ø → ? \}⁴ What happens to /aórt/?? /xáos/??

  • Must the grammar prioritize constraints?

---

⁴ based on Dutch; data from Booij 1995 via Smith 2005)
13. Should a rule be allowed to look ahead in the derivation to see if applying alleviates a constraint violation? (how far?)

❔ Grammar: \{∗C#, C → [–voice], [–voice] → Ø\} What happens to /tab/??

- Or does the alleviation have to be immediate?

14. Relatedly, is a rule allowed to make things \textit{worse} if a later rule will make them better?

❔ Grammar: \{∗CCC, Ø → p / m__s, \begin{array}{llll} C & C & C & C \\ 1 & 2 & 3 & 4 \end{array} → 3 (“if you have 4 consonants in a row, delete all but the third one“)} What happens to /almso/??

15. Can a constraint prohibit a certain type of \textit{change}, rather than a certain structure?
Coming up:
- The reading for Monday is excerpts from Prince & Smolensky’s 1993 manuscript introducing Optimality Theory (OT), an all-constraint theory.
- Over the next three or so classes we’ll cover the fundamentals of OT.
- Then we’ll move into explore the differing predictions that SPE, OT, and their variants make about phonologies.

16. Closing business
- **Muddiest point** in the chat again (I’m finding these helpful for me)
- **Kie: stop recording**

References