

LING 190 Module 6: Speech Development

Table of Contents

1. The Development of Speech in Human Infants	1
1.1. Topics to cover	1
2. Anatomy	1
2.1. The newborn vocal tract	2

1. The Development of Speech in Human Infants

- 2 months: coos and makes gurgling sounds
 - We can see that even 2-month-olds are vocalizing
 - This includes crying, which is a very loud vocalization
 - Most babies, at this age, begin to coo.
- 6 months: coos develop primarily with an open vocal tract, but at 6 months, the babies beginning to move their superlaryngeal vocal tract, making more rhythmic sounds that begin to sound like consonants
- 9 months: lots of different sounds, including ‘bababa’ and ‘mamamama’
 - this is called the ‘babbling phase,’ which just includes a repeating consonant-vowel pattern
- 18 months: several single words, and the words they’re saying resemble the language that they are learning
- 2 years: sentences with 2 to 4 words.
- 4 years: storytelling, essentially fluent speech

1.1. Topics to cover

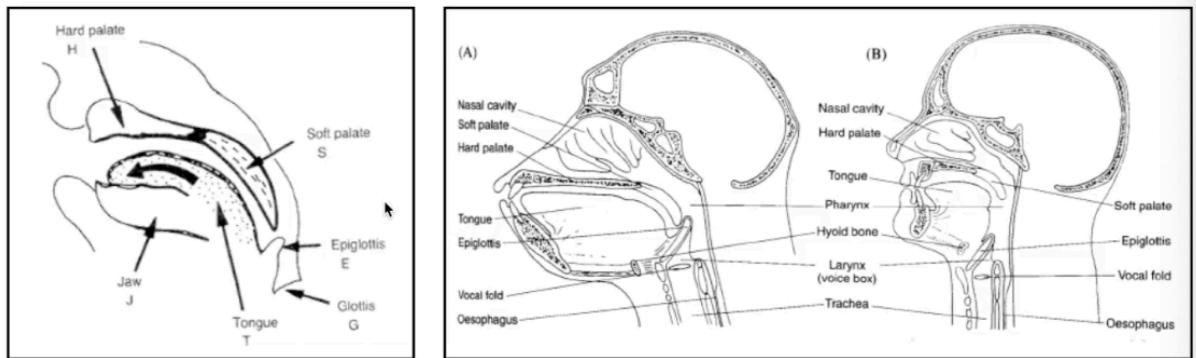
- development of vocal tract anatomy
- Kinds of speech babies hear and produce
 - testing developmental speech perception
 - baby speech production
 - How baby vocalizations change throughout age and how it improves
- How we perceive and change our speech in adulthood
 - puberty voice changes
 - What are some of the factors that affect speech patterns and speech habits (which determine how we sound when we speak)

2. Anatomy

- How do infant and child vocal tracts develop
 - length of vocal tract, vocal folds, other structures
 - Sex differences between males and females
 - What are some factors that affect how the vocal tract develops

2.1. The newborn vocal tract

Very similar in shape to the ape vocal tract. Certain sounds are impossible or very difficult to produce at this age, since the vocal tract is physically different to an adult.



Some differences:

- No teeth in young babies
 - No teeth means no **dental** place of articulation
- Vocal tract length is much shorter
 - This will change later in development
 - Similar to apes, where the tongue can move forward and backward easily, but moving up and down is a problem.
- Newborns/young infants have less neuromuscular control over tongue and other active articulators
- The epiglottis is oriented differently than in an adult
- The vocal folds are also at an angle
- Larynx is still relatively high in the vocal tract

2.1.1. Childhood

- In the first 18 months of life, the vocal tract lengthens extremely quickly, which tracks with the development of the rest of the body at this age.
 - The vocal tract continues to lengthen into adulthood, but this slows down as is typical for the rest of the body.
 - It still takes many years for the vocal tract to reach its full length
 - In the first few years, there aren't many differences between the length of a male and female vocal tract, but as age increases, adult male vocal tracts are typically much longer than female vocal tracts.

2.1.2. Puberty

- Puberty is a gradual change (5-6 year duration)
- Usually begins at 9-11 years of age
 - starts slightly earlier in females
- There are dramatic changes in vocal tract during this period
- **Vocal tract length** increases
 - During puberty, the larynx descends rapidly.
 - By the end of puberty, the larynx ends up twice as long as it was before puberty

- **Males, on average** have a longer vocal tract (during and after puberty).
- There is still quite a bit of overlap (in percentiles) between male and female vocal tract lengths.
- **Length of vocal folds** also change
 - Before puberty, the vocal folds are very similar between males and females
 - After puberty, male vocal folds thicken and become longer compared to female vocal folds
 - Because of the changes in length and thickness, an audible drop in F_0 pitch of male voices is noticeable (from an average of 280Hz to 120Hz).
 - Despite the average being around 120Hz, there is still quite a bit of variability.
 - Females, on average, have a pitch of around 220Hz