- **Phonological rules**

Background reading:

- *CL* Ch 3, sec 1 and Appendix

1. Review: Phonemes, allophones, the mental lexicon, and mental grammar

- The mental sound categories of a language are the **phonemes** of the language
  - Write phonemes using slash brackets: /i/

- A physical pronunciation of a phoneme is an **allophone** of that phoneme
  - Write allophones using square brackets: [i]

- Every phoneme has at least one allophone
  - Some phonemes have more than one allophone

1. Review: Phonemes, allophones, the mental lexicon, and mental grammar

- Words (morphemes) are stored in the mental lexicon in terms of their **phonemes**
- The phonetic (surface, pronounced) forms of words are produced by the mental grammar, which applies **phonological rules** to them
- To analyze a language, use evidence to determine whether two sounds belong to the **same phoneme** (as allophones) or to **different phonemes**

2. Review: Same or different phonemes?

Step 1. Can you find one or more minimal pairs?

YES →

NO →

2. Review: Same or different phonemes?

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YES → Contrast. **Different phonemes**.

NO → *keep going*

2. Review: Same or different phonemes?

Step 2. What is the relationship between the segments' environments?

PREDICTABLE →

UNPREDICTABLE →

2. Review: Same or different phonemes?

Step 2. What is the relationship between the segments' environments?

PREDICTABLE → Complementary distribution; non-overlapping environments. The segments are *dividing up* the set of possible environments; which segment you get is *predictable* from the environment. Mental grammar is responsible. **Allophones of the same phoneme.**

UNPREDICTABLE → Contrastive distribution; overlapping environments. Not the job of the grammar. **Different phonemes.**

2. Review: Same or different phonemes?

Step 3. If the sounds are allophones of the same phoneme, describe the environments where each allophone occurs.

- Each environment should be described as a **natural class**, using **sound properties**
- One allophone may have the environment "elsewhere"

- After finishing Step 3, you are ready to propose a **phonological rule** of the mental grammar

3. Writing a phonological rule

- When one phoneme has multiple allophones, we write a **phonological rule** (or rules) to determine where each allophone appears
- Conceptually:
  - The phoneme appears in its basic form in the mental lexicon
  - When it needs to be changed into a *different* allophone, a phonological rule applies to make that adjustment
  - Phonological rules are part of the **mental grammar** of a native speaker

3. Writing a phonological rule

- How to write a phonological rule:

(1) Choose one allophone as the **basic** one

- If one allophone has the environment '**elsewhere**', pick this one as basic
- Otherwise, if one allophone has an environment that is a **more general natural class**, pick this one as basic (this is NOT about which allophone appears "more often" in the data set!)
- If *no* allophone has a more general environment, just pick any one as the basic one (here, more than one analysis is equally insightful)

3. Writing a phonological rule

(1) Choose one allophone as the **basic** one

- For Canadian Raising, which allophone is basic?

[ʌjs]	‘ice’	[ajz]	‘eyes’
[lʌjs]	‘lice’	[lajz]	‘lies’
[tɹʌjt]	‘trite’	[tɹajd]	‘tried’
[tɹʌjp]	‘tripe’	[tɹajb]	‘tribe’
[flʌjt]	‘flight’	[flaj]	‘fly’
[lʌjk]	‘like’	[tajm]	‘time’
[nʌjf]	‘knife’	[fajv]	‘five’

- [ʌj] appears before **voiceless** sounds
- [aj] appears **elsewhere**

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- [ʌj] appears before **voiceless** sounds
- [aj] appears **elsewhere** ← **basic allophone**

3. Writing a phonological rule

(2) The **basic** allophone is the “name” of the phoneme (what to put inside the / /)

- This is the allophone we will get when *no* phonological rule applies — the default option

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- For Canadian Raising, we can now say that the phoneme that has allophones [aj] and [ʌj] is **/aj/**

3. Writing a phonological rule

(3) For each **non**-basic allophone of the phoneme, write a **phonological rule**

A phonological rule must state:

- the **segment** or **class of segments** it applies to
- the **properties** that need **changing**, in order to turn the basic form of the phoneme into the appropriate allophone
- the **environment** in which it applies

3. Writing a phonological rule

(3) For each **<u>non</u>**-basic allophone of the phoneme, write a **phonological rule**

- For Canadian Raising, we need the rule to…
  - apply to /aj/
  - change the *low* part of this diphthong to *mid*
  - apply in the environment "before a *voiceless* sound"

3. Writing a phonological rule

- Conceptually, a **phonological rule** says, “When phoneme /P/ appears in the designated context, ***change it*** into allophone [P'].”
- Proposal: It is **sound properties** like “voiced” or “nasal” that the mental grammar manipulates, ***not entire individual speech sounds*** like [m]
  - Changing [m] to [b] means ***changing*** “nasal” to “oral”, <u>not</u> replacing one sound with another
  - Therefore: Always write your phonological rule in terms of **sound properties**, even when only one sound is affected!

4. Rule notation

- Here is how we will state phonological rules in our model of mental grammar:

A → B / X _ Y

A The sound(s) affected by the rule
B The property(ies) that the rule **changes**
/ 'In the environment of'
_ Where the affected sound(s) are located with respect to the context
X Preceding context, if any
Y Following context, if any

*** **Always** state A, B, X, Y in terms of **properties** ***

4. Rule notation

- For the Canadian Raising example:
  - We haven't specifically talked about how to represent diphthongs with sound properties, since they have two parts
  - Proposal: Describe a diphthong primarily in terms of its first part (with second part in parentheses)
  - /aj/ is therefore described as:

    low central unrounded (to palatal glide) diphthong

4. Rule notation

- Rule for the Canadian Raising example:

Affected sound:	*Changed property:*	*Environment:*
low central unrounded (to palatal glide) diphthong	→ **mid**	**/ _ voiceless**

  - Describe the affected sound in enough detail to identify it
  - Indicate only the changed property (don't simply state *all* the properties of the outcome, [ʌj]—focus on the *change*)
  - Use _ to show where the affected sound is located with respect to the relevant environment

5. Some key points to remember

- **Natural classes** are essential in stating allophone distributions or phonological rules
  - The **environment** of a rule is often a natural class
  - An entire class may also **undergo** a rule
- Every part of a rule is stated in terms of **properties**, even if only one sound is involved
  - This is how the mental grammar **represents** sounds
  - Phonological rules are part of the mental grammar
- The mental grammar can represent natural classes *because* it represents sounds with **properties**