

Today's objectives:

- **Testing feature models**
- **Describing segment classes**

Background preparation:

- Handout – Feature models
- Data sets – Arabic, Turkish

0. Today's key points

- Practice implementing a formal model (features)
 - What are the features in our model?
 - How do we use features in a formal analysis?
- Testing the hypotheses of our model
 - Which features should we include?
 - Binary vs. monovalent features
- Applying the model: Stating phonological classes and phonological environments

0. Check-in: Preparation questions on Canvas

- Reminders: **preparation questions**
 - Due by **10am**
 - Assume you have a “Pass” (if submitted) unless the feedback tells you otherwise
 - Look at your **point score** to see your **accuracy**
 - Read the **feedback comments**
 - Anything you should review, or ask about?

1. Review: Models in scientific investigation

Warm-up question

- What's the **difference** between these statements?
 - [m] is voiced / is a voiced sound
 - [m] is [+voice]

1. Review: Models in scientific investigation

Warm-up question

- What's the **difference** between these statements?
 - [m] is voiced / is a voiced sound
 - This is a fact about the world
 - [m] is [+voice]
 - This is the way that our **model** of the phonological mental grammar **represents** the above fact about the world

1. Review: Models in scientific investigation

- A model is an **abstract explanatory device** designed to **account for data**
- Having a model allows us to...
 - **Describe** what we observe
 - **Predict** what else should happen
 - (Attempt to) **explain** why phenomena occur
- If our model is a **good match** with how the world works, we can make a case that properties of the world are **like** properties of our model
 - We check this by **testing hypotheses** on data

1. Review: Models in scientific investigation

- When we propose a model:
 - We propose **entities** that exist in the model
 - We propose ways in which those entities **behave** or **interact**
 - We **explicitly define** those elements or entities and their behaviors, so that it is clear what the model allows, or requires, them to do

2. Phonological features as a model

- When we propose a model, we propose
 - **entities**
 - how they **behave** or **interact**
 - how entities and behaviors are **defined**
- How does this relate to our current model of how segments and segment classes are represented by the mental grammar?

2. Phonological features as a model

- How does this relate to our current model?
 - Entities: A set of **features**
 - Definitions: Specify what classes of segments each feature **distinguishes** between
 - Behavior/interaction: Features and combinations of features are **how the mental grammar** represents, and refers to, classes of segments

2. Phonological features as a model

- What are some kinds of **evidence** we can use to test hypotheses/predictions of our feature model?

2. Phonological features as a model

- What are some kinds of **evidence** we can use to test hypotheses/predictions of our feature model?
 - **Phonologically active classes:** Does our model make the right predictions about groups of segments that *pattern together* in languages?
 - **Contrasts:** Does our model make the right predictions about segments that are treated as *distinct mental sound categories* in languages?

3. Testing the model

Group discussion | Data set: [Arabic consonants](#)

- Hypothesis: All of these “groups” can be expressed as segment classes by our feature model
- Test the hypothesis:
 - Group (c)
 - Group (e)
- How does our feature model compare with a model using the “quiz review properties”?

3. Testing the model

Debriefing | Data set: [Arabic consonants](#)

- Test the hypothesis:
 - Group (c)
 - Group (e)
- How does our feature model compare with a model using the “quiz review properties”?
 - Better! “Quiz” model was unable to represent place classes, obstruents vs. sonorants

3. Testing the model

Group discussion | Data set: [Turkish](#)

- Hypothesis: All of these “groups” can be expressed as segment classes by our feature model
- Test the hypothesis:
 - Plural suffix forms
 - Genitive suffix forms
- How does our feature model compare with a model using the “quiz review properties”?

3. Testing the model

Debriefing | Data set: [Turkish](#)

- Test the hypothesis:
 - Plural suffix forms
 - Genitive suffix forms
- How does current model compare w/ “quiz” model?
 - Both work equally well for this Turkish data
 - How do their **predictions differ** for what segment classes can be expressed or distinguished in the languages of the world, in general?

4. Some technical points

- How many features do we need to specify when describing a segment class?
 - Be insightful — usually this means as **few** features as possible
 - This helps us determine which features **really matter** for modeling (understanding) a given phenomenon

4. Some technical points

- How do we write a multi-feature specification?
 - Use one set of brackets per segment position
 - Technically the model uses the vertical format (see board), but we can use the horizontal format with commas between features: [COR, +voi, -cont]

4. Some technical points

- Why is there a distinction between binary and monovalent (privative) features?
 - Which features are monovalent? How do we notate them differently?
 - What different **predictions** do binary vs. monovalent features make?

4. Some technical points

- Why is there a distinction between binary and monovalent (privative) features?
 - Which features are monovalent? How do we notate them differently?
 - What different **predictions** do binary vs. monovalent features make?
 - The model can express “not voiced”, but it **cannot** directly express “not labial”

4. Some technical points

- Other issues in using our feature model
 - What is the warning about $[\pm\text{ATR}]$?
 - What are some segment classes where we have to use evidence to determine $[\pm\text{cont}]$ value?
- Do you have other questions?
 - Remember you can also use the Padlet board to raise questions for the next class meeting!