**Phonological Development: Production**

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**Introduction:**

- Children aged 1.6-4.0 years: 50 word vocabulary
- Important Stage: “The phonology of simple morphemes”

Example- Jespersen (1922): children in different linguistic communities show a tendency to replace velar stops with alveolar ones.

- The child who says [tæt] for *cat* will also say [do] for *go*.

**Phonological Processes: sound law**

- Universal set of hierarchically ordered procedures used by children to simplify speech

- Stamp sees phonological development as a gradual loss of these simplifying processes until the child’s words finally match their adult models

**Substitutions:** comparing adult words to those the children use

- **Place difference:** [bøt] for book…b and o same sounds, but “t” replaces “k”

- **Stopping:** Fricatives, and occasionally other sounds, are replaced with a stop consonant.
  
  *Ex: English- (2.9) sea [ti]; sing [tin]; say [Thei]*
  
  *French- (1.9) fleur ‘flower’ [pØ]; chaud ‘hot’[tɔ];*

- **Fricatives are the most commonly affected group of sounds.**
- **Stopping is common, but actual application of its application by individual children is not**

- **Fronting:** Velar and palatal consonants tend to be replaces with alveolar ones
  
  *Ex: English- (2.0) shoe [zu’]; shop [za’p]; call [ta’]; coat [dut]*
  
  *Polish- (1.11) dz’enkuje ‘thank you’ [dz’ekuje];
  
  *tfasu ‘time’ [ts’as’u]*

- **Fronting:** Two kinds including fronting of palatals and fronting of velars
  - Children may show one and not the other
  - Process interacts with stopping, so child may replace [f] with [t]

- **Gliding:** A glide [w] or [j] is substituted for a liquid sound, i.e. [l] or [r]
  
  *Ex: English- (2.1) lap [jæp]; leg [jek]; ready [wedɪ]*
  
  *Estonian- (1.9) raha ‘money’ [jaha’]; Rosbi ‘Robert’ [jo’bi]*
  
  *French- lampe ‘lamp’ [äp]; la ‘the’ [a]; lire ‘read’ [i]*
lune ‘moon’[um]

- Substitutions used in phonological processes may be highly influenced by the child’s phonological system, not just by universal tendencies.

- **Vocalization**: A vowel replaces a syllabic consonant, a process esp. in English.
  
  Ex: English- (1.9) apple [apo]; bottle [babu]; bottom [bada];
  button [bΛtΛ]; dinner [dindΛ]; hammer [mænu]

- **Vowel Neutralization**: Nasal vowels tend to be changed into oral vowels and vowels in general are often centralized, i.e. [a] or [Λ].
  Ex: English- (2.0) back [bat]; hat [hat]; yard [za:d]; hug [had]

- **Vowel Neutralization** usually occurs earlier and doesn’t affect this part of development.

**Assimilatory Processes**: assimilate one segment in a word to another

- **Voicing**: Consonants tend to be voiced when preceding a vowel, and devoiced at the end of a syllable.
  
  Ex: English: 
  ***paper (2.3) [be:bə]; (2.7) [beibə];
  (2.7) [pe:pə]; (2.8) [pʰeipə]
  **(1.5) pig [bik]; paper [bepi]; toes [dos]

- **Consonant Harmony**: In C\textsubscript{1}VC\textsubscript{2} (X) contexts, consonants tend to assimilate to each other in certain predictable ways. The three patterns that occur are:
  (i) **Velar Assimilation**: Apical consonants tend to assimilate to a neighboring velar consonant.
  
  Ex: (1.7) duck [gΛk]; sock [gΛk]
  (2.2) tickle [gigu]; taxi [gəg:] 

  (ii) **Labial Assimilation**: Apical consonants tend to assimilate to a neighboring labial consonant.
  
  Ex.: tub [bΛb]; table [bΛbu]; steps [bɛps]; tape [bejp]

  (iii) **Denasalization**: A nasal consonant will denasalize in the neighborhood of a non-nasal consonant.
  
  Ex: (2.1) mouton ‘sheep’ [potɔ]; (2.2) monsieur [pofo]

- **Progressive Vowel Assimilation**: An unstressed vowel will assimilate to a preceding (or following) stressed vowel.
  
  Ex: English- (2.0) bacon [bũ:du]; flower [fũ :wa]
  French- (1.7) oiseau ‘bird’ [pogⁿo]

- **Voicing** has two separate, but related processes:
  - Devoicing of final consonants
  - Voicing of prevocalic consonants
    - Voicing of prevocalic consonants: voiced consonants are actually voiceless unaspirated ones.

**Studies**: *Smith (1973): Showed a gradual shift from a voiced substitution to a voiceless unaspirated to the correct voiceless aspirated.*
*Bloch (1913): French-learned daughter voiced prevocalic consonants at
the beginning of her phonological development (French [p] is voiceless
unaspirated).
*Gilbert (1977): Voice onset time for voiceless stops is less stable and
takes longer to develop than for voiced ones.

Some children do appear to assimilate more than others. Also, the various possibilities
for assimilation are quite numerous...

*Menn (1975): proposed that there is a strength hierarchy that determines the
direction of assimilation, in which weaker consonants become to stronger ones.
  • From strongest position to weakest, is velar, labial, dental.

A sample from Menn’s son is as follows:

1. b-d, t    e.g. bed [bed]; boots [buts]
2. k-p, d    e.g. cup [kʌp]; cuddle [kʌdu]
3. t-b→b-b  e.g. tub [bʌb]; table [bʌbu]
4. b-g→g-g  e.g. big [gɪɡ]; back [ɡæk]

*The example above is based on the rule that \( C_1 \) assimilates to \( C_2 \) if \( C_1 \) is weaker
than \( C_2 \) on the strength hierarchy.
  • Since vowels develop rapidly, progressive vowel assimilation is a process
that is usually lost early.

**Syllable Structure Processes:** There are specific phonological processes which are
directly motivated by the tendency of young children to simplify syllable
structure, i.e. a basic CV syllable.

-Fricatives are easier to produce postvocally than prevocally
  • **Cluster Reduction:** A consonant cluster is reduced to a single consonant.
    Ex: English- (1.11) clown [kaʊn]; play [pe]; train [ten]; dress [dɛs]
    German- (2.2) fliegen ‘fly’ [fiːkən]; grosse ‘big’ [ɡɔʊsə]

  • **Deletion of Final Consonants:** A CVC syllable is reduced to CV by
deleting the final consonant.
    Ex: English- (1.5) bib [bi]; bike [bai]; more [mʌr]; out [aʊ]
    French- (2.0) air [ɛ]; allumette ‘match’ [me]; assiete ‘plate’ [asε]
    *Direction of the deletion is also predictable

  • **Deletion of Unstressed Syllables:** An unstressed syllable is deleted,
especially if it precedes a stressed syllable.
    Ex: English- (1.9) banana [nænə]; (2.3) granola [ɔwənə]
    Romanian- (2.0) masina ‘the car’ [məsina]; papusǎ ‘doll’ [pupuasə]
    *The deletion both of final consonants and unstressed syllables is also
frequent, although the latter seems to persist longer than the former.
Reduplication: In a multi-syllabic word, the initial CV syllable is repeated.

Ex. English- (1.9) cookie [gege]; TV [didi]; water [wawa]
French- (1.11) asseoir ‘sit’ [sisi]; bavette ‘bib’ [vεv:ε]

Reduplication occurs quite early in children’s speech and is often lost by the time the stage under discussion begins. Children vary greatly in their tendencies to reduplicate.

Other Aspects of Phonological Development

Dynamic Considerations: System being observed through the children is not static, but dynamic.

- Phonetic Variability: children show in their pronunciation of words.
  - Child 1.6 said these different words for blanket on the same day: [bwati], [bati], [baki], [batit]
  - Bloch (1913): During the months preceding 1.9, vocabulary is limited to around 40 words, and pronunciation is more fixed.
  - Phonological processes are lost not suddenly, but gradually
  - Children will usually have frozen forms in their speech:
    pronunciations that occur early in development and persist during a time when the child should show better pronunciation
  - Children will produce occasional advanced forms:
    productions that are better than what would be expected, given the child’s phonological abilities.
  - The importance of words leads to a significant claim about the structure of a child’s phonological system…this description is inadequate

- adult form + phonological processes = child’s form
  - Children actively operate on adult forms to establish their own phonological representations of these words.
  - That is, there is 1) the adult form; 2) the child’s representation of the word; 3) the child’s spoken form.
  - The child has not yet established a representation in the advanced form, so that the form has not yet conformed to the child’s system

- First few months of phonological development are also characterized by relatively extensive homonymy Ex: ([bat] (1.10) bad, bark, bent, bite)
- Priestley (1980): Problem with homonyms: child perceives the adult words as the same or adult perceives the child’s productions as the same
- Homonymy: *Longitudinal data indicates that the rate of homonymy decreases consistently over time and *the extent of occurrence becomes minimal for most children by age 2

Non-isomorphic processes: Phonological processes have been assumed to be isomorphic in relating the adult form to the child’s production: i.e. a one-to-one correspondence between each element in the adult form and each one in the child’s.
*Priestly (1997)- son around 1.10-1.11 showed these words:

a) banana [bajan] 1.10  
b) Brenda [bεjan] 1.10  
c) carrot [kajat] 1.11  
d) streamer [mijat]  
   
chocolate [kajak] 1.10  
panda [pajan] 1.10  
   
peanut [pijat] 1.10

*Group A was by far the most predominant pattern. The processes are as follows:

1) Change all multisyllabic words into the structure C1VjVC2 
2) After cluster reduction, place the initial consonant of the adult word into the C1 position 
3) If the second consonant of the adult word is an obstruent, place it into the C2 position (Group a) 
4) If the second consonant of the adult word is a sonorant, drop it and place the next consonant into the C2 position (Group c) 
5) If the second consonant is a sonorant, but there is not a third consonant, place the sonorant into C2 (Group b)

Phonological Preferences: preferences by a child for specific articulatory pattern.

- Example: Young boy with preference for nasal consonants- uses many words with nasals and shows a tendency to assimilate non-nasal consonants to nasal ones:  
  Cream [mim] and [miŋ] 1.9  
  Sandwich [nanu] 1.7 and [nænu] 1.9

There are three basic positions: initial, medial, and final.

-Not only do children over-use certain preferred sounds, they also may avoid words that contain sounds that they cannot currently produce.

Summary: Ages 1.6-4.0:

- The child’s language is dynamic in nature, so analysis needs to observe both old and new developments as well as the gradualness of phonological change. 
- The phonological preferences individual children have will also contribute to marked differences.