Child Language Acquisition

LIGN 170, Lecture 12

Roadmap

- Today – basic overview of early language development in children
- Tuesday – theoretical issues with relevant studies and findings; bilingual language development
- Thursday - Interaction of developmental disorders and language development

Today

- Early language perception
- Early language production

Language perception

- At birth, infants
  - already prefer the sounds of their mother's voice
  - can discriminate between mother's native language and other languages
- Low-frequency language information heard in utero

Discriminating sounds

- Adult speakers have difficulty discriminating between language sounds that are not phonemic contrasts in their native language
- Young infants do not demonstrate this difficulty initially:
  - Can discriminate any contrasting phonetic sounds in the world's languages

- How can we possibly know that?

Are /s/ and /ɕ/ different sounds for you, sweetie?

Testing infants

- Some helpful things infants do for experimenters:
  - They look longer at new stimuli compared to familiar stimuli
  - They suck faster when exposed to new stimuli

Testing infants

- Habituation - dishabituation method
  - Habituate infant on one stimulus
  - Show new, different stimulus
    - Does the infant react to the new stimuli as new?

Testing infants

- Habituation-dishabituation measures
  - Time looks to stimulus
  - High-Amplitude Sucking Paradigm
    - Does the infant start sucking faster on a pacifier (that's hooked up to a monitoring device)?

Testing infants

ba ba ba ba ba ba.

Testing infants

ba ba pa ba ba ba.

Testing infants

ba ba pa ba ba ba.

Testing infants

ba ba pa ba ba ba.

Can manipulate range of phonetic features, like VOT

Limited-time offer

- However, infants can discriminate all phonemes for a limited period of time:

At 4 to 6 months

- Non-native vowel discrimination goes away
- Vowels:
  - One study looked at German infants
    - Non-native vowel contrasts initially distinguished
    - After 6 months this ability seemed to disappear
- Non-native sounds lumped into target language categories

At 10 to 12 months

- Non-native consonant discrimination goes away
  - Only native consonants are discriminated
- The (speech) perceptual system is being reorganized around these time periods (4-6 months & 10-12 months)

Theory

- Exposure and habituation to the sounds of the target language impedes an infant's ability to perceive phonetic contrasts that the native language does not make
- There are innate language abilities that are lost due to experience with a first language
- One is born with all language sounds available, but sound distinctions are lost because as sound system develops

Something gained, something lost

- Loss of perceptual ability is related to development of phonemic categories for the first language - phonemic organization
  - Discrimination is lost only for distinctions that are necessary for perception of one's own language
    - Example: need to loose aspiration distinction in English
      - /p/ is /p/ and /p^h/

Something gained, something lost

- Evidence from allophone perception
  - 6- to 8-month-olds can discriminate between non-contrastive English allophones (e.g. /p/ and /p^h/)
  - 10-to-12-month-olds cannot

Something gained, something lost

- Phonemic organization account predicts:
  - People should be able to still discriminate between sounds in categories that aren't present in the language

Something gained, something lost

- Discrimination of 3 different types of Zulu clicks:
  - Apicodental: Tongue tip released from back of upper teeth (Tsk!)
  - Alatoalveolar: Tongue tip and blade released from midline of hard palate behind alveolar ridge (Tock!)
  - Lateral alveolar: Asymmetrical, tongue released from lateral portion of alveolar ridge (commonly used as a horse command)

Something gained, something lost

- English-speaking adults are easily able to tell these apart, because they cannot be assimilated to any native phonemic categories
- Four groups of infants:

1) 6-8 months old
2) 8-10 month old
3) 10-12 months old
4) 12-14 months old

No difference between groups

Something gained, something lost

- Phonemic organization account
  - Click evidence supports idea that loss of discrimination at 10-12 months is the result of phonemic organization

Responding to infant directed speech

- IDS, also called motherese & care-giver speech
- 7-week-old infants prefer infant-directed speech to adult-directed speech
  - Regardless of gender of speaker
- Older infants show this preference as well, but younger infants are more responsive, both in terms of attention and affect

Responding to infant directed speech

- Infants (4-5.5 months) prefer vocal features of infant-directed speech even with facial features held constant

Responding to infant directed speech

- Undergraduates rate infants listening to IDS as more appealing
  - Suggests that IDT may facilitate the establishment of an emotional relationship between adults and infants

Responding to infant directed speech

- English- and Cantonese-learning infants (aged 4.5-9.0 mo)
  - Both sets showed a robust attentional and affective preference for IDS over Adult-directed speak in Cantonese
- Preference for IDS apparently not language-specific
- (Almost) all cultures modify their speech for infants

Content vs. intonation

- What kinds of information can infants take in?
  - Intonational cues predominate up to 15 months

Content vs. intonation

Positive intonation

yes, yes, that's good!

no, no, don't touch!

Negative intonation

yes, yes, that's good!

no, no, don't touch!

Content vs. intonation

Positive intonation

yes, yes, that's good!

no, no, don't touch!

Negative intonation

yes, yes, that's good!

no, no, don't touch!

At 8 months…

- Intonational cues only

yes, yes, that's good!

no, no, don't touch!

At 8 months…

- Intonational cues only

yes, yes, that's good!

no, no, don't touch!

At 15 months…

- Fine when intonation matches content

yes, yes, that's good!

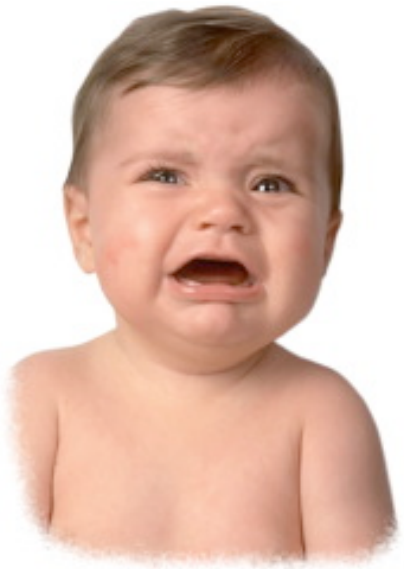
no, no, don't touch!

At 15 months…

- Really unhappy when intonation conflicts with content

yes, yes, that's good!

no, no, don't touch!



Content vs. intonation

- What kinds of information can infants take in?
  - Intonational cues predominate up to 15 months
    - Thereafter, semantic content can conflict with intonation

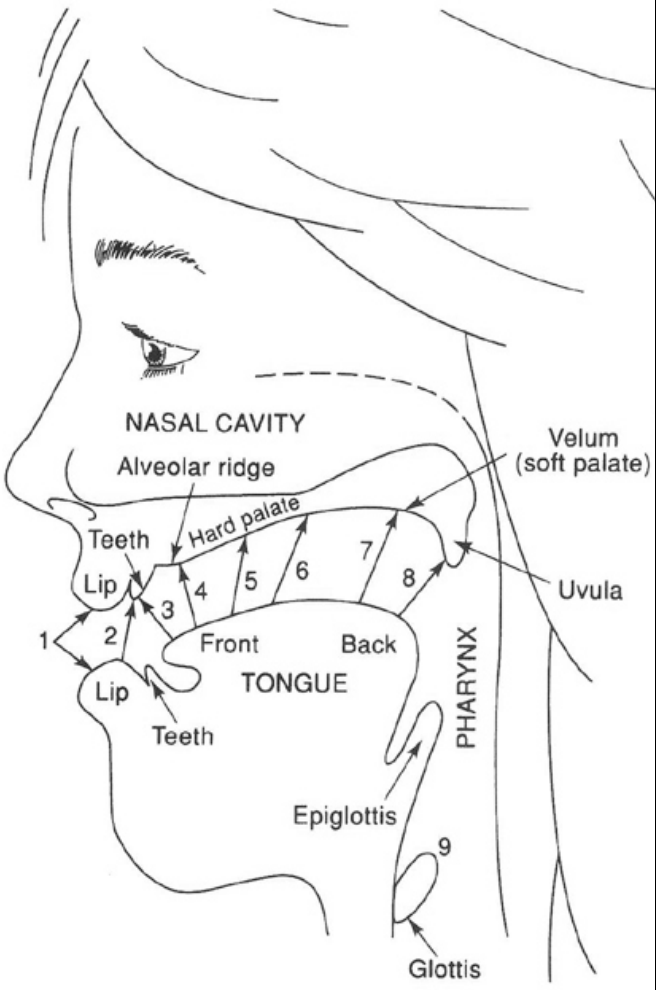
Intonation & IDS

- Prosody of IDS (but not adult-directed speech) appears to be useful for segmenting the speech stream and for structural bracketing
- But IDS is not strictly needed -
  - Infants are very good at detecting sound patterns and segmenting speech sounds in artificial speech

Early Language Production

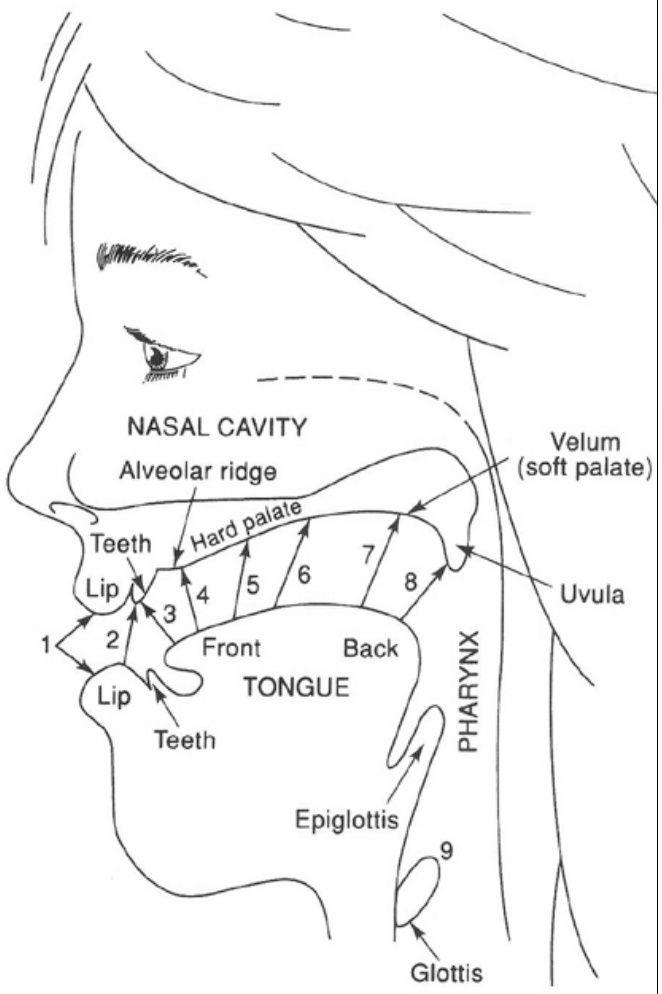
Infant Speech Production

- Return to the larynx
  - At birth – the larynx is relatively high, and entire vocal tract is quite different from adult
  - At 3 months – larynx begins to descend (won't hit adult location until ~3 years old)
  - At 4 months – the vocal tract begins to resemble an adult vocal tract



Infant Speech Production

- Because of their maturing vocal tract, some sounds are genuinely difficult for young children to produce
- In particular, early vowels are often central, and only later go the extremes of [i] and [u].



Stage I (0-8 weeks): Basic biological noises

- Reflexive
  - Hunger, pain, and discomfort resulting in crying
- Vegetative
  - Sucking, swallowing, coughing, burping
- Airstream mechanism and vocal folds used to produce pitch patterns in a rhythmical fashion

Stage II (2 to 5 months): Cooing and laughing

- Cooing sounds develop alongside crying
  - Quieter, lower-pitched, and more musical than crying
- Short vowel-like sounds preceded by a consonant-like sound produced at the back of the mouth
- No rhythm or intonational contour
- Laughing sounds emerge at around 4 months

Stage III (5 to 7 1/2 months): Vocal play

- High-pitched CV-like segments over one second long, frequently repeated (longer in duration than cooing)
- Wider intonation ranges (high to low)
- Large inventory of consonant and vowel sounds, with periodic focus on particular places of articulation

Stage IV (around 6 to 12 months): Babbling

- Features of babbling:
  - 1) Sounds are a subset of possible sounds found in spoken language
    - 12 most frequent sounds in babbling = 95% of all consonants heard in the infants' subsequent language production
    - 12 least frequent sounds (often fricatives, affricates, and liquids) = 5% of subsequent production

Stage IV (around 6 to 12 months): Babbling

- Features of babbling:
  - 2) syllabic organization
  - 3) reduplication
    - Same two sounds repeated: bababa papapapap

Stage IV (around 6 to 12 months): Babbling

- Features of babbling:
  - 4) variegated babbling (follows reduplication – around 12 months
    - Sounds change from syllable to syllable (bamipabo)
  - 5) lack of meaning/reference
  - 6) rhythm and intonation reminiscent of speech
  - 7) continuity of phonetic form and syllabic type between a child's babbling and first words

Stage IV (around 6 to 12 months): Babbling

- Features of babbling:
  - Less varied than vocal play
    - More language-like in that it includes more language sounds
    - Continues after speech begins (as late as 18 months)
  - Considered part of linguistic development
  - Infants will often seem to "practice" when alone
    - Suggests that babbling is related more to practicing speech sounds than communication

Language environment & babbling

- Babbling of children in different language environments is not judged different by subjects
- However, studies of 10-month olds from different language backgrounds (French, Arabic, English, Cantonese) have shown that their production of vowels parallels differences in the adult vowels in each language.

Language environment & babbling

- Toward the end of the 1st year, infants are also more likely to babble in ways that respect the distribution of syllable types within their language environment:
- French infants less likely to produce closed syllables (/bam/ vs. /ba ma/) than English-exposed infants.

(Adult French has a much lower occurrence of closed syllables than Adult English)

Babbling & Sign Language

- Deaf infants also babble
  - Often delayed (11-24 months) compared to hearing infants
  - Often different in character (e.g. fewer different kinds of consonants)
    - This indicates that exposure to a spoken language influences babbling

Babbling & Sign Language

- Infants (hearing and deaf) who are exposed to sign language will babble manually:
  - Circular motion of clasped hands, with index and middle fingers of right hand opening and closing
  - Middle finger and thumb together, index finger pointed wrist flexes back and forth

Stage V (9 to 18 months): Melodic utterance

- Variations in melody, rhythm, and intonation become a major feature toward the end of the first year
- Begins to sound language-like

Phonological Errors

Consistent phonological mistakes into and through year 2:

1) fricatives replaced by stops: see ==> tee
2) velars replaced by alveolars: gone ==> dawn
3) consonant clusters avoided: sky ==> Kai
4) final consonants omitted: hat ==> ha
5) unstressed syllables dropped: banana ==> nana
6) consonant/vowel harmony:

   window ==> wow-wow

7) liquids replaced by glides: lion ==> yion

First words

- Around 12 months
  - Focus on words related to the here & now, concrete things:
    - toys, clothes, food they eat
  - Words for things that they can influence
    - “ball” likely to be learned earlier than “chair” or “tree”

First words

- Two kinds of errors kids can make:
  - Overextensions – refer to all four legged animals as dogs
  - Underextensions – refer to only the family dog as dog

The mapping problem

- Child says "What's that?" and points to:

- So... how could this possibly go wrong?

Potential problems

- More than one referent could apply to word
  - "Teacup"

Potential problems

- More than one word may apply to a referent
  - tea?
  - teacup?
  - saucer?
  - a drink?
  - cup?

Apparent solutions

- Whole object bias – children prefer to attach new labels to the whole object

- Mutual Exclusivity bias – children prefer to have only one name for an object

Doing a lot with a little: Holo-phrases

- "Water!" could mean
  - "Hey, that's a glass of water!"
  - "Hey, I want that glass of water!"
  - "Hey, give me some water!"
  - "Hey, look at that dog drink that water!"
  - "Hey! why don't you drink some of that water?"

Early "multiword" utterances

- Children begin using single words around 12 months
- During 2nd year, two-word utterances begin
- In the meanwhile...
  - Children will also pick up whole phrases as single words at the early (1- and 2- word) stages

Also between one and two years…

- Gesture-word combinations
  - Predicate-Agent Combinations
    - A `Fall-down' gesture (a palm flipping over in the air, an iconic gesture) while saying `mouse'
  - Predicate-Patient Combinations
    - Pointing at a box while saying `open'

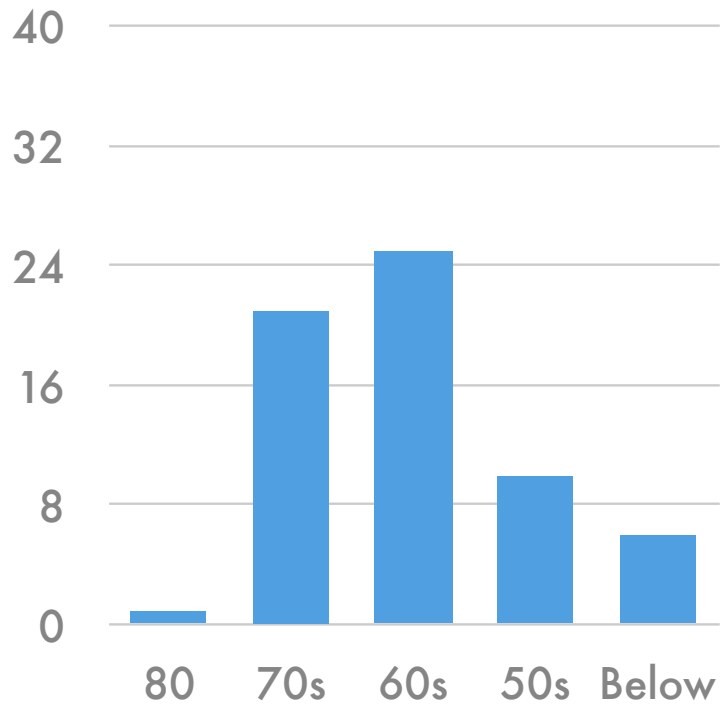
Summary

- Birth
  - Discriminating language sounds
  - Preferring mother's language
- Birth to 1 year
  - Phoneme comprehension
  - Babbling
  - First words

Summary

- 1 to 2 years
  - Gesture + Single Words
  - Holo-phrases
  - Two-word stage

Midterm



Score Distribution

Example Curve

70-80: As

60-69: Bs

40-59: Cs

Below: Ds

Broken down by question