Today's topics:

- **Child phonology in OT / ROTB**
- **Grammar-learning algorithms**
- **Variation, stochastic grammars**

Background preparation: (none)

0. Today's key points

- Checking in on squib, etc.
- Child phonology in OT
- Learning algorithms
- Language variation and stochastic grammars

1. Checking in: Squib, etc.

- Squib topic proposal feedback has been returned
  - Please let me know if you have questions or have anything you would like to discuss
- Details and grading criteria for presentation and squib now available
  - I will be looking for at least 2 people (ideally 3) to present on Th Apr 25

2. Child phonology in OT

- Problems with **modeling children's developing phonological grammar** were one motivation for moving from a rule-based framework to a constraint-based one (OT)
  - What were some of the problems we identified for modeling child phonology using rules? (See outline from Th Feb 22)

2. Child phonology in OT

- Child A (age 2) produces…
  the target (adult) form *play* [plej] as [pej]
  the target (adult) form *other* [ʌðə] as [ʌdə]
  - What is the difference between A's grammar and the adult grammar in a rule-based approach?
  - In OT?

2. Child phonology in OT

- Does the OT approach to phonological acquisition solve any of the problems presented by the rule-based approach?
  - Does phonology learning in OT raise any new problems or questions?

2. Child phonology in OT

- Based on your analysis of the *play* and *other* examples:

  Assuming a standard OT model with an innate constraint set, what **general** type of constraint is ranked **high**, and what type is ranked **low**, in the **Initial State** (before acquisition begins)?

2. Child phonology in OT

- Can we make any **generalizations** about *how* the child and adult rankings differ?

Child: Markedness » Faithfulness

*ComplexOnset » NoDeletion

NoFricative » Ident[±cont]

Adult: Faithfulness » Markedness

NoDeletion » *ComplexOnset

Ident[±cont] » NoFricative

3. Richness of the Base, revisited

- Consider a language in which all morphemes have the shape /CV/, /CVCV/, /CVCVCV/, etc. Two consonants never occur adjacent to one another.
  - Assuming this pattern is productive, what ranking or rankings can we determine among the constraints *ComplexOnset, Max, and Dep?

3. Richness of the Base, revisited

- Consider a language in which all morphemes have the shape /CV/, /CVCV/, /CVCVCV/, etc. Two consonants never occur adjacent to one another.
  - Assuming this pattern is productive, what ranking or rankings can we determine among the constraints *ComplexOnset, Max, and Dep?
  - Is there a connection between this result and the conclusion we reached about the **Initial State ranking** in phonological acquisition?

4. Learning an OT grammar

- Initial state: **M » F**
- What does the learner have to do now? How?

4. Learning an OT grammar

Some proposals:

- **Error-driven** constraint demotion
  (Tesar & Smolensky 1993, 1998, 2000)
  - Learner notices error (wrong winner) and changes ranking by demoting L-constraints **below** W-constraints
- **The Gradual Learning Algorithm (GLA)**
  (Boersma 1997, 1998, Boersma & Hayes 2001)
  - Still error-driven, but rankings change **gradually**

5. Phonological variation

- What does it mean if there are **two** possible surface forms of a given word?
  - What does this look like in the world?
  - How do we formally **model** this in OT?
    - What must the grammar be doing?
    - How can our model make this happen?

5. Phonological variation

- How can OT (HG) model variation?
  - Early idea: "Tied" constraints
  - Later ideas:
    - Cogrammars (Anttila, etc.)
      = Certain constraints mutually unranked; one ranking chosen in production
    - Stochastic ranking / weighting (Boersma, Hayes, Flemming, Zuraw, Goldwater & Johnson, etc.)
      = Rankings/weightings are numerical and chosen from a distribution

5. Phonological variation

- Is “free variation” in phonology really free?
  - How could social factors be incorporated into a model of phonological variation?

6. The Gradual Learning Algorithm (GLA)

- **The Gradual Learning Algorithm (GLA)** (Boersma 1997, 1998, Boersma & Hayes 2001)

  A model of:

  - The gradual reranking of constraints during grammar learning
  - When stochastic: The learning of constraint rankings/weightings that are represented as chosen from a distribution

- A stochastic grammar basically has to be constructed with a learning algorithm!