Overview
- Duality of patterning
- Why phonology?
- Contrast
- Predictability
- The phoneme
- Allophonic variation
- Contextually limited contrast
- Limited distribution
- Well/ill-formedness

Duality of patterning
First type of pattern: *meaningful* units are arranged to form larger *meaningful* units. The meaning of the larger unit is a predictable function of the smaller units and their arrangement.

Dog bites man.
Man bites dog.
*Bites dog man.
un-manage-able

Second type of pattern: *meaningless* units are combined to form larger *meaningful* units. Varying the order of the smaller units can change the meaning, but the semantic contribution of the smaller units is not predictable.

[nus] = ‘noose’
[sun] = ‘soon’
*[snu] meaningless
*[usn] meaningless and ill-formed

It is the “syntax” of these meaningless units that we’ll study =
- which sequences are allowed?
- what happens when a forbidden sequence is created?
**Why does phonology exist?**

Words and morphemes need a syntax, because we (humans) have to calculate a meaning from their arrangement.

Forbidding *Bites dog man* simplifies things for English speakers:

(i) fewer patterns to remember

(ii) helps to disambiguate

But why bother with syntax for sounds (meaningless units)?

Speech is an information-transmission device that is dependent on *articulatory* and *auditory*, as well as cognitive, limitations. The syntax of words caters to our cognitive limitations; the syntax of sounds caters to our articulatory and perceptual limitations. Each language strikes its own balance among articulatory ease, perceptual clarity, and rate of information transmission.

Example: With two sounds, /b/ and /a/, we want to create a vocabulary of 14 words (homonyms not allowed).

**Language 1:** no restrictions on sequence

**Language 2:** requires all Cs to be adjacent to a V, no sequences of two Vs in a row.
In this class, we'll be looking at what kinds of syntactic restrictions and “transformations” languages impose, and why.

Phonology as a field tries to understand the nature and range of existing “sound syntax” and develop a model of that part of human cognition that governs it.

**Contrast**
Languages have many sounds because it makes large vocabularies possible without excessively long words.

English /p/ versus /b/:
- it’s not that words with /p/ consistently have the semantic feature [X] and words with /b/ have [Y]…
- rather words with /p/ and words with /b/ consistently differ in meaning.

→ /p/ and /b/ contrast in English, which makes them separate phonemes in English.

English [p] vs. [pʰ]: minimal pairs?
Definition: a minimal pair for sounds /X/ and /Y/ is a pair of words that (i) differ in meaning and (ii) differ (morphologically and phonologically) only in that where one word has /X/, the other has /Y/.

Compare Hindi:
- pal ‘take care of’
- pʰal ‘edge of knife’
- bal ‘hair’

**Predictability**
In Hindi, whether a word will have [p] or [pʰ] is not predictable.
(That’s what allows the contrast to carry information).

But in English, the distribution of [p] and [pʰ] is quite predictable.
They are in complementary distribution: there are contexts that allow [p] but not [pʰ]; there are contexts that allow [pʰ] but not [p]; there are no contexts that allow either one.

**The Phoneme**
English speakers seem to group [p] and [pʰ] together into a phoneme (symbolic unit).

Evidence:
- we spell them with the same letter
- English speakers don’t notice the difference
- alternation: depending on context, the same slot can get filled in different ways ([p] or [pʰ])
**Alternation and allophonic variation**

In English, [p] and [ph] are both *allophones* (concrete pronunciations) of a single phoneme, (abstract slot—let’s call it /p/). When a word is uttered, *rules* choose the correct allophone.

<table>
<thead>
<tr>
<th>mental dictionary</th>
<th>pronunciation</th>
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<tbody>
<tr>
<td>/p/</td>
<td>[p]</td>
</tr>
<tr>
<td></td>
<td>[pʰ]</td>
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</tbody>
</table>

**Practice**

*Kenyang*

Niger-Congo language spoken by 65,000 Banyang people in and around Mamfe, Cameroon. Not traditionally written.

- eneq: ‘tree’
- eket: ‘house’
- nek: ‘rope’
- ngaq: ‘knife’
- eteq: ‘town’
- ajuk: ‘(person’s name)’
- enoq: ‘drum’
- ntʃiku: ‘I am buying’
- ekaq: ‘leg’
- naq: ‘brother-in-law’
- pəbrik: ‘work project’
- ndek: ‘European’

*Sindhi*

Indo-European language spoken by 19,675,000 people in Pakistan, India, Singapore. Uses Arabic and Gurumukhi scripts.

- pənu: ‘leaf’
- vədʒu: ‘opportunity’
- ʃeki: ‘suspicious’
- gədo: ‘dull’
- dəru: ‘door’
- pʰənu: ‘snake hood’
- təru: ‘bottom’
- kʰəto: ‘sour’
- bədʒu: ‘run’
**Farsi** *(Western?)*
Indo-European language spoken by 26,523,000 people in Iran, USA, Turkey, Iraq, Saudi Arabia, Germany, United Arab Emirates, Qatar, Bahrain, Uzbekistan, Tajikistan, Oman, Canada, UK, Greece, Denmark, Turkmenistan, Netherlands, Austria, Israel.

<table>
<thead>
<tr>
<th>Ærtæs</th>
<th>‘army’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farsi</td>
<td>‘Persian’</td>
</tr>
<tr>
<td>Qædri</td>
<td>‘a little bit’</td>
</tr>
<tr>
<td>Rah</td>
<td>‘road’</td>
</tr>
<tr>
<td>Ris</td>
<td>‘beard’</td>
</tr>
<tr>
<td>Ruz</td>
<td>‘day’</td>
</tr>
<tr>
<td>Ahař</td>
<td>‘starch’</td>
</tr>
<tr>
<td>Behțæř</td>
<td>‘better’</td>
</tr>
<tr>
<td>Hærtowř</td>
<td>‘however’</td>
</tr>
<tr>
<td>Tjr</td>
<td>‘four’</td>
</tr>
<tr>
<td>Tʃedzur</td>
<td>‘what kind’</td>
</tr>
<tr>
<td>Ahari</td>
<td>‘starched’</td>
</tr>
<tr>
<td>Bæradæř</td>
<td>‘brother’</td>
</tr>
<tr>
<td>Berid</td>
<td>‘go’</td>
</tr>
<tr>
<td>Briaŋg</td>
<td>‘pale’</td>
</tr>
<tr>
<td>Tʃera</td>
<td>‘why’</td>
</tr>
<tr>
<td>Darid</td>
<td>‘you have’</td>
</tr>
<tr>
<td>Šjř</td>
<td>‘lion’</td>
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</tbody>
</table>

**Contextually-limited contrast**

**Polish**
Indo-European language spoken by 44,000,000 people in Poland, USA, Ukraine, Belarus, Lithuania, Canada, Israel, Russia, Kazakhstan, Latvia, Czech Republic, Slovakia, Austria, Hungary, Australia, Romania, Azerbaijan, Finland. Uses Roman script.

<table>
<thead>
<tr>
<th>singular</th>
<th>plural</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klup</td>
<td>Klubi</td>
<td>‘club’</td>
</tr>
<tr>
<td>Trup</td>
<td>Trupi</td>
<td>‘corpse’</td>
</tr>
<tr>
<td>Dom</td>
<td>Domi</td>
<td>‘house’</td>
</tr>
<tr>
<td>Šum</td>
<td>Šumi</td>
<td>‘noise’</td>
</tr>
<tr>
<td>Snop</td>
<td>Snopi</td>
<td>‘sheaf’</td>
</tr>
<tr>
<td>Žwup</td>
<td>Žwobi</td>
<td>‘crib’</td>
</tr>
</tbody>
</table>
Limited distribution

English η vs. h

Should we consider these allophones of the same phoneme?

What is well-formedness?
Failing to apply the English aspiration rule produces “illegal” sequences.

But what does “illegal” mean?

Preview of next time:
- Review of articulatory (and maybe a little acoustic!) phonetics to help us understand functional motivations
- Natural classes and distinctive features for capturing situations like multi-phoneme devoicing rules
- Formalisms for writing rules
- Some common types of phonological rule

To do for next time:
Read:
- Kenstowicz chs. 1 & 2, including exercise 2.9 on pp. 86-87 (Kire orthography)
Problems:
- Mokilese, Maltese