

Objectives:

- **Model allophone distribution in OT**
- **Strengthen the OT grammar with 'Richness of the Base'**

Background preparation:

- *Data set: Greek*

0. Today's plan

- OT check-in
- The Greek allophone distribution problem, part 1 — how do we understand the phonological factors involved in this pattern?
- Predictable information in OT
- Richness of the Base
- Looking ahead: allophone distribution in OT, part 2 (next class)

1. OT check-in

- In OT, when we want to **determine the grammar of one language** (from a data set), what do we do?
 - We observe some _____
 - We might use phonological evidence to propose their _____ structure, as before
 - We use phonological evidence to propose their _____, as before
 - We use tableaux to make an argument about how the _____ are _____

1. OT check-in

- In OT, when we want to **determine the grammar of one language** (from a data set), what do we do?
 - We observe some **outputs (surface forms)**
 - We might use phonological evidence to propose their **syllable** structure, as before
 - We use phonological evidence to propose their **inputs (URs)**, as before
 - We use tableaux to make an argument about how the **constraints** are **ranked**

1. OT check-in

- In OT, when we want to **determine the grammar of one language** (from a data set), what do we do?
 - Observe some **outputs** (& determine syllable structure?)
 - Propose their **inputs**
 - Use tableaux to find the **ranking**
- In OT, when we want to **test the predictions of a certain constraint ranking**, what do we do?
 - We start by knowing or assuming a **ranking**
 - We pick some relevant _____ to work with
 - We use tableaux to identify the winning _____

1. OT check-in

- In OT, when we want to **determine the grammar of one language** (from a data set), what do we do?
 - Observe some **outputs** (& determine syllable structure?)
 - Propose their **inputs**
 - Use tableaux to find the **ranking**
- In OT, when we want to **test the predictions of a certain constraint ranking**, what do we do?
 - We start by knowing or assuming a **ranking**
 - We pick some relevant **inputs** to work with
 - We use tableaux to identify the winning **outputs**

2. Allophone distribution in OT (part 1)

- When we propose a grammar for a given language, **what kinds of phenomena should this grammar be able to predict (make happen) in the language?**

2. Allophone distribution in OT (part 1)

- When we propose a grammar for a given language, **what kinds of phenomena should this grammar be able to predict (make happen)** in the language?
 - Account for the phonological patterns of a native speaker of the language!
 - **Enforce predictable patterns:**
 - Syllable structure (← our focus in OT so far)
 - Segment distribution patterns
 - Morpheme alternations

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- What are the facts in this data set?
 - In what **environments** do these sounds occur?
 - Which sounds are in **contrastive** (unpredictable) vs. **complementary** (predictable) distribution?
 - What are the “**elsewhere**”/default allophones?
- Note: This pattern is not about syllable structure

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only $_\text{[-bk]}$
 - The velars [k], [x] occur $_\text{[+bk]}$ *and* $_\text{[+cons]}$
- Which sounds are in **contrastive** (unpredictable) vs. **complementary** (predictable) distribution?

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only $_\text{[-bk]}$
 - The velars [k], [x] occur $_\text{[+bk]}$ *and* $_\text{[+cons]}$
- Which sounds are in **contrastive** (unpredictable) vs. **complementary** (predictable) distribution?
 - Contrastive: [k] vs. [x]; [c] vs. [ç]
 - Complementary: [k] and [c]; [x] and [ç]

Generalizations:

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only $_\text{[-bk]}$
 - The velars [k], [x] occur $_\text{[+bk]}$ *and* $_\text{[+cons]}$
- Which sounds are in **contrastive** (unpredictable) vs. **complementary** (predictable) distribution?

Generalizations:

- Velars and palatals are in complementary dist.
- Dorsal stops contrast with dorsal fricatives

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only $_\text{[-bk]}$
 - The velars [k], [x] occur $_\text{[+bk]}$ *and* $_\text{[+cons]}$
- What are the “**elsewhere**”/default allophones?

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only $_\text{[-bk]}$
 - The velars [k], [x] occur $_\text{[+bk]}$ *and* $_\text{[+cons]}$
- What are the “**elsewhere**”/default allophones?
 - The velars [k], [x] have no natural-class environment
- If we were doing rule-based phonology, what rule would we write for this pattern?

2. Allophone distribution in OT (part 1)

Data set: Greek | [k], [x], [c], [ç]

- In what **environments** do these sounds occur?
 - The palatals [c], [ç] occur only __[-bk]
 - The velars [k], [x] occur elsewhere
- If we were doing rule-based phonology, what rule would we write for this pattern?
 - Remember that palatals are [COR, DORS]

$$\left[\begin{array}{c} \text{DORS} \\ \text{-son} \end{array} \right] \rightarrow [\text{COR}] / _ _ [-bk]$$

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- Now that we know what the phonological patterns are, we can start thinking about them in terms of constraints
 - What is a word from the data set that you would propose *doesn't* look like its UR?
 - Make an OT tableau: What is the most important useful loser (for allophone distribution)?
 - What makes this candidate lose?
 - What constraint does the winner violate?

2. Allophone distribution in OT (part 1)

Data set: [Greek](#) | [k], [x], [c], [ç]

- Before we return to a full OT analysis of allophones in complementary (predictable) distribution, we need to discuss another key idea:

how to make an OT grammar **enforce predictable information**

3. Predictable information in OT

Group discussion

Exercise: [A CVCV language](#)

- Consider the word [patoma] in the data set
 - What is the **gloss** (English translation)?
 - There are no morpheme alternations in this language. What is the **UR** of this word?
 - Choose any **two** of the given constraints. Can you propose an **informative loser** (for the output [patoma]) that proves a constraint ranking? If yes, state it; if no, explain.

3. Predictable information in OT

Debriefing | Exercise: [A CVCV language](#)

- Suppose a language only has morphemes with the shape /CV/, /CVCV/, /CVCVCV/, etc.
 - Can we rank ONSET and NoCODA with respect to NoEPENTHESIS and NoDELETION ?

3. Predictable information in OT

Debriefing | Exercise: [A CVCV language](#)

- Suppose a language only has morphemes with the shape /CV/, /CVCV/, /CVCVCV/, etc.
 - Can we rank ONSET and NoCODA with respect to NoEPENTHESIS and NoDELETION ?
 - Not with morphemes from the lexicon as inputs!
There will **never** be any constraint conflict to provide a ranking argument, because the winners are all **perfect** on these constraints

3. Predictable information in OT

Debriefing | Exercise: [A CVCV language](#)

- Suppose a language only has morphemes with the shape /CV/, /CVCV/, /CVCVCV/, etc.
 - Can we rank ONSET and NoCODA with respect to NoEPENTHESIS and NoDELETION ?
 - Not with morphemes from the lexicon as inputs!
- BUT: What do you think will happen if this language **borrow**s a word with the shape /CVC/? How do you think the loanword will surface?

3. Predictable information in OT

- BUT: What do you think will happen if this language **borrow**s a word with the shape /CVC/? How do you think the loanword will surface?
 - Most languages that never have codas also **avoid** codas when they **borrow** words (at least at first—prolonged borrowing can change this pattern)
 - Hawai'ian is one example:
English *wine* [wain̩] → [wai.na̩]

3. Predictable information in OT

- BUT: What do you think will happen if this language **borrow**s a word with the shape /CVC/? How do you think the loanword will surface?
 - If the language **adds vowels to avoid codas** in borrowed words, what *should* we conclude about NoEPENTHESIS, NoDELETION, and NoCODA?

3. Predictable information in OT

- If the language **adds vowels to avoid codas** in borrowed words, what *should* we conclude about NoEPENTHESIS, NoDELETION, and NoCODA?

/CVC/	NoEPEN	NoDEL	NoCODA
→ (a) [CV.C <u>V</u>]			
(b) [CV_]			
(c) [CVC]			

- How do we use this tableau?

3. Predictable information in OT

- If the language **adds vowels to avoid codas** in borrowed words, what *should* we conclude about NoEPENTHESIS, NoDELETION, and NoCODA?

/CVC/	NoEPEN	NoDEL	NoCODA
→ (a) [CV.C <u>V</u>]	*		
(b) [CV_]	L	* W	
(c) [CVC]	L		* W

- { NoCODA, NoDELETION } » NoEPENTHESIS

3. Predictable information in OT

- If a language only has morphemes with the shape /CV/, /CVCV/, /CVCVCV/, etc. ...
 - There is **no way to prove any rankings** among (for example) NoCODA, NoEPENTHESIS, and NoDELETION using existing morphemes of the language
 - And yet, native speakers of such a language typically **will not allow** (for example) **codas** in loanwords
- How can we reconcile these two facts?

3. Predictable information in OT

- More generally:
 - We need a way to make an OT grammar **predict** that something is **ungrammatical** in a language, when it simply **never arises**
 - No tableau for any morpheme of the language will ever lead to constraint conflict, so there is **no direct evidence** for the constraint ranking we would need

4. The OT principle of “Richness of the Base”

- Quick OT concept check:

Markedness or **faithfulness**?

- Which type of constraint (if ranked high enough) can **enforce predictable patterns** in a language by requiring surface forms to have particular properties?
- Which type of constraint (if ranked high enough) can ensure that **unpredictable information** stored in URs will survive (=be **contrastive**) in surface forms in a language?

4. The OT principle of “Richness of the Base”

- Quick OT concept check:

Markedness or **faithfulness**?

- Which type of constraint (if ranked high enough) can **enforce predictable patterns** in a language by requiring surface forms to have particular properties? | **markedness constraints**
- Which type of constraint (if ranked high enough) can ensure that **unpredictable information** stored in URs will survive (=be **contrastive**) in surface forms in a language? | **faithfulness constraints**

4. The OT principle of “Richness of the Base”

- If we are serious about the idea that **predictable** patterns are driven by **markedness** constraints, we must conclude that NoCODA » *Faithfulness* in our CVCV language exercise
 - NoCODA must dominate either NoDEL or NoEPENTH, although **we don't know which one** (if we don't know about loanwords)
 - Why don't we know? Existing words in a CVCV language never show epenthesis or deletion

4. The OT principle of “Richness of the Base”

- If we are serious about the idea that **predictable** patterns are driven by **markedness** constraints, we must conclude that NoCODA » *Faithfulness* in our CVCV language exercise
- If we have NoCODA » *Faithfulness*, we have a grammar with the **power** to get rid of codas
 - Even if we give the grammar an input with a final consonant, the output will still have no coda

4. The OT principle of “Richness of the Base”

- But...how can we give the grammar an input with a final consonant, if there is no evidence that any morpheme ends in a consonant?
 - Here is where *input and UR are not the same*
 - We can give the grammar a **hypothetical** input (not a real word) and consider *what it would do*
 - In a way, this is like “giving the grammar a loanword”
- Handout - Predictable information in OT and ‘Richness of the Base’

4. The OT principle of “Richness of the Base”

- What this means:

A grammar with NoCODA » *Faithfulness* will

productively get rid of codas, even if no existing morphemes show this alternation

4. The OT principle of “Richness of the Base”

- This example illustrates a key OT principle:
 - **Richness of the Base (ROTB):** There are no language-particular restrictions on input forms (Prince & Smolensky 1993)
 - We can’t “explain” why there are no codas simply by saying that no inputs have final consonants
 - Instead, we have to **make the grammar robust enough** to cause candidates with codas to lose

5. Allophone distribution in OT (part 2)

- Next time:
 - We will return to the Greek allophones problem and combine our **description** of the allophone distribution with this new idea of **Richness of the Base** to develop an approach to **complementary distribution** in OT
 - Then we will apply the concept of **factorial typology** (from last class) to see what other language patterns our allophone analysis predicts should exist!