

Development of language

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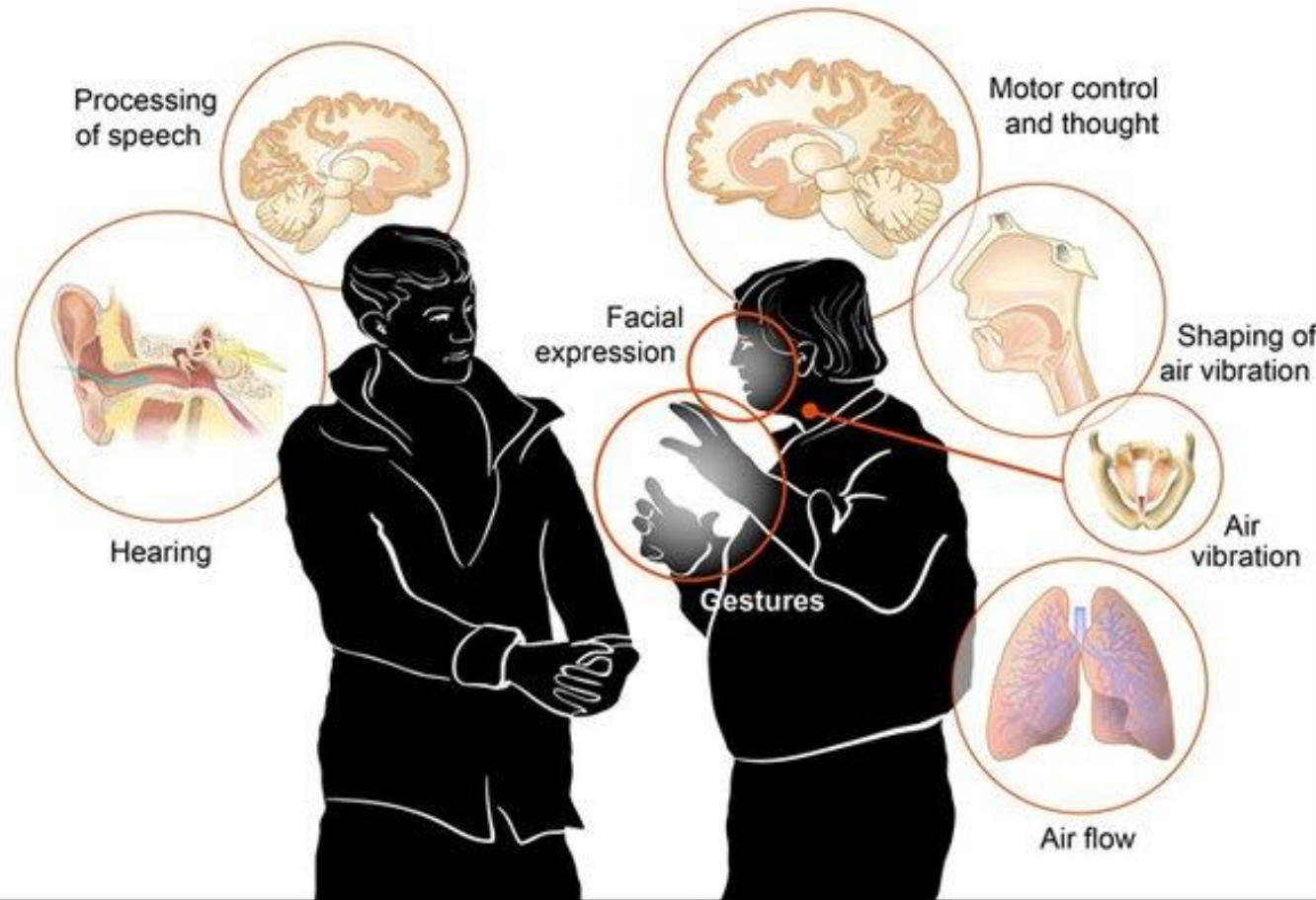
The origin of language

- ▶ "**Continuity theories**" build on the idea that language exhibits so much complexity that one cannot imagine it simply appearing from nothing in its final form; therefore it must have evolved from earlier pre-linguistic systems among humans' primate ancestors.
- ▶ "**Discontinuity theories**" take the opposite approach—that language, as a unique trait which cannot be compared to anything found among non-humans, must have appeared fairly suddenly during the course of human evolution.
- ▶ Some theories consider language mostly as an innate faculty—largely **genetically encoded**.
- ▶ Other theories regard language as a mainly **cultural** system—learned through social interaction

Theories of Language Development

- ▶ **Skinner: Operant Conditioning**
- ▶ **Chomsky: Language Acquisition Device**
- ▶ **Piaget: Assimilation and Accommodation**
- ▶ **Vygotsky: Zone of Proximal Development**

THE ANATOMY OF LANGUAGE



Language and the brain

Broca's Area :

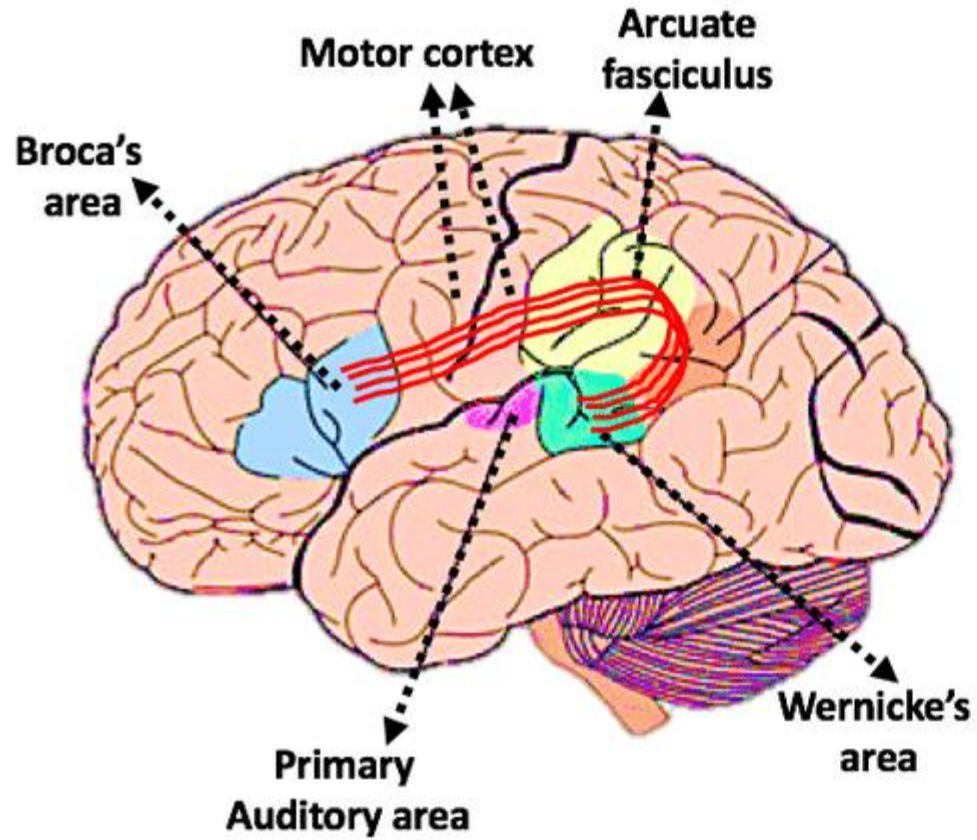
- ▶ located in the frontal lobe of the brain, is linked to speech production, and recent studies have shown that it also plays a significant role in language comprehension. Broca's area works in conjunction with working memory to allow a person to use verbal expression and spoken words. Damage to Broca's area can result in productive aphasia (also known as Broca's aphasia), or an inability to speak. Patients with Broca's can often still understand language, but they cannot speak fluently.

Wernicke's Area

- ▶ Wernicke's area, located in the cerebral cortex, is the part of the brain involved in understanding written and spoken language. Damage to this area results in receptive aphasia (also called Wernicke's aphasia). This type of aphasia manifests itself as a loss of comprehension, so sometimes while the patient can apparently still speak, their language is nonsensical and incomprehensible

Auditory Cortex and Angular Gyrus

- ▶ The primary auditory cortex, located in the temporal lobe and connected to the auditory system, is organized so that it responds to neighboring frequencies in the other cells of the cortex. It is responsible for identifying pitch and loudness of sounds.
- ▶ The angular gyrus , located in the parietal lobe of the brain, is responsible for several language processes, including number processing, spatial recognition and attention



Broca's area: involved in production of speech sound

Wernicke's area: involved in Understanding of speech

Motor cortex: controls the Movements of muscles

Arcuate fasciculus: connects Wernicke's area to Broca's area.

Parts of the Brain that controls Speech

Vocal Production

- ▶ During the first month of life, infants make reflexive cries, fusses, and vegetative sounds
- ▶ Between 4 and 6 months of age, infants explore a variety of vocalizations, such as squeals, yells, growls, and vowel-like sounds.
- ▶ Thereafter (7 to 10 months of age), canonical or reduplicated babbling occurs, with infants producing syllables and reduplicating the same consonant and vowel
- ▶ Between 11 and 12 months, nonreduplicated babbling emerges; at this stage, infants produce a variety of sounds in which syllables, consonants, and vowels

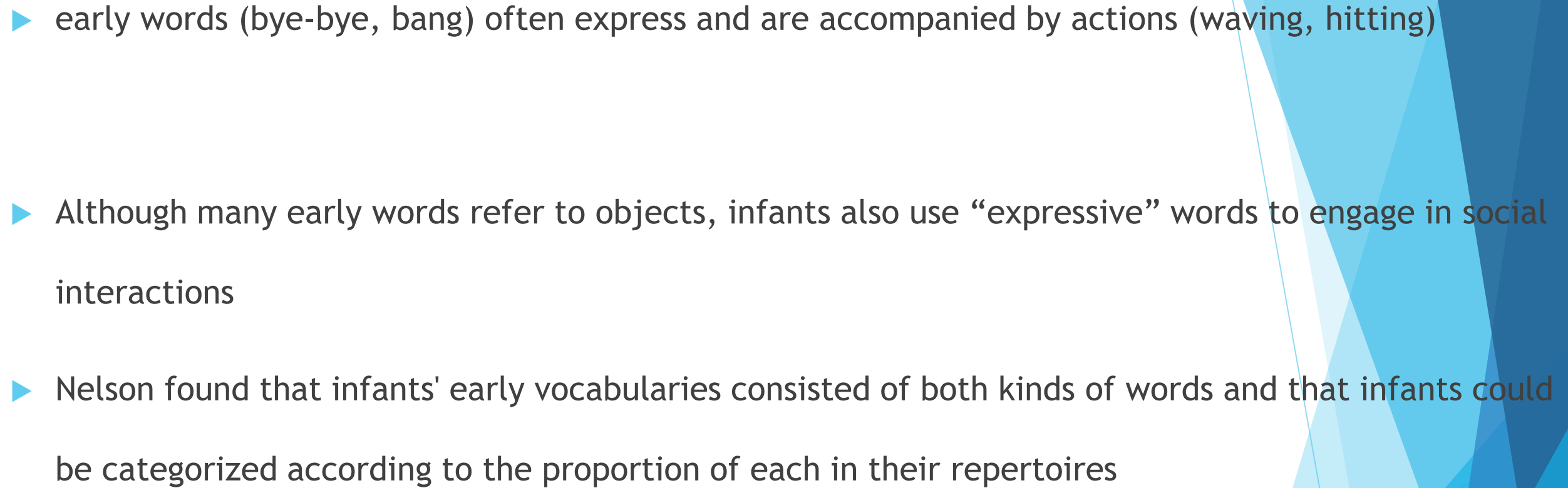
- ▶ Changes in these vocal abilities are paralleled by changes in the anatomy and physiology of the vocal apparatus, which suggests that the developmental changes in vocal behavior are related to structural changes in oropharyngeal anatomy
- ▶ initial sound production follows a universal pattern.
- ▶ Infants brought up in Spanish-, Japanese-, Arabic-, or English-speaking homes show no great differences in their basic sound production repertoire, suggesting that very different linguistic experiences do not affect the elements of babbling very much

- ▶ infants with little language experience vocalize much like infants in sound-rich environments until they are approximately 6 months old
- ▶ This does not mean that sound production is unaffected by environmental input: Infants eventually do produce the sounds they commonly hear, and they correctly mimic the rhythm and intonation of their native language long before they know what the words mean
- ▶ Webster found that when 6-month-olds were stimulated with vowel sounds, they increased the proportion of consonants produced, and vice versa

- ▶ studies suggest that infants can modify their own vocalizations in response to the vocalizations of others, by either matching or contrasting the sounds that they hear
- ▶ The amount and patterning of babbling is affected by **environmental factors** as well.
- ▶ when adult vocalizations or adult silences are contingent on infant vocalizations, infants suppress their own vocalizations just after the contingent stimulation or silence, as though listening for something.

First Words

- ▶ Gesell observed that children regularly say their first words approximately the time they celebrate their first birthday.
- ▶ At this age, children are interested in movements and actions they can perform, both with and without objects, and their first words typically reflect their sensorimotor schema; often they refer to objects that move or can be held rather than to equally common words on which infants seldom act (diaper, crib, shoe)

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- ▶ early words (bye-bye, bang) often express and are accompanied by actions (waving, hitting)
 - ▶ Although many early words refer to objects, infants also use “expressive” words to engage in social interactions
 - ▶ Nelson found that infants' early vocabularies consisted of both kinds of words and that infants could be categorized according to the proportion of each in their repertoires

- ▶ Although children may use one style more than the other, only rarely do they exclusively use either one
- ▶ In addition to individual differences in the style of first words used, individual differences in the timing of early word acquisition are common
- ▶ Similar variation was found in the number of words in the vocabularies of 13-month-olds; production ranged from 0 to 45 words, and comprehension varied from 11 to 97 words .
- ▶ In general, **comprehension** of words precedes their production.

Sharing a Referent: Development of Gestural Communication

- ▶ Producing and comprehending words necessitates an understanding of shared referents.
- ▶ During the second half of the first year, infants begin to use and understand various communicative signals to potentiate mutual attention to external topics
- ▶ Joint attention and external reference are the bases of symbolic communication, be it gestural or vocal

- ▶ There is some evidence indicating that infants who experience more of these joint attention experiences tend to talk earlier and show faster vocabulary development
- ▶ Toward the end of the first year, infants begin to share objects and events with others by using conventional gestures such as pointing, offering, and showing objects

- ▶ By the start of the second year of life, infants frequently use conventional gestures (such as showing and offering objects) with mothers and fathers, as well as with unfamiliar men and women and with peers .
- ▶ Conventional gestures and language follow a parallel developmental course. Infants begin to use shared referents, both gestural and verbal, at approximately 1 year of age, the age at which Piaget suggests that the capacity for symbolic representation first emerges

Pre linguistic Conversations and Behavioral Dialogues

- ▶ Besides helping infants understand semantics, interactive routines also help infants learn the pragmatics of language and the rules of conversation, such as mutual attention, sharing a topic, and taking turns
- ▶ Dialogues between infants and caretakers begin in the newborn period: The communicative exchanges between parents and 3-day-old infants are smooth, with a high degree of turn taking

- ▶ At this stage, however, adults more frequently initiate, follow through, and complete behavioral sequences
- ▶ At 2 months of age, infants regularly respond to attentive, talking adults by orienting to their faces, focusing on their eyes, smiling, becoming more active, and vocalizing, then shifting their gaze to the adults' mouths or away from their faces
- ▶ Infants, thus, seem to alternate between attending and expressing themselves.

- ▶ Mothers frequently respond to such pre speech with talk of their own. By 3 months of age, infants and parents tend to alternate their vocalizations, taking turns
- ▶ Mothers are primarily responsible for initiating exchanges and attempting to elicit responses from infants, but infants at this age sometimes vocalize after silences, as if attempting to keep the “conversations” going
- ▶ Turn taking becomes more and more refined and predominates in the vocal exchanges of 6- to 16-month-olds and their mothers

- ▶ Schaffer found that turn taking occurs equally often in the vocal exchanges of 12- and 24-month-old children.
- ▶ During the first 6 months, conversations and dialogues are sustained mainly by adults, but after this, infants begin to take more responsibility
- ▶ The role of infants in the management of joint activities was shown to increase rapidly from 6 to 13 months .

- ▶ H.S. Ross reported that, when an adult stopped a game by not taking her turn, 12-month-olds reacted as though they had some understanding of the rules of turn taking; for example, they guided the adult's hand to the appropriate object, thus helping the adult to take her turn
- ▶ The infant's role in taking turns is illuminated by behavior with peers from the start of the second year, when “games” may include turn taking

- ▶ Although 12-month-olds understand some rules of social exchange and take an active role in keeping exchanges going, adults still take the major responsibility
- ▶ That vocal and behavioral interactive routines follow the same developmental course is illustrated by Bruner's descriptions of “Give and Take” games and Snow's examinations of vocal conversations

- ▶ At 3 months, Bruner found the game of “Give and Take” to be one sided, with mothers offering objects to their infants most frequently
- ▶ At 6 months, the infants played a more active role, accepting the objects

- ▶ By the end of the first year, children more often initiated turns, actively assuming the roles of speaker and listener
- ▶ By 12 months, children both gave and took objects. The number of exchanges and offers of objects initiated by the children increased from 0% to 50%, so that “Give and Take” became a game involving reciprocal roles

Language and cognition

- ▶ 4-6 months: Babbling using all sounds.
- ▶ 6-9 months: Babbling becomes more focused—narrowing of sounds.
- ▶ 10-12 months: First words develop.
- ▶ 18-24 months: Children begin using two-word phrases (example: “Me up” or “Get milk”).
- ▶ 2-3 years: Children begin using three-word phrases in correct order with inflection.
- ▶ 4-5 years: Children start speaking with nearly complete syntax.
- ▶ 5-7 years: Children begin using and understanding more complex language.
- ▶ 9 years and older: Children understand almost all forms of language.

با تشکر از توجه شما

