Jason Eisner (1997). What Constraints Should OT Allow?

Basics of OTP (= Primitive OT)

*Representations:* temporally aligned tiers (represent prosody and gestures)

- edges: [, ]
- interiors: F

\[\eta k:\]

\[
\begin{align*}
\text{voi} & \quad \text{voi} \\
\text{nas} & \quad \text{nas} \\
c & \quad \text{c} \\
\text{vel} & \quad \text{vel}
\end{align*}
\]

- Gen requires matched pairs of brackets & no nesting on a tier
- Input has its own tier(s) (underlined)—floating input material may be placed anywhere on the tier
- Otherwise, anything goes

I-O Correspondence = alignment of input and output tiers
B-R Correspondence = alignment of R tiers and copy of B tiers (Gen is required to make a perfect copy of the base)

How about O-O Correspondence?

*Constraints:* refer to temporal relationships among elements of the representation

- require simultaneity: \( \alpha \rightarrow \beta \quad (\forall \alpha \exists \beta \ (\alpha \text{Coincide} \beta) \)
  one violation for every \( \alpha \) without a \( \beta \)
- forbid simultaneity: \( \alpha \perp \beta \quad (\forall \alpha \neg (\exists \beta \ (\alpha \text{Coincide} \beta)) \)
  one violation for every overlapping \( \alpha-\beta \) pair

\( \alpha \) and \( \beta \) can be edges, interiors, and conjunctions and disjunctions thereof
Examples

MacEachern 1999

IDENT[LAR] must be broken down into a set of constraints (this is what MacEachern does too)

\[
\begin{align*}
    cg \rightarrow cg & \quad \text{DEP}[CG] \\
    cg \rightarrow cg & \quad \text{MAX}[CG] \\
    sg \rightarrow sg & \quad \text{DEP}[SG] \\
    sg \rightarrow sg & \quad \text{DEP}[SG]
\end{align*}
\]

IDENT[PLACE] again, break down into a set of constraints

\[
\begin{align*}
    lab \rightarrow lab & \quad \text{DEP}[LAB] \\
    lab \rightarrow lab & \quad \text{MAX}[LAB]
\end{align*}
\]

etc.

*LARSIM this is trickier—works if the Cs are adjacent on a C tier, but not otherwise

BEIDENTICAL similarly. Unless we assume pseudoreduplicative correspondence.

Are these “bad” constraints unrepresentable in OTP?

PALINDROMIC
FTQUINT
MEMBEROF(A, AARDVARK, AARDVARKS, AARDWOLF, AARDWOLVES, AARON…)
MATCHESOUTPUTOfSPE

How about these “questionable” constraints?

FTBIN
ALIGN-L(FOOT, PRWD)

Discussion

Existential vs. universal faithfulness (Struijke, Feng)

REDUP (Zuraw)

Long-distance consonantal correspondence (Walker & Rose)

OCP
• Does this necessarily mean all constraints are universal? Constructibility of new constraints?
• Is the set of possible constraints finite in OTP?
• Some “bad” constraints are still allowed.
• Adaptability to syntax?

Next time
  • Computability and complexity

For next time
• Reading
  o David Harel *Computers, Ltd.* pp. 59-89 (ch. 3), 119-142 (most of ch. 5).
• Homework
  o Think about algorithms we’ve seen so far (recursive constraint demotion, gradual learning algorithm, dynamic programming for generation, determining a bounding set, constraints as finite-state machines…). Try to categorize them in terms of their tractability: can algorithm X be calculated in infinite time? finite time? exponential time? polynomial time?

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LAB: UCOTP

Dan Albro’s implementation of Primitive OT

1. Download:
   http://www.linguistics.ucla.edu/people/grads/albro/software.html

2. You may need to set an environment variable
   • Start>Settings>Control Panel>System>Environment (tab)
   • In Variable box, type OTPDIR
   • In Value box, type the full path of the directory that UCOTP is installed in

3. Play with the program. You can look at one of the sample projects.

4. Create a new project with the constraints, input, and candidates from your tableau and try to get it to work.