Lec21: Language Development

Slides from Mark Liberman, David Pesetsky

HUL 242

25/4

Infant vocal tract

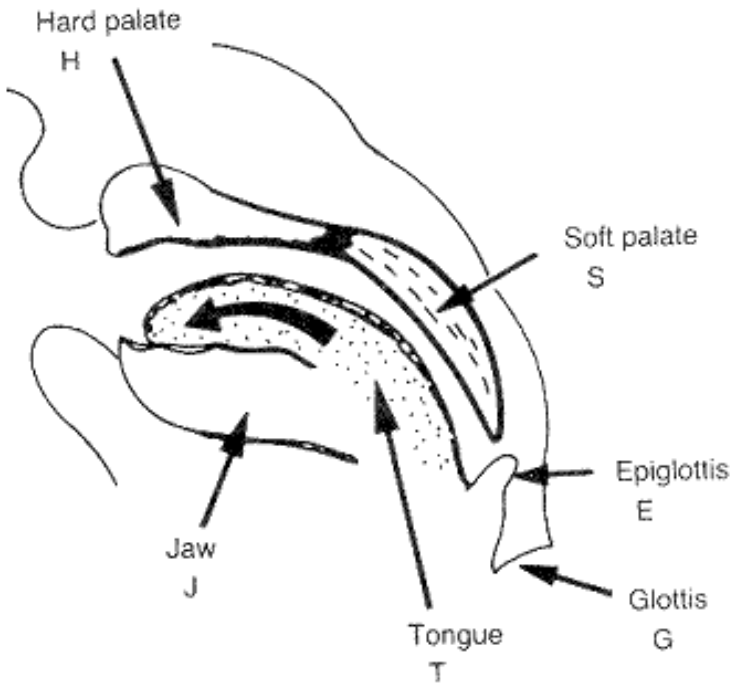
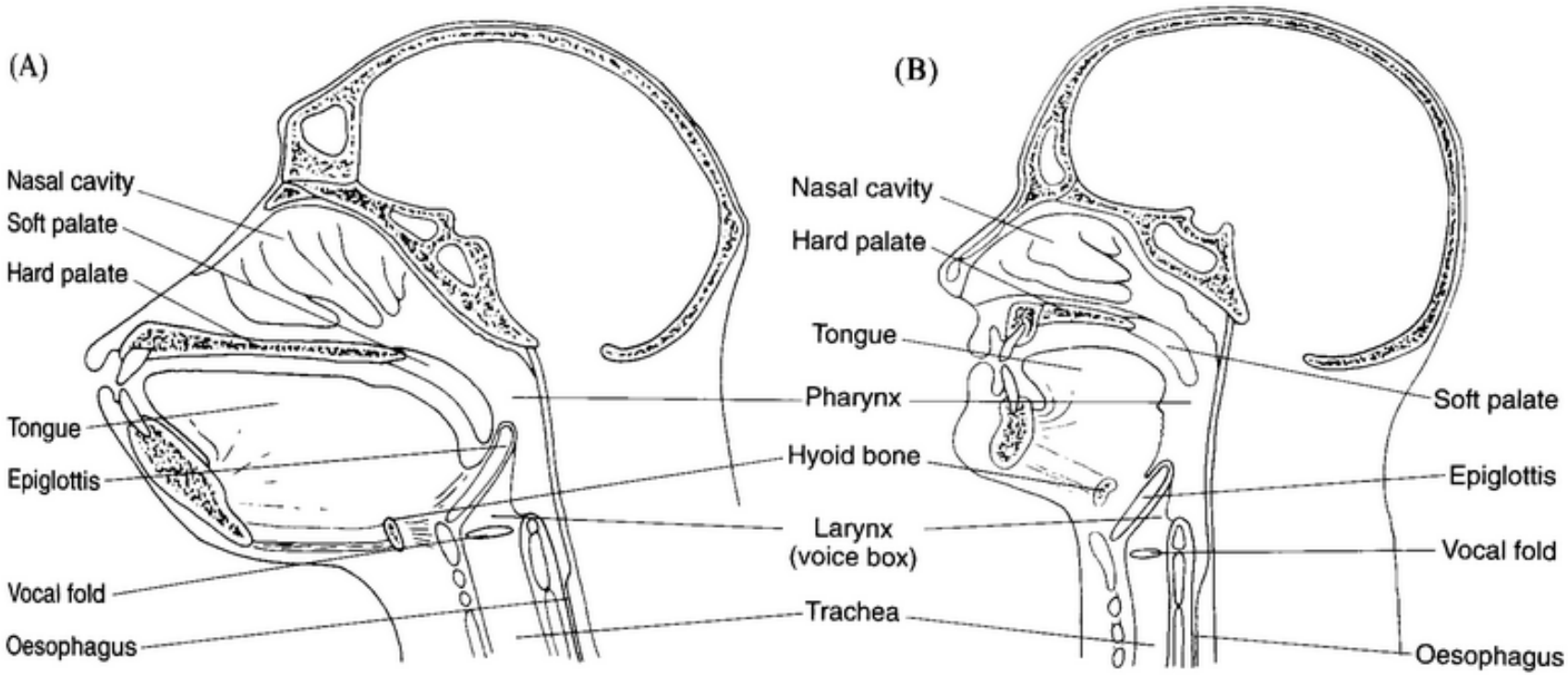


Figure : Soft palate close to the epiglottis in a baby

Image from Mark Liberman

Ape and human vocal tracts



Imagine you are a baby

- Which sounds are phonetically easier to learn?
- What kind of words are linguistically easier to learn?

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Imagine you are a baby

- Which sounds are phonetically easier to learn? : Stops rather than fricatives, simple CV sequences
- What kind of words are linguistically easier to learn? Open class rather than closed class items

Babbling	6-12 months	Repetitive CV patterns
1 word	1 yr - 1.5 yrs	Open class items, stems
2 word	1.5- 2 yrs	mini-sentences, simple semantic relations
telegraphic	2- 2.5 yrs	Telegraphic structures, lexical morphemes
Adult-like	2.5 yrs onward	Lexical and functional morphemes

Rapid vocabulary increase

At the 2 word stage, 5-9 new words learnt daily until the child reaches 6 years.

Telegraphic word stage

- See cow (Eve at 25 months)
- Doggy bite (Adam at 28 months)
- Kathryn no like celery (Kathryn at 22 months)

- No determiners, modals or auxiliaries or inflections
- Often, no pronouns as well
- Sensitivity to word order

- She's gone. Her gone school. (Domenico at 24 months)
- He's kicking a beach ball. Her climbing up the ladder there. (Jem at 24 months).
- I teasing Mummy. I'm teasing Mummy. (Holly at 24 months)

How do children learn words?

- How do you segment speech into words if you don't know the words?
- *pretty baby* $\rightarrow$ pri-tibey-bi

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Prosodic bootstrapping
Statistical bootstrapping

- English words usually begin with a stressed syllable
- Exaggeration during production: (Motherese)

- Sensitivity to the distribution of words

Marcus et al, 1999

- Infants recognize some patterns before producing sounds
- Stream of synthesized (nonsense) syllables heard by 7 mo. olds
- One group heard *ga ti ti, li na na* the other *ti ga ti, na li na*
- A second set of sounds were presented, which the infants could control by looking at/away
- These did not have the same syllables, but similar *patterns*
- Infants preferred new words following the 'old rule'

Comprehension before production

- Production usually lags behind comprehension
- We know this via experiments based on gaze direction (4-9 mo)
- Infants also distinguish speech in native language vs. foreign language (3 mo)

Maternal diaries and checklists

When children produce approx 10 words, they comprehend around 60
5 months for the gap to be closed between comprehension and production

Over-regularization

C: My teacher holded the baby rabbits and we patted them.
A: Did you say your teacher held the baby rabbits?
C: Yes.
A: What did you say she did?
C: She holded the baby rabbits and we patted them.
A: Did you say she held them tightly?
C: No, she holded them loosely.

Irregular inflections (like hold-held) are often over-generalized to the regular inflection (walk-walked)

The big debate

Do parents **teach** children how to speak, or do children learn from the input?

- Does deliberate instruction help, or is there an innate mechanism?

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A: What did you say she did?
C: She holded the baby rabbits and we patted them.
A: Did you say she held them tightly?
C: No, she holded them loosely.

- In the previous example, the adult is trying to *recast* the child's utterances
- Is the child learning from such deliberate instruction?

Usage-based vs. innatist theories of acquisition

- Clear that social interaction does play a role- know this from 'feral' children
- Yet, children (or humans in general) do appear to have a pattern-finding system
- Languages are also known to emerge without explicit instruction (e.g. home-sign, or Nicarguan Sign Language developed by an isolated group of deaf children)

Word order studies

- Word order and inflections tell us about grammatical relations
- *The cat ate the rat* vs *billi-ne chuhe-ko khaaya*
- Languages themselves have different word orders- how sensitive are children to word order?

Views on word order acquisition

- Inside-out theories
  - Attention to word order determines the order of the heads (verbs, nouns)
  - Children note early whether the parameter for the language is head-final or head-initial
  - Only these options are available, based on the idea of a Universal Grammar

X-bar parameters[1]

Specifier	*Adjunct*	*Complement*
$XP \rightarrow (YP)\ X'$	$X' \rightarrow (ZP)\ X'$	$X' \rightarrow (WP)\ X$
		
$XP \rightarrow X'\ (YP)$	$X' \rightarrow X'\ (ZP)$	$X' \rightarrow X\ (WP)$

[1] Image from Andrew Carnie

Views on word order acquisition

- Outside-in theories
  - Children pay attention to the input they receive and map from utterances to grammatical relations
  - Gradually, based on more input, they generalize the relations to particular word positions
  - No pre-set options to choose from

Word order acquisition

- Test the sensitivity to word order to children in single-word stage : Hirsh-Pasek and Golinkoff (1996)
- Do they still know the difference between *The cat ate the rat* vs the *The rat ate the cat* ?
- In contrast, Akhtar (1999) looks at production in children between 2-4 years.

Hirsh-Pasek and Golinkoff

- 16-19 mo infants tested using preferential-looking paradigm
- Training phase and a testing phase
- Tested on 4 familiar verbs *tickle*, *hug*, *wash* and *feed*

Hirsh-Pasek and Golinkoff

- Children see a light, then hear a sentence 'Look, Cookie Monster is tickling Big Bird. Where is Cookie Monster tickling Big Bird?'

Hirsh-Pasek and Golinkoff

- Children expected to focus on a picture where CM is tickling BB, rather than the reverse
- Found that the gaze/looks matched favorably with the sentence (but only for the girls, not the boys)
- The wording of the question was found not to have any effect on the looking

Akhtar

- A production, rather than a comprehension study
- Participants older, 2-4 yrs of age
- Heard three novel verbs *tamming*, *gopping* and *dacking*
- E.g. throwing a toy down a tube is *tamming*

Akhtar

- Children shown three word orders: SVO, SOV and VSO
  - Elmo dacking the car
  - Elmo the car dacking
  - Dacking Elmo the car
- During testing, the action shown again, child asked to describe the action

Akhtar

- The two year olds did not correct the word order, but 4 year olds did so
- Akhtar hypothesized that verb frames (semantics) was learnt first (2 yrs), and then the word order (4 yrs)
- Her work supports the 2 stage learning hypothesis