Phonological Development
Learning sounds and sound patterns

- Infant speech perception
- Production: The prelinguistic Period
- Learning to pronounce
- Theories of the acquisition of phonology

Infant speech perception

- Infants are born with the ability to discriminate the phonetic contrasts of any of the world languages.
- With exposure to their own language, they begin to focus on those contrasts that are relevant for that particular language and to lose the ability to perceive certain contrasts not found in their native language.

- 3-day-old infants can identify their own mothers’ voices.
- 4-day-old infants can distinguish between utterances in their maternal language and those of another language.
- 4.5-month-old infants can recognize their names.

High amplitude sucking

- The infant is given a pacifier to suck on that is connected to a sound generating system. Each suck causes a noise to be generated.
- Infants suck less frequently after repetition of the same noise.
- They suck more in response to their interest in a new and different sound.

Production: the prelinguistic period

1. Reflexive vocalization (0~2 months)
2. Cooing and laughter (2~4 months)
3. Vocal play (4~6 months)
4. Canonical babbling (6 months~)
5. Jargon stage (10 months~)
### Sounds of babbling

- **0~6 months**: vowels, back consonants ([k], [g]), front consonants ([m], [b], [d])
- **6~12 months**: sound repertoire expands, similar across languages
- Stops, nasals, glides > fricatives, affricates, liquids

### Babbling and speech

- Children in the late stages of babble prefer to sound like the people around them.
- Children’s phonological patterns in early meaningful speech are directly linked to the babbling patterns.
- Early speech usually coexists with babbling for several months.

### Regularity in children’s renditions of adult words

- Feature change (p. 90)
- Cluster reductions (p. 92-93)
- Suprasemantical-segmental interactions (p. 94)
- Assimilation (p. 94-96)

### Voicing change

<table>
<thead>
<tr>
<th>Child A</th>
<th>Child B</th>
</tr>
</thead>
<tbody>
<tr>
<td>pot [bot] (“bor”)</td>
<td>back [bak] (correct)</td>
</tr>
<tr>
<td>top [top] (“dop”)</td>
<td>day [dej] (correct)</td>
</tr>
<tr>
<td>cat [kat] (“gat”)</td>
<td>game [gejm] (correct)</td>
</tr>
</tbody>
</table>

### Place change

<table>
<thead>
<tr>
<th>Child B</th>
</tr>
</thead>
<tbody>
<tr>
<td>pot [pat] (correct)</td>
</tr>
<tr>
<td>top [tap] (correct)</td>
</tr>
<tr>
<td>cat [tet] (“tut”)</td>
</tr>
</tbody>
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### Cluster reduction

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tr>
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<td>[w]</td>
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</table>
Suprasemential-segmental interactions

- tomato “mato”
- dessert “zert”
- supposed “posed”
- telephone “tefone”
- elephant “efent”

Assimilation 1

- “beef” [bjf] → [majf] (milk)
- “teef” [tjf] → [tjf] (tide)
- “zeef” [zf] → [znf] (tide)
- “nif” [nf] → [znf] (line)

Assimilation 2

- “shel” [sl] → [sl] (she’ll)
- “gurl” [gr] → [gr] (gurl)
- “drill” [dr] → [dr] (droll)
- “bluff” [blf] → [blf] (be'll)

Nasal assimilation

- “bump” [mjmp] → (“mump”)
- “bean” [mzn] → (“means”)
- “dance” [nzn] → (“nance”)

Accuracy of perception

- Children who fail to pronounce particular sounds correctly may have failed to perceive them correctly.
- But, usually children with normal hearing are able to discriminate sounds. Child A might be able to point correctly to a coat and a goat even while calling them both “goat.”

Rule origin

- They can not yet produce more accurate match to the adult target sound.
- They continue to apply the old rules.
- Imperfectly coordinated articulatory movements.
- Natural processes
### Canonical forms

- How to say a word is generated to other similar words
- Abstracted patterns of words (p.98)
- Children’s words can be described as several canonical forms plus a handful of other words, usually phonological idioms.

### Instrumental analyses of children’s speech

- Children may be making inaudible but correct distinction.
- The distinction is detectable only by laboratory measurement of the sound waves they produce.

### Strategies in learning to pronounce

- Conservative
- One word at a time
- Approximate whole phrases with much less clear or consistent pronunciation
- The frequency of sounds in the ambient language may also be an effect.

### Change over time

- Trial and error
- Progressive phonological idioms
- Generalization
- Overgeneralization
- Word segmentation
- Gradually replacement (p.102)

### Development after three years

- By three, most of children can pronounce all the vowels and nearly all the consonants.
- The sounds are pronounced correctly in at least a few words.
- In most cases, correct production of all sounds is achieved by around 7 years of age.

### Theories of the acquisition of phonology

- Nativist theory
- Behaviorist theory
- Cognitive approaches
## Nativist Theory
- Roman Jakobson (1941/1969)
- Sounds that are acquired late in any given language are those that are relatively rare in the languages of the world.
- Earliest contrasts developed by the individual should be those that are most common in the languages of the world such as “pa” and “ma.”

## Counterexamples
- Jacob acquired a contrast between dental and velar stops before learning to produce labials (Menn, 1976).
- Some children, for example, Hildegard (Leopold, 1970) have produced a word without any vowels, like “mmm” or “shhh,” as a first word.

## Behaviorist Theory
- External reward
- Children tended to begin acquisition with the most frequent phones of their language and then proceed to the least frequent ones (Olmsted, 1971).
- Counterexample: very frequent sound “th” is among the least to be acquired.
- Doesn’t account for individual variation.

## Regression
- The pronunciation particular words got worse over time.
- down (correct) → “noun”
- stone “doan” → “noan”
- beans “means”
- dance “nance”

## Progressive phonological idioms
- Many children acquire a word or two who pronunciation is much closer to the adult model than that of their other words.
- Daniel had initial [h] only in hi and hello. All other adult words beginning with [h] were produced without [h].

## Cognitive approaches
- Problem solving approach
- The child is seen as a somewhat intelligent creature actively trying to solve a difficult problem: how to talk like the people around her do (Macken & Ferguson, 1983).
- Internal feedback
### Strategies for temporary solutions

- Avoidance of difficult sounds or sound sequences
- Exploitation of favorite sounds
- Replacement
- Rearrangement
- One word at a time

### Characteristic component of problem solving

- Trial and error
- Generalization
- Overgeneralization

### Cognitive approach

- Internal reward
- Children get external rewards whatever they perform.
- Deaf children miss internal feedback.
- The child is innately disposed to feel pleasure with behavior that he apprehends as successful emulation of adult or peer models.