Objectives:

- **Some final points about OT**
- **General discussion & review**

Background preparation:

- *Skill-check HW #4, #5*
- *Padlet (for submitting questions)*

0. Today's plan

- Any questions or clarifications about WU #2?
  - Check-in on SC HW #4, #5 by request
- Some final points about OT
  - Child phonology
  - Richness of the base again
- Looking back
  - OT vs. rule-based phonology models
  - Key points from this course
  - Why does phonology matter?

1. WU #2 check-in

- Any questions or clarifications?
- Any questions / comments / discussion for SC HW #4, 5?

2. Child phonology in OT

- Data set - Consonant patterns in child phonology

  /ʌðə/ → [ʌdə] ‘other’ /swiŋ/ → [wiŋ] ‘swing’

  /zu:/ → [du:] ‘zoo’ /bʌmp/ → [bʌp] ‘bump’

- Review:
  - In general, how do child **surface forms** differ from adult surface forms?
  - In a **rule-based model** of phonology, how do we have to say a child’s **grammar** differs from the target (adult) grammar?

2. Child phonology in OT

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  /zu:/ → [du:] ‘zoo’ /bʌmp/ → [bʌp] ‘bump’

- Review:
  - In general, how do child **surface forms** differ from adult surface forms? | **simpler**
  - In a **rule-based model** of phonology, how do we have to say a child’s **grammar** differs from the target (adult) grammar? | **more rules — more complex (?!)**

2. Child phonology in OT

- Data set - Consonant patterns in child phonology

  /ʌðə/ → [ʌdə] ‘other’ /swiŋ/ → [wiŋ] ‘swing’

  /zu:/ → [du:] ‘zoo’ /bʌmp/ → [bʌp] ‘bump’

- What does the child’s grammar look like in OT?
  - Cluster simplification patterns
  - Fricative ‘stopping’ pattern

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?

/swiŋ/ ‘swing’		
→ (a) **[wiŋ]**		
(b) [swiŋ]		

/bʌmp/ ‘bump’		
→ (a) **[bʌp]**		
(b) [bʌmp]		

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?

/swiŋ/ 'swing'	NoOnsetCluster	NoDeletion
→ (a) **[wiŋ]**		*
(b) [swiŋ]	* W	L

/bʌmp/ 'bump'	NoCodaCluster	NoDeletion
→ (a) **[bʌp]**		*
(b) [bʌmp]	* W	L

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?
  - NoOnsetCluster » NoDeletion

/swiŋ/ 'swing'	NoOnsetCluster	NoDeletion
→ (a) **[wiŋ]**		*
(b) [swiŋ]	* W	L

  - NoCodaCluster » NoDeletion

/bʌmp/ 'bump'	NoCodaCluster	NoDeletion
→ (a) **[bʌp]**		*
(b) [bʌmp]	* W	L

2. Child phonology in OT

- *Adult grammar:* What are the constraint rankings?

/swiŋ/ 'swing'	NoOnsetCluster	NoDeletion
(a) [wiŋ]		*
→ (b) **[swiŋ]**	*	

/bʌmp/ 'bump'	NoCodaCluster	NoDeletion
(a) [bʌp]		*
→ (b) **[bʌmp]**	*	

2. Child phonology in OT

- *Adult grammar:* What are the constraint rankings?
  - NoDeletion » NoOnsetCluster

/swiŋ/ 'swing'	NoDeletion	NoOnsetCluster
(a) [wiŋ]	* W	L
→ (b) **[swiŋ]**		*

  - NoDeletion » NoCodaCluster

/bʌmp/ 'bump'	NoDeletion	NoCodaCluster
(a) [bʌp]	* W	L
→ (b) **[bʌmp]**		*

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?

/ʌðə/ ‘other’		
→ (a) **[ʌdə]**		
(b) [ʌðə]		

/zuː/ ‘zoo’			
→ (a) **[duː]**			
(b) [zuː]			

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?

/ʌðə/ 'other'	NoFricative	Ident[±cont]
→ (a) **[ʌdə]**		*
(b) [ʌðə]	* W	L

/zuː/ 'zoo'	NoFricative	Ident[±cont]	Ident[±strid]
→ (a) **[duː]**		*	*
(b) [zuː]	* W	L	L

2. Child phonology in OT

- *Child grammar:* What are the constraint rankings?
  - NoFricative » Ident[±cont]

/ʌðə/ 'other'	NoFricative	Ident[±cont]
→ (a) **[ʌdə]**		*
(b) [ʌðə]	* W	L

  - NoFricative » { Ident[±cont], Ident[±strid] }

/zuː/ 'zoo'	NoFricative	Ident[±cont]	Ident[±strid]
→ (a) **[duː]**		*	*
(b) [zuː]	* W	L	L

2. Child phonology in OT

- Is there really evidence for a NoFricative constraint?
  - What interesting type of language does **factorial typology** predict if this constraint exists?
  - Check this World Atlas of Language Structures (WALS) online map!

2. Child phonology in OT

- *Adult grammar:* What are the constraint rankings?

/ʌðə/ 'other'	NoFricative	Ident[±cont]
(a) [ʌdə]		*
→ (b) **[ʌðə]**	*	

/zuː/ 'zoo'	NoFricative	Ident[±cont]	Ident[±strid]
(a) [duː]		*	*
→ (b) **[zuː]**	*		

2. Child phonology in OT

- *Adult grammar:* What are the constraint rankings?
  - IDENT[±cont] » NOFRICATIVE

/ʌðə/ 'other'	IDENT[±cont]	NOFRICATIVE
(a) [ʌdə]	* W	L
→ (b) **[ʌðə]**		*

  - { IDENT[±cont] <*or*> IDENT[±strid] } » NOFRICATIVE

/zuː/ 'zoo'	IDENT[±cont]	IDENT[±strid]	NOFRICATIVE
(a) [duː]	* W	* W	L
→ (b) **[zuː]**			*

2. Child phonology in OT

- In general, how do child **surface forms** differ from adult surface forms?

- In a **constraint-based model** of phonology, how do we have to say a child's **grammar** differs from the target (adult) grammar?

- What occurs during children's acquisition of phonology?

2. Child phonology in OT

- In general, how do child **surface forms** differ from adult surface forms? | **simpler**

- In a **constraint-based model** of phonology, how do we have to say a child's **grammar** differs from the target (adult) grammar? | **different ranking, same constraints**

- What occurs during children's acquisition of phonology?

  → The constraints **get reranked** to match adults

2. Child phonology in OT

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

Child:

{ NoOnsetCluster, NoCodaCluster } » NoDeletion

NoFricative » { Ident[±cont], Ident[±strid] }

Adult:

NoDeletion » { NoOnsetCluster, NoCodaCluster }

{ Ident[±cont] } » NoFricative

2. Child phonology in OT

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

Child: Markedness » Faithfulness

{ NoOnsetCluster, NoCodaCluster } » NoDeletion

NoFricative » { Ident[±cont], Ident[±strid] }

Adult: Faithfulness » Markedness

NoDeletion » { NoOnsetCluster, NoCodaCluster }

{ Ident[±cont] } » NoFricative

2. Child phonology in OT

How do we model grammar learning in OT?

- Models of acquisition in OT are **error-driven**
  - Child's grammar "notices" (subconsciously) that the winning output is not the adult target form
  - Constraints preferring the current, non-target winner get moved **lower** and/or constraints that prefer the target winner get moved **higher**
    - Some OT acquisition models use *gradual* reranking (children change gradually)
  - Note the similarities to our w/L notation!

2. Child phonology in OT

- One example of error-driven learning

Before:

/swiŋ/ 'swing'	NoOnsetCluster ↓	NoDeletion ↑
→ (a) **[wiŋ]** ☹		*
(b) [swiŋ] ☺	* ☹	☺

After:

/swiŋ/ 'swing'	NoDeletion	NoOnsetCluster
(a) [wiŋ] ☹	* ☺	☹
→ (b) **[swiŋ]** ☺		*

3. Child phonology and predictable patterns

In OT, there is a connection between how we model **child phonology** and **predictable patterns**

- Review: What do we need to say about the **grammar** of a language that *never* has (for example)
  - onset clusters
  - fricatives

  if we want to model this absence as **predictable**?

3. Child phonology and predictable patterns

How does this relate to **predictable patterns**?

- Review: What do we need to say about the **grammar** of a language that *never* has (for example)
  - onset clusters
  - fricatives

  if we want to model this absence as **predictable**?
- We need to make the grammar **robust enough** to remove these structures if we forced it to take an input that had them (loanwords, experiments, etc.)
  - NoOnsetCluster » some faithfulness constraint
  - NoFricative » some faithfulness constraint

3. Child phonology and predictable patterns

How does this relate to **predictable patterns**?

- Review: What do we need to say about the **grammar** of a language that *never* has (for example)
  - onset clusters
  - fricatives

  if we want to model this absence as **predictable**?
  - NoOnsetCluster » some faithfulness constraint
  - NoFricative » some faithfulness constraint

- But how can the speaker **learn** these rankings if there is no **evidence** for them?

3. Child phonology and predictable patterns

- This is part of a general question in language acquisition: How can a child **learn** that a structure is **impossible**?

3. Child phonology and predictable patterns

- One widespread proposal: They do **not** learn this!
  - Children (i.e., grammars) start out **assuming** that the structure is **impossible**
  - But if they see **positive evidence** that the structure is possible, they **change** their grammar

  This is sometimes known in language acquisition as the **Subset Principle**: moving from a "subset" grammar (allowing fewer structures) to a "superset" grammar (allowing more structures) is logically **easier** than the reverse, so acquisition is **predicted** to proceed this way

3. Child phonology and predictable patterns

- In OT, what does it mean to say that a learner starts out assuming clusters or fricatives are **impossible**?

3. Child phonology and predictable patterns

- In OT, what does it mean to say that a learner starts out assuming clusters or fricatives are **impossible**?
  - Have the learner start out with these rankings!
    NoOnsetCluster » some faithfulness constraint
    NoFricative » some faithfulness constraint

- But…
  - How to tell *which* faithfulness constraints are low?
  - How to **generalize** across all the patterns?

3. Child phonology and predictable patterns

- Initial State ranking (before acquisition begins):

  (all) **Markedness** » (all) **Faithfulness**

  - *For our phonological model:* We need this initial ranking to explain how speakers "know" that never-observed structures are illegal
  - *Evidence from actual child language:* This initial ranking also fits very well with observed differences between child and adult grammars!

- Seeing a structure in your language is **evidence** for moving **faithfulness** constraints **higher**

4. Some final thoughts on OT

- **A big-picture view** of how our model of the mental grammar is different under OT
  - Handout - Phonology in mental grammar:Rule-based phonology vs. OT

- Extra/optional resource, for those who are interested:
  - Handout - Theories of the constraint set

4. Some final thoughts on OT

- What is OT good at?
  - Progress toward **more "universal"** phonology
  - Connecting the analysis of *each* language to the set of ***possible*** **human languages**
    - This requires nuance, because factors other than the mental grammar do determine which kinds of languages can exist
  - Connecting how **predictable patterns** are enforced to **child language acquisition**

4. Some final thoughts on OT

- What is OT not so good at?
  - **Intermediate stages**: Some phonological patterns seem to need "steps" between URs/SRs
  - *Directions to explore:*
    - Are these "steps" really phonological? (instead of being related **morphological** forms, or frozen outcomes of **historical** change?)
    - Does OT operate by changing inputs "one step at a time" until the best winner is found? → Harmonic Serialism

4. Some final thoughts on OT

- What is OT not so good at?
  - **Cumulative constraint interaction:** Sometimes the effects of lower constraints "gang up" to overcome higher constraints
  - *Directions to explore:*
    - Many researchers now assume **weighted** constraints as in Harmonic Grammar or Maximum Entropy Grammar

5. General discussion and conclusions

From the first day of class:

- This course will examine human-language phonology in more depth, asking questions like:
  - How are speech sounds mentally **represented**?
  - What kinds of phonological **processes** are there?
  - If some phonological processes are **phonetically plausible**, why aren't they universally mandatory?

5. General discussion and conclusions

From the first day of class:

- This course will examine human-language phonology in more depth, asking questions like:
  - Are **rules even the right way** to think about phonological processes?
  - How to build a model of the phonology of human language that is **general** and **restrictive**?
    - *general:* able to account for the range of phenomena that we encounter across languages
    - *restrictive:* avoids predicting phenomena that are unattested in any human language

5. General discussion and conclusions

Phonology as natural science

- Excerpts from NATSCI Learning Outcomes
  - *… use scientific knowledge, logic, and imagination to* ***construct and justify scientific claims*** *about* ***naturally occurring phenomena*** *…*

5. General discussion and conclusions

Phonology as natural science

- Excerpts from NATSCI Learning Outcomes
  - *Analyze and apply **processes of scientific inquiry** … These include*
    - *generating and testing **hypotheses** or **theories** pertaining to the **natural world***
    - *building and justifying **arguments** and **explanations***
    - ***communicating** and **defending** conclusions*

5. General discussion and conclusions

Phonology as natural science

- Excerpts from NATSCI Learning Outcomes
  - *Identify, assess, and make informed decisions about **ethical issues** at the intersections of the natural sciences and society*

5. General discussion and conclusions

- Where is phonology relevant?

5. General discussion and conclusions

- Where is phonology relevant?

  Here are just a few areas:

  - Second/foreign language instruction or learning

    Where does a "**foreign accent**" typically come from?
  - Literacy education [see this link for more]

    Example: **Phonemic awareness** (the ability to hear and manipulate **segments** within words) makes "phonics" letter decoding easier to learn
  - Speech/language therapy

    Some disorders involve **mental representation or organization**, not just articulation (phonetics)

5. General discussion and conclusions

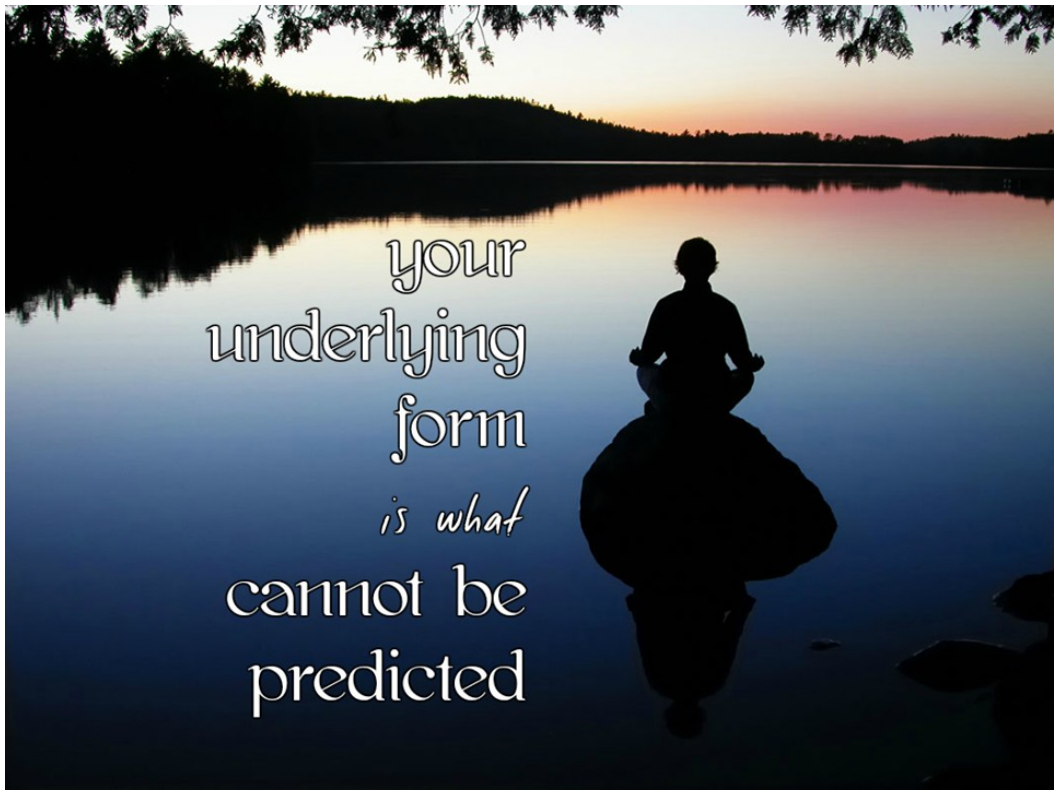
- How has this class been relevant or useful?

5. General discussion and conclusions

- How has this class been relevant or useful?
  - Knowledge of phonology (see above!)
  - Practice finding patterns in complicated data
  - Practice considering what predictions a claim or proposal makes
  - Practice presenting a convincing argument
    . Starting with the punch line
    . Supporting each claim with evidence
    . Looking for advantages over alternatives
  - Other?

6. THE END

- Good luck with WU #2
- Have a good winter break!



(from the lolPhonology group on Facebook)