- **Phonological rules**
- **What do we do about *systematic* exceptions to rules?**

Background:

- *Data sets: Fricatives, alveolar obstruents*

0. Today's plan

- Checking in: Phonemes, allophones, mental grammar — the classic view
- Analysis of two cases in Japanese, first pass
- The (more) complete story
  - Lexical strata (morpheme classes) in Japanese
  - Implications for phonological theory

1. Review: Allophones and rules

From last class:
- Handout - "Phonemes, allophones..."
- Data set - "Voiceless vowels"

- Key concepts
  - One **phoneme** may have multiple **allophones**
  - We diagnose this when the **choice** between two (phonetically similar) sounds is **predictable** based on the **environment**
  - We model this by saying there is **one mental category**, and a **rule** for creating the other allophone in the relevant context
- Questions/discussion?

1. Review: Allophones and rules

- Carrying out a phonological analysis:
  - Examine the **environments** for patterns
  - Determine whether the environments where the sounds occur are...
    - **Predictable** → Allophones of *same phoneme*
    - **Unpredictable** → *Distinct phonemes*
  - Write a **phonological rule** to account for the allophones of a phoneme

- Questions/discussion?

2. Try it: Environments and rules

Work groups: Environments

- Data sets -

  "Bilabial, palatal, and glottal fricatives", Part I only

  "Alveolar/alveopalatal obstruents, part (I)", set (2)

- What do we conclude for [ɸ] vs. [ç] vs. [h]?
  [t] vs. [tɕ] vs. [ts]?
  - Are their **environments predictable**?
  - Should we analyze these as separate **phonemes**, or as **allophones** of the same phoneme?
- If your group finishes, switch to the other data set

2. Try it: Environments and rules

Debriefing: Environments

- Can we characterize the **environment** of any of these sounds?
- Is the distribution pattern in the data set **predictable** or **unpredictable**?
- What does this tell us about **phonemes** and **allophones**?
- Where will we need **phonological rules**?

2. Try it: Environments and rules

Work groups: Rules

- Data sets -

  "Bilabial, palatal, and glottal fricatives", Part I only

  "Alveolar/alveopalatal obstruents, part (I)", set (2)

- What rules can we write for [ɸ] vs. [ç] vs. [h]?
  [t] vs. [tɕ] vs. [ts]?
  - Rule = ***target*** → ***change*** / ***environment***
  - Express rules using sound properties

2. Try it: Environments and rules

Debriefing: Rules

- Which of the allophones is the best **mental representation** of the category?
  - That is, the **starting point** for the rules
  - This is known as the “underlying representation” in phonological theory
- What rules will we need to produce the other allophones?
- Does our analysis make the kunrei romanization system make more sense?

3. A fuller picture

Work groups: Fricatives, revisited

- Data set -
  "Bilabial, palatal, and glottal fricatives", part 2

- Questions to discuss:
  - Are we seeing evidence for separate **phonemes**, or multiple **allophones** of the same phoneme?
  - How would we analyze this in terms of mental **representations** and phonological **rules**?
  - Can we reconcile the analysis of part 2 with the analysis of part 1?

3. A fuller picture

Debriefing: Fricatives, revisited

- Data set -
  "Bilabial, palatal, and glottal fricatives", part 2

- What analysis would we propose for part 2?
  - Is this inconsistent with part 1, or can the two analyses coexist?
  - What is different about the words in part 1 and part 2 of this data set?

3. A fuller picture

- Data set - "Alveolar/alveopalatal obstruents, part (II)", sets (5b) and (5c)
- Questions to discuss:
  - Are we seeing evidence for separate **phonemes**, or multiple **allophones** of the same phoneme?
  - How would we analyze this in terms of mental **representations** and phonological **rules**?

3. A fuller picture

- Data set - "Alveolar/alveopalatal obstruents, part (II)", sets (5b) and (5c)
- Questions to discuss, continued:
  - Now consider **verb conjugations**

    'to wait' (dictionary form)

    'doesn't wait'

    'let's wait'

    'provided that we wait' (ends in [-ba]

    'waits-POLITE'

3. A fuller picture

- Data set - "Alveolar/alveopalatal obstruents, part (II)", sets (5b) and (5c)
- What do we have to conclude here?
  - Are there **phonological rules** relating these three consonants?
  - Are any of the consonants separate **phonemes**?
  - Do the answers to these questions depend on what **word class** we are considering?

4. Implications for linguistic theory

- What are some of the differences between “native” and “loanword” items in Japanese?
  - “Loanword” items have a **larger inventory of phonemes**
  - Some phonological **rules are actually suspended** in “loanword” items
- Our model of human language must be able to handle these facts! Some proposals:
  - Mental lexicon distinguishes classes
  - Mental grammar can refer to these classes