Today's objectives:

- **Morpheme alternations – putting the pieces together**
- **Adding phonological rules to our model of the grammar**

Background preparation:

- *PPs: Lamba, Dutch*

0. Today's key points

- Morpheme alternations and the scientific approach to phonology
- Taking a closer look at the concept of phonological process
- Formalizing phonological rules

1. Morpheme alternations and our model

- The process of scientific inquiry includes:
  - **Generating** and **testing hypotheses** or **theories** pertaining to the **natural world**

- One goal of this course: Make progress toward a **model** of human **phonological knowledge** that can
  - **describe** phonological data that we observe
  - **predict** what else should / should not occur
  - **explain** why languages are the way they are

1. Morpheme alternations and our model

- One kind of phonological data: Morphemes that change their sound shape in context

- What are some hypotheses we have tested about this phenomenon…
  - specific to particular languages?
  - in general?

1. Morpheme alternations and our model

- What is the general outline of our model of morpheme alternations?

  Some keywords to consider:

  - mental lexicon
  - morpheme
  - underlying representation
  - surface form
  - phonological process

1. Morpheme alternations and our model

General outline of our model:

- The **underlying representations (URs)** of **morphemes** are selected from the **mental lexicon**
  - If a word contains multiple morphemes, its UR is assembled in the morphological component
- Cases where the **surface form** of a word is different from its UR are caused by the phonological grammar applying a **phonological process**

1. Morpheme alternations and our model

- Suppose we observe an **alternating morpheme** that has two surface forms:
  -  , which occurs in the environment 
  -  , which occurs in the environment 
- In our model, this morpheme has **one consistent UR**, and the other surface form is caused by a phonological process
- We have to consider two hypotheses:
  - Hypothesis 1: the UR is /  /
  - Hypothesis 2: the UR is /  /

1. Morpheme alternations and our model

- We have to consider two hypotheses:
  - Hypothesis 1: the UR is /▬/
  - Hypothesis 2: the UR is /▰/

- In order to decide between the two hypotheses, we need to consider what **phonological process** the grammar would have to make happen in each case
  - Does either option make better **predictions**?
  - Does either option get expressed more **insightfully** in the model?

1. Morpheme alternations and our model

Hypothesis 1: UR is /■/	Hypothesis 2: UR is /■/
/■/	/■/
∧	∧
(no change) [■] [■] **CHANGE**	**CHANGE** [■] [■] *(no change)*
in ○ in ○	in ○ in ○

- If Hypothesis 1 is correct:
  - The grammar changes /■/ to [■] in ○
- If Hypothesis 2 is correct:
  - The grammar changes /■/ to [■] in ○

1. Morpheme alternations and our model

- If Hypothesis 1 is correct:
  - The grammar changes /▬/ to [▰] in ◯
- If Hypothesis 2 is correct:
  - The grammar changes /▰/ to [▬] in ◯
- Now we need to check:
  - Does either option make better **predictions**?
  - Does either option get expressed more **insightfully** in the model?

1. Morpheme alternations and our model

*Here are the steps we take as analysts; the boxed steps are where we **propose an analysis using our model***

1 Isolate the **morphemes** in the data set

2 Identify which morphemes are **alternating**

3 Determine the **phonological context** in which each surface form appears

4 Determine the best **analysis** (UR + rule(s) combination)

5 Make sure your analysis is **formalized** using the tools of our phonological model

2. Phonological processes

- Informally speaking…
  - What phonological process applies in our analysis of Dutch?
  - What about Lamba?
- How can we use the tools of our formal model to characterize these phonological processes?
  - What is the **environment** where the process takes place?
  - What sounds does the process **apply to**?
  - What **change** does the process make?

3. Formalizing processes as phonological rules

- In order to incorporate phonological processes into our model of phonology, we need to make specific proposals about what the grammar does to make a process happen
- One proposal: **Phonological rules**

3. Formalizing processes as phonological rules

- A phonological rule takes the following form:

  target → change / environment

  - What do these terms refer to?

3. Formalizing processes as phonological rules

- A phonological rule takes the following form:

  target → **change** / **environment**

- The **target** is the segment class that the rule *applies to*
  - It must be stated in terms of **features**
  - This is true even if the segment class that the rule applies to consists of only one segment!
  - **Why?**

3. Formalizing processes as phonological rules

- A phonological rule takes the following form:

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- The **target** is the segment class that the rule *applies to*
  - It must be stated in terms of **features**
  - This is true even if the segment class that the rule applies to consists of only one segment!
  - **Why?** Because we have proposed that features are how the mental grammar refers to segments

3. Formalizing processes as phonological rules

- A phonological rule takes the following form:

  target → **change** / **environment**

- The **change** is a list of ***only*** *those features* that are *affected*
  - We don't conceive of a rule as something that *replaces* one segment with an entirely different segment
  - We see a rule as making *adjustments* to a segment

3. Formalizing processes as phonological rules

- A phonological rule takes the following form:
  target → **change** / **environment**
- The **environment** specifies *where the rule applies*
  - Use **features** to represent natural classes
  - **#** = word boundary; **C_0** = 0 or more [–syll] segments
  - An **underscore** shows the **position** of the target:
    - # [–cont] __ after a word-initial stop
    - __ [–son, +cont] before a fricative
    - [+strid] __ [+lat] between a strident and a lateral
    - [–hi] C_0 __ after a non-high vowel, with zero or more [– syll] segments intervening

3. Formalizing processes as phonological rules

Group discussion

- Propose a rule-based analysis for the Turkish genitive morpheme
  - Apply the tools of our model
  - Make the analysis as insightful as you can!
  - Note: This analysis has a pretty good answer and a really good answer — aim high!