

Today's topics:

- **Richness of the Base; inputs, URs**
- **Allophonic alternations in OT**

Background preparation:

- McCarthy (2008), sec 2.8

0. Today's key points

- Predictable and unpredictable information in OT
- Richness of the Base
 - Implications for modeling predictable information
 - Implications for inputs in the model
- OT exercises (from last time)

1. Modeling predictable information

- Review: In generative grammar, there is a key conceptual distinction between **predictable** and **unpredictable** information
 - Unpredictable information *must* be
 - Predictable information (if productive) is

1. Modeling predictable information

- Review: In generative grammar, there is a key conceptual distinction between **predictable** and **unpredictable** information
 - Unpredictable information *must* be **learned, memorized, stored in the lexicon**
 - Predictable information (if productive) is **enforced by the mental grammar**
- How does this look from the perspective of a constraint-based phonological model (OT)?

1. Modeling predictable information

From a constraint-based perspective

- **Predictable** info: enforced by the grammar
 - This means that predictable information is enforced by the **constraints** as they are **ranked** in a particular language
- **Unpredictable** info: stored in mental lexicon
 - But now this means that unpredictable information found in the UR/input form must **survive** in the **winning output** form

1. Modeling predictable information

- Is it predictable whether or not a syllable has a coda?
 - Some examples to explore this question

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | What is the ranking?

/tip/	NoCODA	DEP	MAX
→ a. ti			*
b. tip	*		
c. ti.pV		*	

(We know /tip/ because of an **alternation**: /tip+o/ → [tipo])

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | What is the ranking?

/tip/	NoCODA	DEP	MAX
→ a. ti			*
b. tip	* _W		L
c. ti.pV		* _W	L

(We know /tip/ because of an **alternation**: /tip+o/ → [tipo])

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | { NoCODA, DEP } » MAX

/tip/	NoCODA	DEP	MAX
→ a. ti			*
b. tip	* _W		L
c. ti.pV		* _W	L

(We know /tip/ because of an **alternation**: /tip+o/ → [tipo])

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | What is the ranking?

/ba/	NoCODA	DEP	MAX
→ a. ba			
b. bat	*	*	

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | What is the ranking?

/ba/	NoCODA	DEP	MAX
→ a. ba			
b. bat	* _W	* _W	

1. Modeling predictable information

- Language #1: Syllables never have codas, codas avoided by deletion | (no rk arg here)

/ba/	NoCODA	DEP	MAX
→ a. ba			
b. bat	* _W	* _W	

- Ranking from above is *consistent* with this outcome: { **NoCODA, DEP** } » **MAX**

1. Modeling predictable information

- Language #1: Syllables never have codas / deletion
 - Is it **predictable** or **unpredictable** whether a word chosen at random will have a coda or not?
 - What is the relationship between *markedness* and *faithfulness* constraints here?

1. Modeling predictable information

- Language #1: Syllables never have codas / deletion
 - Is it **predictable** or **unpredictable** whether a word chosen at random will have a coda or not?
 - **Predictable!** Whether UR ends in a consonant or not, output will have **no coda**
/tip/ → [ti] and /ba/ → [ba]
 - Relationship between *markedness, faithfulness*?
 - The **markedness** constraint enforcing the predictable pattern (NoCoDA) dominates a faithfulness constraint that would preserve the contrast

1. Modeling predictable information

- Language #2: Codas allowed | What is the ranking?

/kip/	DEP	MAX	NoCODA
→ a. kip			*
b. ki		* _W	L
c. ki.pV	* _W		L

/ma/	DEP	MAX	NoCODA
→ a. ma			
b. mat	* _W		* _W

1. Modeling predictable information

- Language #2: Codas allowed | { DEP, MAX } » NoCODA

/kip/	DEP	MAX	NoCODA
→ a. kip			*
b. ki		* _W	L
c. ki.pV	* _W		L

/ma/	DEP	MAX	NoCODA
→ a. ma			
b. mat	* _W		* _W

1. Modeling predictable information

- Language #2: Codas are allowed
 - Is it **predictable** or **unpredictable** whether a word chosen at random will have a coda or not?
 - What is the relationship between *markedness* and *faithfulness* constraints here?

1. Modeling predictable information

- Language #2: Codas are allowed
 - Is it **predictable** or **unpredictable** whether a word chosen at random will have a coda or not?
 - **Unpredictable!** If UR ends in a consonant, the output will have a coda; otherwise not
/tip/ → [tip] and /ba/ → [ba]
 - What is the relationship between *markedness* and *faithfulness* constraints here?
 - All **faithfulness** constraints that preserve the contrast dominate the markedness constraint enforcing the pattern

1. Modeling predictable information

- Summary: Whether some phonological property is **predictable or unpredictable** depends on the **markedness vs. faithfulness** rankings
 - For **unpredictable** information to survive in the output form, *all* the relevant **faithfulness** constraints must dominate the markedness constraint that would remove that unpredictable information

1. Modeling predictable information

- Summary: Whether some phonological property is **predictable or unpredictable** depends on the **markedness vs. faithfulness** rankings
 - If the **markedness** constraint dominates even *one* faithfulness constraint, the winner will be unfaithful and the markedness constraint will always be satisfied
 - Every surface form will *avoid* the same phonological pattern (so the behavior is **predictable**)

1. Modeling predictable information

- Note that for input /ba/, candidate (a) [ba] has *no violations* of these constraints
 - This means that /ba/ → [ba] is predicted to be the winner in *all languages*
 - How does this match what we know about cross-linguistic syllable typology?
 - /ba/ → [ba], *[bat] is an example of **harmonic bounding**
 - /ba/ → [ba] has a *proper subset* of the violations of /ba/ → [bat]

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

- Now consider Language #3 — see also [A CVCV language](#)
 - Similar to Language #1 in that no surface forms have codas (predictable)
 - But unlike Language #1, *no* alternations
 - Every morpheme always surfaces with no evidence for a final C: /pa/ always surfaces as [pa], /mifu/ always surfaces as [mi.fu], etc.
 - This means that every morpheme’s UR has the same segmental structure as its SR
 - What is the constraint ranking for this language?

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

- Language #3: No codas, no alternations
 - What ranking can we explicitly motivate by analyzing attested surface forms?

/mifu/	NoCODA	DEP	MAX
→ a. mi.fu			
b. mif	*		*
c. mi.fut	*	*	

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

- Language #3: No codas, no alternations
 - What ranking can we explicitly motivate by analyzing attested surface forms?

/mifu/	NoCODA	DEP	MAX
→ a. mi.fu			
b. mif	* _W		* _W
c. mi.fut	* _W	* _W	

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

- Language #3: No codas, no alternations
 - What ranking can we explicitly motivate by analyzing attested surface forms?
 - **Nothing!**

We can't motivate any rankings here, because there are **no conflicts** among these constraints

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

- However!

If we are serious about the idea that **predictable** patterns are driven by **markedness** constraints, we must conclude that NoCODA » *Faithfulness*

- NoCODA must dominate either MAX or DEP, although **we don't know which one**
- Why don't we know? Because real words in this language never show either epenthesis or deletion

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

- 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

2. 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*

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

- We can give the grammar a **hypothetical** input (not a real word) and consider *what it would do*

/CVC/	NoCODA	DEP	MAX
?→ a. CV_			*
?→ b. CV.CV_		*	
c. CVC	* _W	L(?)	L(?)

- If DEP » MAX (MAX is lowest), candidate (a) will win
If MAX » DEP (DEP is lowest), candidate (b) will win

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

- We can give the grammar a **hypothetical** input (not a real word) and consider *what it would do*
 - If DEP » MAX (MAX is lowest), candidate (a) will win
If MAX » DEP (DEP is lowest), candidate (b) will win
 - We don't know which, but **one of them will**
This is because **NoCoDA must be highest**, to enforce the **predictable** information that codas are not allowed

2. 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
- This example illustrates a key OT principle:
 - **Richness of the Base** (ROTB): There are no language-particular restrictions on input forms (Prince & Smolensky 1993)

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

- **Richness of the Base (ROTB):** There are no language-particular restrictions on input forms
 - Translation: If something is a possible input in one language (such as /CVC/), it is a **possible input in all languages**
 - This means we do not need devices such as “morpheme structure constraints” that allow the phonological grammar to specify what is or is not a *possible UR* in each language

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

- In **rule-based phonology**, how would we model Language #3 (no codas; no alternations)?
 - We would **not** model this with a deletion (or insertion) **rule**, because there is no deletion (insertion) process in this language
 - Morphemes simply never have consonants in a position where they would *become* codas
 - Instead, we would propose a **morpheme structure constraint**:
“URs can never have CC or C#”

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

- In OT, Language #3 is modeled the **same way** as Language #1: NoCODA » *Faithfulness*

<i>Language #1</i>	<i>Language #3</i>
/tip/ [ti_], /tip+o/ [ti. po]	/pa/ [pa], /mifu/ [mi.fu]
Consonant deletion can be observed	There are no visible C~∅ or ∅~V alternations
Analysis: NoCODA » MAX (and DEP » MAX)	Analysis: NoCODA » (MAX or DEP)

- Predictable = **enforced by the constraint ranking**, whether we see an active “rule” (alternation) or not

3. ROTB and *productive* predictable patterns

- In general:
If some structure is absent in a language, this tells us markedness (M) » (some!) faithfulness (F)
 - codas in Hawai'ian
 - front rounded vowels in English

3. ROTB and *productive* predictable patterns

- Having an M » F ranking for some phonological structure makes a prediction:

- It should be part of the native speaker's **knowledge** that this structure is illegal

- Evidence for this?

Consider loanword phonology or invented words; what does a native speaker do?

- Hawai'ian: English *wine* [wain̩] → [wai.na̩]
- English: French *menu* [...ny̩] → [...nju̩]

3. ROTB and *productive* predictable patterns

- However, languages also have **accidental gaps**
 - Some structure just happens to be missing in the morphemes of the lexicon, but the grammar doesn't actually prohibit it
 - The absence of this structure is **not productive**
 - Example: [bw] onset clusters are extremely rare in English, but in experiments, native speakers do not treat them as ungrammatical

3. ROTB and *productive* predictable patterns

- We can model this difference in OT as follows:
 - True **productive gaps** have **M » F**
 - Given a “new” word or a loanword, native speakers actively avoid the structure
 - **Accidental gaps** do not have ~~M » F~~
 - Given a “new” word or a loanword, native speakers produce the structure faithfully
 - *Warning:* Sometimes speakers/languages use special faithfulness for loanwords — this could mean that the gap *is* productive, outside loanwords

4. ROTB and implications for “inputs”

- What is an **input** in an OT grammar?
 - Sometimes, an input is an **actual UR** of an attested morpheme or word
 - But sometimes, an input is a **hypothetical** input that we use to make the grammar is doing its job: the grammar must actively enforce productive predictable patterns

4. ROTB and implications for “inputs”

- McCarthy (2008), sec 2.8 | What inputs do we need to consider for an analysis?
 - Obvious: **URs that surface unfaithfully** — show that the grammar is enforcing something
 - Perhaps less obvious: **URs that surface faithfully** are informative when they violate markedness constraints

4. ROTB and implications for “inputs”

- McCarthy (2008), sec 2.8 | What inputs do we need to consider for an analysis?
 - Perhaps even less obvious: **Hypothetical inputs**, that don't correspond to actual URs of the language, are sometimes needed in order to test the grammar's ability to rule out ungrammatical forms

5. Exercises — Practice with OT concepts

- Exercises in McCarthy (2008), Ch 2
(see slides from last class)