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### What is a good theory?

From Schwartz, cited in Bauman-Wangler, p. 48

Theoretical frameworks for language must:

- Address abstract knowledge and representation
- Address processing of input, how it's represented, and how it's produced
- Address developmental change

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### Phonological Theories

- Contemporary theories are phonological theories
- Focus on the function of the phoneme in creating meaning
- Phonology recognizes two levels:
  - phonetic level of sound production
  - phonemic level or function of sounds
- Phoneme is a family of sounds

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### Articulation versus Phonology

- Traditionally articulation
  - underlying assumption that children know the rules
- More currently, phonology
  - main goal is mastery of the rules not the sounds
- However, articulation and phonology are highly dependent
  - example of child with cleft palate
  - example of child with fronting processes
- Does the terminology matter?

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**Distinctive Feature Theories**

- What features of sounds function within a language to create meaning?
- **Distinctive features** are the phonetic properties that distinguish between phonemes
  - example of voicing /p/ vs. /b/
- Jakobson - first attempted to use distinctive features to describe sound classes (1928)
- Distinctive features are universal properties that can be used to describe all the sounds of human languages

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**A binary system**

- Binary system uses + or -
  - + indicates presence of distinctive feature
  - - indicates absence
- “Two sound segments are considered distinct, and can, therefore, serve as phonemes if at least one of their features is different”

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**Distinctive Features Describe Cognates**

<p><b>/p/</b></p> <ul style="list-style-type: none"> <li>• + consonantal</li> <li>• + anterior</li> <li>• - voicing</li> </ul> <p><b>/t/</b></p> <ul style="list-style-type: none"> <li>• + consonantal</li> <li>• + coronal</li> <li>• + anterior</li> <li>• - voicing</li> <li>• - continuant</li> </ul>	<p><b>/b/</b></p> <ul style="list-style-type: none"> <li>• + consonantal</li> <li>• + anterior</li> <li>• + voicing</li> </ul> <p><b>/s/</b></p> <ul style="list-style-type: none"> <li>• + consonantal</li> <li>• + coronal</li> <li>• + anterior</li> <li>• - voicing</li> <li>• + continuant</li> </ul>
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**Classification Systems**

- Features are theoretical constructs, thus there are different systems:
  - Jakobson, Fant and Halle
  - Chomsky and Halle (The Sound Pattern of English, SPE)
- Initially, J, F and H used acoustic features, now most systems are primarily based on articulatory features
- “Strident” is an example of an acoustic feature

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**Chomsky and Halle’s System**

- Table 2.4, p. 33 in BBF (2009), Chomsky and Halle
- Terminology falls under 5 categories of features (See Table 2.1., p. 18 in BBF for 3 of these):
  - (1) Major Class Features
    - distinguish groups - vowels, glides, and obstruents
  - (2) Manner Features
  - (3) Cavity Features
  - (4) Tongue Root Features
  - (5) Laryngeal Features

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**Major Class Features**

- **Sonorant** - vocal cavity is relatively open
  - vowels, nasals, liquids, glides
- **Vocalic** - function as syllable nuclei
  - Aka “syllabic”
  - vowels, liquids
- **Consonantal** - produced with obstruction along the center line of the oral cavity
  - obstruents, nasals, liquids
  - NOT vowels, glides, /h/
- These three categories allowed for unique description of major groups of sounds

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**Manner Features**

- **Continuant** - air able to flow through oral cavity without complete stoppage
- **Strident** - (an acoustic feature) high intensity noise associated with friction
- **Delayed Release** - release of stop is gradual rather than abrupt
- **Lateral** - air flows through the sides of the oral cavity
- **Nasal** - air passes out of the nose

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**Cavity Features**

- **Anterior** - produced at or anterior to the alveolar region
- **Coronal** - produced with the front part of the tongue raised
- **High** - produced by raising the body of tongue
- **Low** - produced by lowering the body of tongue
- **Back** - tongue retracted from neutral position
- **Round** - lips rounded

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**Tongue Root and Laryngeal Features**

- **Tongue Root Features:**
  - Only one of these applies to American-English
  - **Tense** - more muscular tension at the root of the tongue, usually also greater constriction
- **Laryngeal Features:**
  - only interested in covering one of these features
  - **Voiced** - produced with vibration of vocal folds

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### Clinical Implications of Distinctive Features

- Shift in focus from form to function - beginning of phonology
- Distinctive features are able to describe “natural classes” of sounds
  - observed in developing sound systems
  - /p, t, k/ versus /p, z, η/
- Jakobson believed that children acquire features of the language and not sounds
  - acquisition theory
  - also predicts generalization

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### Generative Phonology

- Application of generative grammar to phonology (Chomsky)
- Generative - rules that will describe possibilities in the language, grammar or phonology
  - developed to analyze phonological systems of languages around the world
- Surface level versus deep level
  - underlying form - purely theoretical concept of how speech is represented in the mind
- Competence versus performance

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### Generative Phonology cont'd

- Distinctive features are central
- Phonological rules - used to describe differences between the underlying phonological representation of the lexeme (word root) and the phonetic or surface-level realization
  - Rules are generated to account for what occurs in a language
  - not originally used to describe children’s or disordered speech

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**Phonological Notation**

- **A → B** means A changes to B
- Example: [p] → [p<sup>h</sup>]
- **A → B/** means A changes to B in the context of
- Contexts:
  - #\_\_
  - \_\_#
  - V\_\_V
- Example: [p] → [p<sup>h</sup>]/#\_\_
- C = consonant,  $\Phi$  = deleted

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**Naturalness versus Markedness**

- **Naturalness** - denotes (1) ease of production, and (2) frequency of sounds in languages
- **Markedness** - opposite of naturalness, sounds are more difficult, less frequently occurring
- Related to development, natural sounds are acquired earlier by children and marked sounds tend to be acquired later
- Sound cognates are typically described as marked versus unmarked

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**Markedness Principles**

- Voiceless obstruents are more natural than voiced obstruents
- Obstruents are more natural than sonorants
- Stops are more natural than fricatives
- Fricatives are more natural than affricates
- Low front vowels are the most natural vowels
- Close-tense vowels are more natural than open-lax vowels
- Anterior consonants are more natural than nonanterior consonants

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### Markedness and Implied Universals

- Fricatives imply stops
- Voiced stops imply voiceless stops
- Thus, whenever a more marked aspect is seen in the language, the unmarked cognate is assumed
- This idea has also been applied to children's phonological systems

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### Clinical Implications of Generative Phonology

- Phonological rules of generative phonology have been applied to describing children's speech and disordered speech
  - Comparison of the child's speech to adult's speech
- Formal notation and distinctive features are typically not used in assessment due to level of complexity
- Naturalness/Markedness has been applied to clinical work
  - children substitute unmarked for marked sounds
  - delete the more marked member of a cluster

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### Terms Related to Phonological Theories

Phonology is primarily concerned with the unconscious knowledge that underlies a person's speech

- Segments - individual phonemes (ex. Car = k a r)
- Features - segments are composed of features
- Levels of Representation - example of surface versus deep levels
  - (ex. /æ/ same or different in "cap" and "cab")
- Rules - segments on different levels are related by rules

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**Natural Phonology**

- Proposed by Stampe to describe phonological development
- Natural phonology hypothesizes that patterns of speech are governed by an innate, universal set of phonological processes
- **Phonological Process** - a pattern of substitution that applies to a class of sounds which are difficult for an individual
- All children use the phonological processes as they learn the phonological rules of their language and as their motor system develops

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**Development and Natural Phonology**

- Child's innate phonology is continuously revised toward the adult system, passive process
- 3 mechanisms:
  - (1) **limitation** - differences in child's system compared to adult system become limited to specific sounds or sequences
  - (2) **ordering** - substitutions that appear random or unordered become ordered
  - (3) **suppression** - elimination of child's phonological processes to fit adult language

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**Phonological Processes**

- Disordered child is not progressing with suppression of processes as expected
- Phonological processes are useful clinically
  - used to *describe* the patterns of errors
  - do not need to agree with the original idea that phonological processes *explain* acquisition and disorder
- Natural Processes - phonological processes that occur crosslinguistically

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**Natural Processes**

- **Assimilatory processes**
  - Described in BBF as similar to co-articulation processes
  - See p. 54 BBF (2009)
- **Nonassimilatory processes**
  - Omission and substitution processes
  - **Epenthesis** – insertion of a sound, usually in a cluster (e.g., blue is /bʌlu/)
  - **Metathesis** – reversal of sounds (e.g., ask is /æks/)

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**Clinical Implications of Natural Phonology**

- **Relational analyses** - assessment procedures contrast the child's patterns with the adult
- **Grunwell's classifications for disordered phonological processes:**
  - (1) Persisting normal processes
  - (2) Chronological mismatch
  - (3) Systematic sound preference
  - (4) Unusual or idiosyncratic processes
  - (5) Variable use of processes

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**Linear versus Nonlinear Phonologies**

<p><u>Linear</u></p> <ul style="list-style-type: none"> <li>• emphasis on serial sequence of segments</li> <li>• segments = bundles of features</li> <li>• all sound segments have equal value</li> <li>• phonological rules apply only at the level of the segment and distinctive features</li> </ul>	<p><u>Nonlinear</u></p> <ul style="list-style-type: none"> <li>• propose a tiered or hierarchical arrangement</li> <li>• segments = distinctive features that are ordered</li> <li>• some features dominate other features</li> <li>• phonological rules are affected by the sentence, word, stress, syllable, segment, and features</li> </ul>
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**Nonlinear Phonologies**

- **Autosegmental Phonology**
  - a feature can operate independently, although within the hierarchical structure
- **Metrical Phonology**
  - specifically deals with the dimension of stress
- **Feature Geometry**
  - focused on the ordering of features, explain spreading and deletion processes

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**Nonlinear Representation**

- **Word tier**
- **Foot tier**
- **Syllable tier**
- **Onset-Rime tier**
- **Skeletal tier**
- **Segmental tier**

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**Feature Geometry**

- **Figure 2.28, p. 56 in BBF (2009) text**
- **Differs from other hierarchical depictions of Feature Geometry (Bauman-Wangler)**
- **Spread glottis**
  - applies to aspiration
- **Distributed versus grooved**
  - replaces “strident” from Chomsky and Halle

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### Underspecification

- “the theory of radical underspecification”  
– (p. 82 in Bauman-Wangler textbook)
- The minimum representations of segments are minimal, only enough info to distinguish phonemes
- Example - sonorants and nasals are voiced, so don't need to state the voiced feature
- Only state the unpredicted feature

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