# Today's objectives:

- Phonemes, allophones, environments
- Review of contrastive vs.
   complementary distribution

#### Background preparation:

Practice with features handout

### 0. Today's plan

- Check-in on working with features (and models)
- Phonemes and allophones
  - Contrastive and complementary distribution
  - How to model these facts about the world

### 1. Check-in: Working with features (and models)

- Building a model allows us to describe / predict / explain facts about the world
- We define the entities in a model, and define their behaviors and interactions — this allows us to see what the model predicts
  - Then we can **test** these predictions on new data
- When we work with a model, we must use it according to how it is defined!
  - Otherwise, we aren't actually testing the model

### 1. Check-in: Working with features (and models)

- Examples...
  - If we use [+front] to describe a class of vowels [i e y ø], are we testing our feature model?
  - Is our model, as defined, able to **distinguish** the segment classes [**p b f v θ ð**] vs. [**t d s z k g**]?
- Remember If we apply the model incorrectly, we aren't testing its predictions!
  - Even if the model is a bad fit for the data, we need to "play by the rules of the game" (apply the model as defined) to **show** that it is a bad fit

# 1. Check-in: Working with features (and models)

Any questions about today's prep questions?

- Feature charts (and answer key) posted for practice IMPORTANT:
  - Do not try to memorize feature charts!
  - Always think about feature values in terms of the segment classes they distinguish

#### 2. Phonemes and allophones: Try it

#### **Group discussion (LING 101 review)**

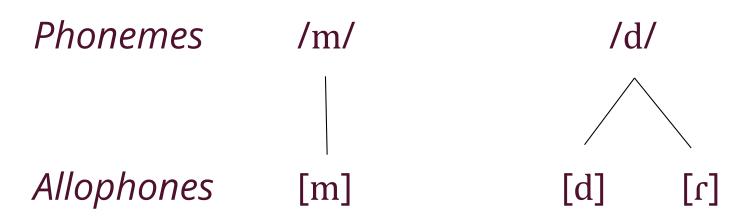
- Data set: <u>Tohono O'odham</u>
   Consider the sounds [t d t] d3]
  - How many phonemes are there?
  - Which of these sounds are allophones of the same phoneme?
- No outside resources!
  - Pool your group's knowledge to see what you can remember about how to do this

#### 2. Phonemes and allophones: Try it

#### Debriefing

- - environment
  - predictable or unpredictable
  - in contrast
  - complementary distribution
  - how to group allophones
- How can we use the highlighted points to test the predictions of our feature model?

- Some review from LING 101:
  - What is a phoneme? mental sound category
  - What is an **allophone**? surface or "phonetic" pronunciation of a sound
- Some plausible made-up examples for illustration:



- Key question: Is the distribution of two sounds predictable or unpredictable?
  - How can we figure this out?
  - How does this help us test our feature model?

- Key question: Is the distribution of two sounds predictable or unpredictable?
  - How can we figure this out?
    - Is the choice between the two sounds something we can **predict** based entirely on the **environment** where they occur?
  - How does this test our feature model?
    - Does the model let us describe the crucial environment?
  - Try it for Tohono O'odham | [t d t] d3]

- Terminology
  - Contrastive distribution

Complementary distribution

- How do these terms match up with...
  - phoneme vs. allophone?
  - predictable vs. unpredictable distribution?

- Terminology
  - Contrastive distribution
    - Sounds are in contrast; (near-)minimal pairs
  - Complementary distribution
    - Environments are complements (as in sets)
- How do these terms match up with...
  - phoneme vs. allophone?
  - predictable vs. unpredictable distribution?
- For more review of these key LING 101 concepts, see handout "Determining the distribution of segments in a language"

- Key question: Is the distribution of two sounds predictable or unpredictable?
  - Why does this matter?

- Key question: Is the distribution of two sounds predictable or unpredictable?
  - Why does this matter?
- Should our model of the phonology of a language propose that a predictable pattern is...
  - stored in the mental lexicon?
  - produced by the phonological grammar?

**Why?** (And how could we **test** this prediction?)

# 4. Modeling segment distribution

 When the distribution of two sounds [X] and [Y] in a language is **predictable** (and productive) ...

...we propose that the **grammar** determines whether [X] or [Y] appears in any given surface form

- [X] and [Y] differ phonetically and featurally
- But they belong to the **same phoneme** (mental/cognitive sound category)

Phoneme /(?)/ (← How do we decide this? Later!)
Allophones [X] [Y]

### 4. Modeling segment distribution

- How does the grammar enforce the predictable distribution of allophones?
  - This is a topic we will continue to develop in the next unit of the course
  - But the **environments** where the allophones occur will be a key part of our analysis
- For now, we can focus on
  - Identifying the crucial environments
  - Using our feature model to describe them
  - Examples: Tohono O'odham, Scottish English

#### 5. Multiple allophone pairs

- How do we pair up allophones when multiple phonemes show the same pattern?
  - Try it for <u>Tohono O'odham</u> | [t̪ d̪ t͡ʃ d͡ʒ]

### 5. Multiple allophone pairs

- How do we pair up allophones when multiple phonemes show the same pattern?
  - Try it for <u>Tohono O'odham</u> | [t̪ d̪ t͡ʃ d͡ʒ]
- Consider each pairing hypothesis
  - Which hypothesis is more insightfully expressed in our feature model?
  - Does this choice seem plausible or insighful to you? (Why?)