Remember Saussure’s approach to phonemes: defined by being different from other phonemes in a system. Two schools of phonological analysis changed Saussure's concept:

<table>
<thead>
<tr>
<th>Prague</th>
<th>American Structuralist (as we discussed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trubetzkoi</td>
<td>Jakobson</td>
</tr>
<tr>
<td>Sapir</td>
<td>Bloomfield</td>
</tr>
<tr>
<td>Taxonomic phonemicists (Pike)</td>
<td></td>
</tr>
</tbody>
</table>

Trubetzkoi is one of the most famous members of the Prague school. Three ways Trubetzkoi differs from Saussure:

1) emphasis on the phonetic reality underlying the phoneme: the phoneme is the particular collection of (ideal) phonetic properties that define it.

2) phoneme is a partially specified entity, it does not contain any specification for redundant, non-phonological, sub-phonemic properties.

3) the system of phonemes (phonological contrasts) has internal structure.

As a result of the positive approach, phonology began to define phonemes and allophones (and now underlying/lexical and surface/phonetic representations) by these phonetic features.

**Why break segments into features?**

Phonemic analysis of a language gives us a system of segments as unique individual units. We break segments into smaller units to be able to recognize similarities among segments that are functionally distinct phonemes.

**Inventories** are symmetric: a phonetic property used to distinguish between two phonemes can be exploited throughout the system to distinguish other pairs of phonemes.

**Rules:** often change one sound to become more like some sound nearby in some phonetic property, e.g., voicing assimilation of liquids (l, l) in English to voiceless stops.

<table>
<thead>
<tr>
<th>pray</th>
<th>[pɹeɪ]</th>
<th>train</th>
<th>[tɹeɪn]</th>
<th>crane</th>
<th>[kɹeɪn]</th>
</tr>
</thead>
<tbody>
<tr>
<td>brain</td>
<td>[bɹeɪn]</td>
<td>drain</td>
<td>[dɹeɪn]</td>
<td>grain</td>
<td>[ɡɹeɪn]</td>
</tr>
</tbody>
</table>

**Phonotactics/Sequential Redundancy constraints:** Constraints on sequences of sounds also need to refer to sets of segments (natural classes) which are allowed in certain positions of a word or syllable, like stops plus /l/, /ɹ/ at the beginning of English syllables, but not the other way around (no /l/ or /ɹ/ plus stops).
Distinctive features enable us to do two things:

1) **distinguish** segments from each other  
2) **group** segments together into classes

Both functions are necessary in writing phonological rules (or generalizations), whether allophonic or morphophonemic, or UR to Surface. A good feature system makes it possible to write natural rules more simply and makes it difficult to write unnatural rules.

**Distinctive feature system for consonants:** Odden uses mostly those of the *Sound Pattern of English* (SPE): note that these are usually articulatory (not acoustic/perceptual). They are generally abbreviated with the first 3-4 letters of the name, i.e. [-syl, +cons, +cont]

**Major class features:** ±syllabic, ±consonantal, ±sonorant

**Place Features:** ±labial, ±coronal, ±anterior, ±distributed, ±strident

**Vowel features:** ±high, ±low, ±back, ±round, ±tense or ±Advanced Tongue Root  
(also may be used in consonants)

**Manner features:** ±continuant, ±lateral, ±nasal, ±delayed release

**Laryngeal features:** ±voice, ±spread glottis, ±constricted glottis

**Using Distinctive Features: Defining Natural Classes and Writing Rules**

**Natural Classes:** One goal of specifying features is to define natural classes:  
a natural class is a group of segments defined by a set of distinctive features.

The more features you specify, the smaller the set of sounds (each feature filters out more sounds from the inventory of sounds in a language):

\[
[+\text{cons}] = \{ \} \\
[+\text{cons}, +\text{voice}] = \{ \}
\]

We expect the definition of natural classes to correlate with the groups of segments found commonly as triggers or undergoers of natural phonological rules.

**Writing Rules with features:**
The segments which undergo the rule should be a natural class; the segments which trigger the change (the environment) should be a natural class, and the change should be described in terms of feature change.

\[
[+\text{voice}, +\text{cont}] \rightarrow [-\text{voice}] / [-\text{voice}] ___
\]

\[
[+\text{syl}] \rightarrow [+\text{nas}] / ___ [+\text{nas}]
\]

\[
[-\text{cont}] \rightarrow [+\text{cont}] / V ___ V
\]

\[
[+\text{nas}, -\text{syl}] \rightarrow [\alpha\text{lab}, \beta\text{cor}, \gamma, \text{ant}, \delta\text{dist}] / ___ [-\text{cont}, \alpha\text{lab}, \beta\text{cor}, \gamma, \text{ant}, \delta\text{dist}]
\]