

Today's objectives:

- **Modeling phonemes, allophones**
- **Contrastive vs. complementary distribution**

Background preparation:

- *Data set – Tohono O'odham (bring to class only)*

0. Today's plan

- Check-in on WU #1
- Phonemes and allophones
 - Contrastive and complementary distribution
 - How to model these facts about the world
- Alternations, allophones, and evidence for phonological rules

1. Check-in on WU #1

- Be sure to read the **instructions** carefully
 - Where is it especially important to provide **arguments** or **justification**?
 - Where do you need to consider how to **organize** the information or discussion you present?
- Apply **course concepts** insightfully!
 - Review the [Course info & policies](#) document for expectations for write-up assignments
- Any **questions** about the instructions or the goals of the assignment?

2. Phonemes and allophones: Try it

Group discussion

- Data set: [Tohono O'odham](#)

Consider the sounds [t̚ d̚ tʃ̚ dʒ̚]

- 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

- Data set: [Tohono O'odham](#) | [t̚ d̚ t̪̚ d̪̚]

Some key concepts

- environment
- predictable or unpredictable
- in contrast
- complementary distribution
- how to group allophones

3. Segment distribution — predictable?

- 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:

Phonemes

/m/

/d/

Allophones

[m]

[d]

[r]

3. Segment distribution — predictable?

- Key question: Is the distribution of two sounds **predictable** or **unpredictable**?
 - How can we figure this out?

3. Segment distribution — predictable?

- 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?
 - Try it for Tohono O'odham | [t̥ d̥ t̥ʰ d̥ʰ]

3. Segment distribution — predictable?

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

3. Segment distribution — predictable?

- 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?

3. Segment distribution — predictable?

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

3. Segment distribution — predictable?

- 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 particular language is **predictable** ...

...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?)

Allophones [X] [Y]



4. Modeling segment distribution

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- In both cases, some **phonological process** in the grammar is changing certain sound representations in certain environments
 - How do we model a phonological process?

4. Modeling segment distribution

- What is the connection, in our **model** of phonological grammars, between:
 - phonemes with multiple allophones
 - morphemes that alternate
- In both cases, some **phonological process** in the grammar is changing certain sound representations in certain environments
 - How do we model a phonological process?
 - With a **phonological rule**

4. Modeling segment distribution

- Once we have identified a phoneme with multiple allophones, how do we write a phonological rule?
 - Can any of the environments be stated as a natural class using **features**?
 - The environment of one allophone is sometimes best described as '**elsewhere**', if it can't be stated as a single natural class
- Similar principles for morpheme alternations!
 - Compare hypotheses for the UR (phoneme label)
 - Which hypothesis leads to a better rule?

4. Modeling segment distribution

- How do we pair up allophones when multiple phonemes show the same pattern?
 - Try it for [Tohono O'odham](#) | [t̥̚ d̥̚ t̥̃̚ d̥̃̚]

4. Modeling segment distribution

- How do we pair up allophones when multiple phonemes show the same pattern?
 - Try it for [Tohono O'odham](#) | [t̥̚ d̥̚ t̥̃̚ d̥̃̚]
- Consider each pairing hypothesis
 - Which hypothesis leads to better rules?

5. Allophones and alternating morphemes

General discussion

- Given a data set showing either
 - allophones in predictable distribution
 - morpheme alternations

Which is *stronger* evidence for the existence of a phonological process in the grammar? Why?

5. Allophones and alternating morphemes

- Can a single data set show both predictable distribution and alternating morphemes?
 - What do we expect, if a phonological process is maximally general?
 - Try it for Lamba | [ʃs]

5. Allophones and alternating morphemes

- Can a single data set show both predictable distribution and alternating morphemes?
 - What do we expect, if a phonological process is maximally general?
- If a rule in the phonological grammar refers only to surrounding phonological environments...
 - we predict sounds in predictable / complementary / allophonic distribution
 - we predict morpheme alternations when word-building creates the relevant environment

5. Allophones and alternating morphemes

- A term you saw in the Odden reading:
neutralization
 - What does this mean?
 - Where have we seen examples?

5. Allophones and alternating morphemes

- A term you saw in the Odden reading:
neutralization
 - Two sounds are separate phonemes
 - But: In at least one environment, the two sounds have allophones that are identical

