

LANGUAGE AND ITS DEVELOPMENT 2

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LANGUAGE



...an indicator of mental representation and sets humans apart from other species.

Theories of Language Development

Three theories:

Learning Theory Environment (B. F. Skinner)	Learning Perspective Nurture - infants are directly taught Learned through operant conditioning (reinforcement) and imitation
Nativist-Biology (Noam Chomsky)	Nativist Perspective Nature - infants teach themselves Humans are biologically predisposed to learning language. Inborn Language Acquisition Device (LAD) biologically prepares infants to learn rules of language.
Interactionist	Both nature and nurture affect language development Inner capacities and environment work together; Social context is important.

Nature and Nurture

Genes

Environment
spoken language
heard

Brain
mechanisms for
understanding
and producing
language

Behavior
Mastery of
native language

Theory 2 Infants Teach Themselves

Noam Chomsky: Nativist Perspective

Innate Capacity for Language - Humans biologically primed to acquire language

Language Acquisition Device (LAD) - Humans are born with a **LAD**; children are pre-wired for language, including intonations and language structure

Human brain predisposed to understand language -LAD contains a universal grammar – a knowledge of rules common to all languages which allows children with sufficient vocabulary to create new combinations of words, words they may never had heard before

Universally patterned stages of development in language acquisition:

- In the earliest stage, children's language consists of names, desires for action.
- Later child able to generate language that uses words and sentences to express their opinions, feelings and needs.

Research Support for Theory Two

- Babies are eager learners
- Genetic programming
- Categorization

Nativist Perspective

What about animals?

- Chimps can sign, manipulate objects or even use specially designed computers, ask and answer questions, but they do not show knowledge of grammar, rarely use new information in utterances and show little understanding of language pragmatics, such as taking turns in a conversation
- In other words, it is unclear whether they can produce grammatically correct phrases.
- Nativists argue that other species lack the specialized brain mechanism common to all humans: LAD.

Nativist Perspective

- At birth, infants highly sensitive to and show a preference for speech sounds
- Early speech sounds are universal and indistinguishable
- Linguistic universals are evident – developmental patterns of speech and language “mistakes” common around the world
- Some theorists even postulate a critical period for acquiring language

Contributions of the Nativist Perspective

- Humans are biologically predisposed widely accepted by experts
- Babies are eager learners

Limitations

- There does not appear to be one single area that is LAD as Chomsky proposed. Instead, the LAD may be thought as several interconnected brain areas

Interactionist Perspective

A Hybrid Theory

- Language develops in many ways for many reasons
- Communication is crucial for humans, and nature provides many paths
- Any path may be preferred or more efficient in some stages, cultures, and families, but every child must learn language

Interactionist Perspective

Cognitive Approach

- Piaget believed that cognitive development is a necessary prerequisite for normal language development
- Cognitive skills interact with environmental demands and language experience to produce mature language skill

Social Interactionist Theory

- Based on information-processing theory
- Language is a result of complex interaction between the child's biological predispositions and social interactions

Interaction of biological heritage and environment

- Emphasizes the innate abilities and environmental influences to produce language
- Acknowledges the important roles of nature and nurture
- Social-pragmatic- Practical reason for language is communication

Inside-out vs. Outside-in Theories

A COMPARISON OF INSIDE-OUT AND OUTSIDE-IN THEORIES OF LANGUAGE DEVELOPMENT

	Inside-out theories	Outside-in theories
Initial structure	Linguistic	Social or cognitive
Mechanism of language development	Domain-specific	Domain-general
Source of structure	Innate	Learning procedure
Key theories	Chomsky (1981, 1986) Hyams (1986) Landau & Gleitman (1985) Pinker (1989)	Bates & MacWhinney (1989) Bruner (1975, 1983) Nelson (1977) Snow (1989)

Adapted from Hirsch-Pasek and Goinkoff (1996).

Language Disorders

COMMUNICATION

There are 3 elements in this exchange and all must be present:

1. Message

2. Message must be expressed

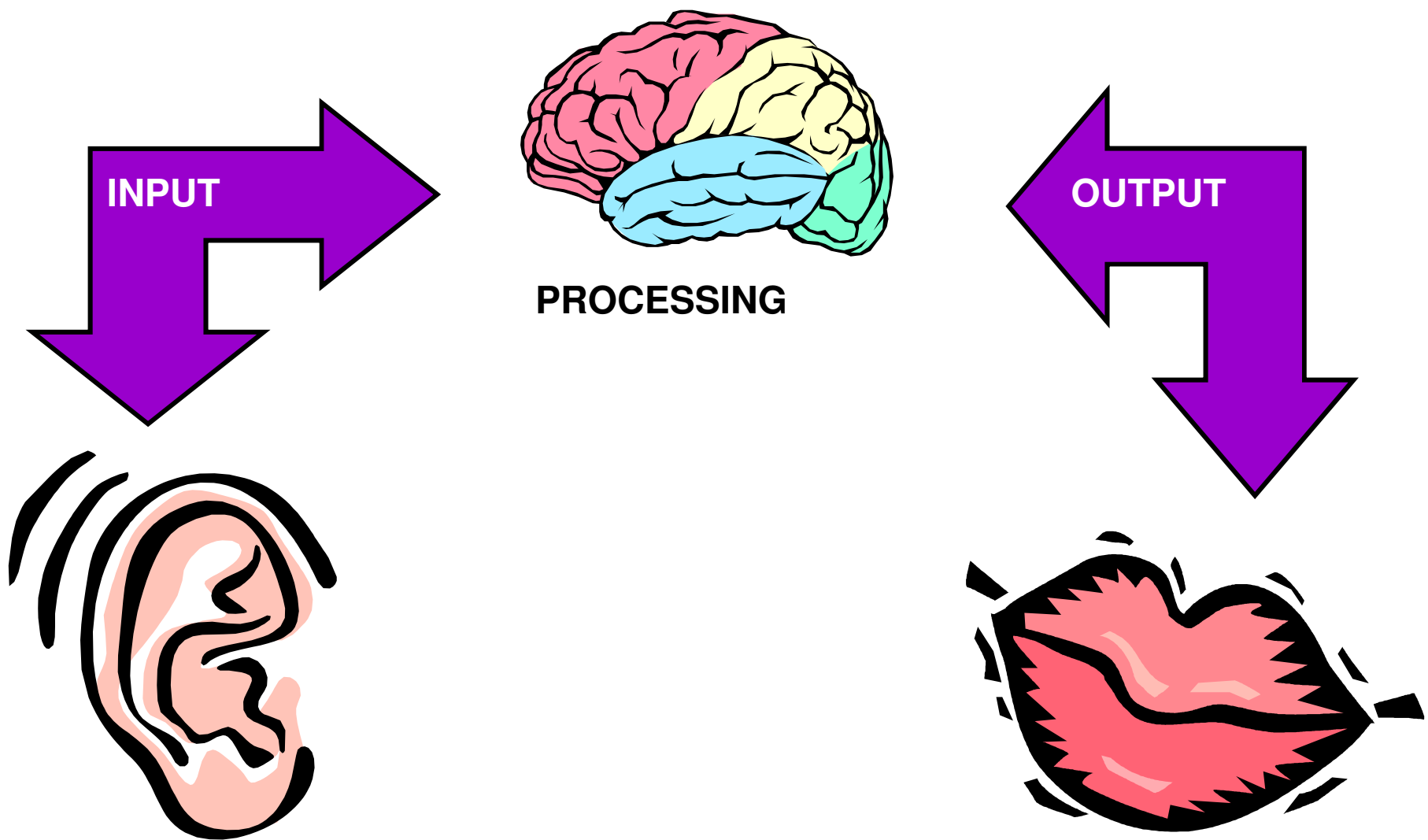
3. Message must be understood

THE COMMUNICATION CHAIN:

- Input

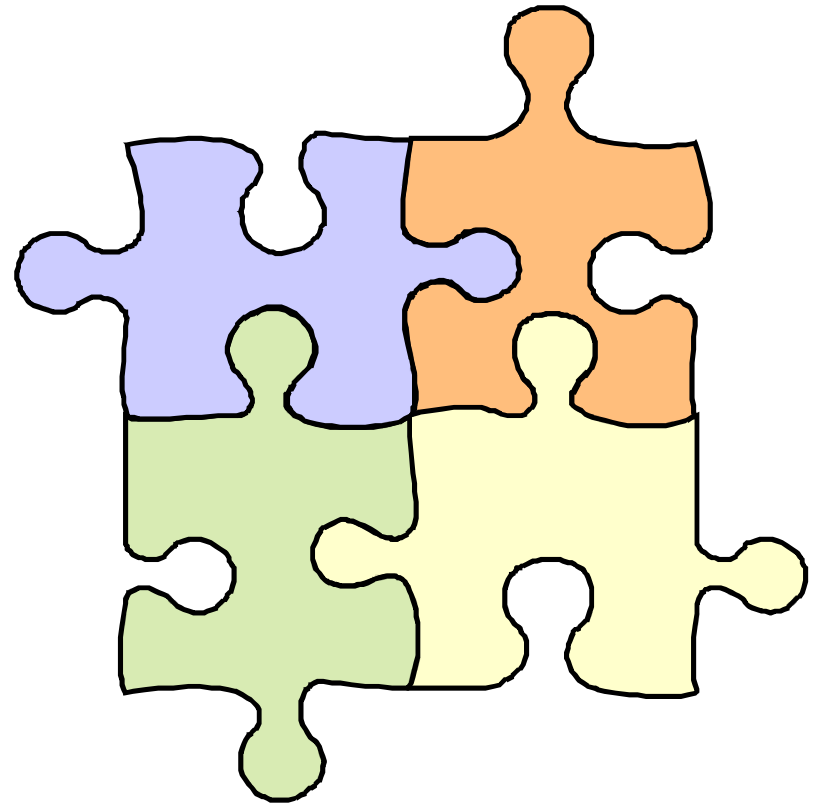
- Processing

- Output



Four domains of language

- Phonology (form) – **sounds**
- syntax and morphology (rules) - **grammar**
- Semantics - **meaning**
- Pragmatics - **use**



What are language disorders?

Some children experience significant difficulties in acquiring and developing speech, language and communication.

Language disorder occurs when a person has difficulties in using (expression) and/or understanding (reception) language.

Etiology of Language Disorders

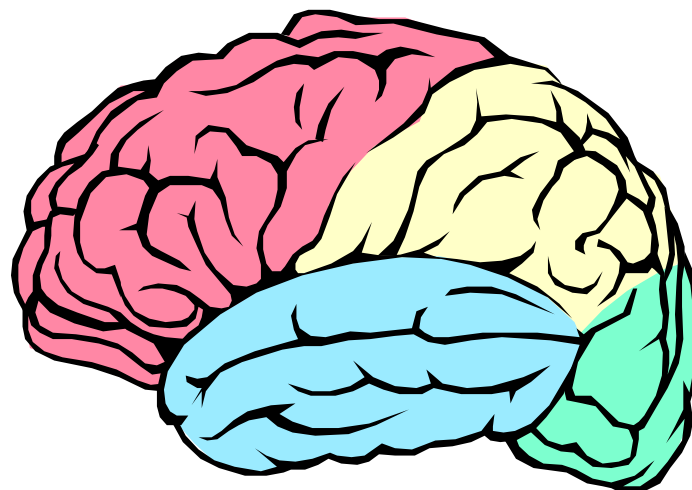
- Mental retardation
 - Hearing loss
 - Maturation delay
(developmental language delay)
 - Expressive language disorder
(developmental expressive aphasia)
- Bilingualism
 - Psychosocial deprivation
 - Autism
 - Elective mutism
 - Receptive aphasia
 - Cerebral palsy

Language disorders

- 1. Expressive language disorders**
- 2. Receptive language disorders**
- 3. Aphasia** – loss of the ability to speak or comprehend language because of an injury or developmental abnormality in the brain

EXPRESSIVE LANGUAGE DISORDER

- Brain dysfunction that results in an inability to translate ideas into speech.



May use gestures to supplement their limited verbal expression .

EXPRESSIVE LANGUAGE DISORDER

(developmental expressive aphasia)

Fail to develop use of speech at the usual age
but:

- Normal intelligence
- Normal hearing
- Good emotional relationships
- Normal articulation skills.
- Comprehension of speech is appropriate to the age of the child

Delayed speech

- Failure to develop speech at the expected age
- Usually associated with other maturational delays
- May also be associated with a hearing impairment, mental retardation, emotional disturbance, or brain injury
- Often the result of environmental deprivation

Dyslexia

- Problem in learning to read
- Common in boys and left-handed
- High IQ, so related with language only

Acquired Dyslexia = Alexia

Disorder in adulthood as a result of disease or injury


Receptive language disorders

1. Children with **language disorder** can have problems with the **sounds** of the language. They may fail to discriminate correctly between speech sounds (for e.g. /t/ versus /s/), and mispronounce sounds (for e.g. /tat for /cat/).

Children make the following speech errors:

- Substitution
- Omission
- Distortion
- Addition

2. Problems can be seen in **grammar**, with difficulties with past tense, for example, 'caught'  'caught'

We also may see problems in putting words together to form sentences 'The boy hits the ball'  'Boy hit ball'

They may also experience difficulties in using conjunctions like '**but**', '**if**', '**however**'.

3. Problems in **semantics** manifest in word finding difficulties - struggling to find the target word and overusing general words like 'thing' and 'stuff' and 'uhm' and 'er. Students with **semantic difficulties** show a reduced vocabulary and their understanding of words is very literal and limited to specific items - e.g. the word '**sweet**' will be used for a snack from the newsagent, but won't be extended to the chocolate mousse dessert. There is also less understanding of this word in a more figurative sense, i.e. the **sweet-natured man**.
4. Problems with **pragmatics** involve the way children use language. **Pragmatic difficulties** can be seen when students use language inappropriately, for e.g. using the same language when talking to their peers and head teacher. **Pragmatics** also includes the use and interpretation of appropriate non-verbal language (facial expression and body language) to communicate effectively.

Punishment given to secondary school-aged children for the following misdemeanours:

- coming in late for class
- leaving equipment at home, for e.g. a ruler in maths class
- not paying attention in class
- getting lost on the way to the classroom
- not finishing work on time
- being disruptive in the classroom

Bad behaviour or possibly understandable as part of the presenting picture of the language impairment??

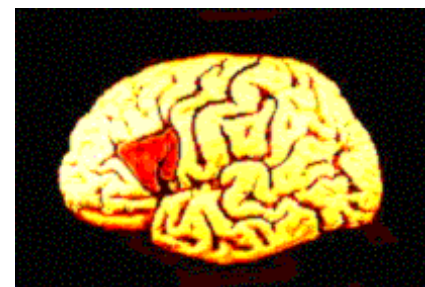
Three major types of Aphasia

- Borca's aphasia
 - Nonfluent speech
- Wernicke's aphasia
 - Fluent speech but unintelligible
- Global aphasia
 - Total loss of language

In most people the LEFT hemisphere is responsible for processing language information.

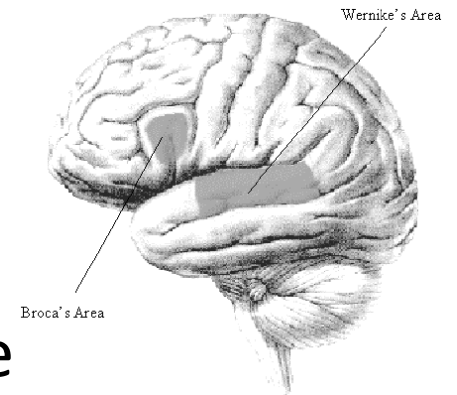
- **Wernicke's area** – left temporal lobe – helps to understand spoken words and produce coherent written and spoken language
- **Broca's area**- left frontal lobe – directs the patterns of muscle movements necessary for producing speech
- There is also a band of fibers that connects Wernicke's area to Broca's area which is involved in processing written language.

Broca's Aphasia



- Lesions in left inferior frontal region (Broca's area)
- Nonfluent, labored, and hesitant speech
- Most also lost the ability to name persons or subjects (anomia)
- Can utter automatic speech ("hello")
- Comprehension relatively intact
- Most also have partial paralysis of one side of the body (hemiplegia)
- If extensive, not much recovery over time

Wernicke's Aphasia



- Lesions in posterior of the left superior te gyrus, extending to adjacent parietal cortex
- Fluent speech
- But contains many paraphasias
 - “girl”-“curl”, “bread”-“cake”
- Syntactical but empty sentences
- Cannot repeat words or sentences
- Unable to understand what they read or hear
- Usually no partial paralysis

Wernicke-Geschwind Model

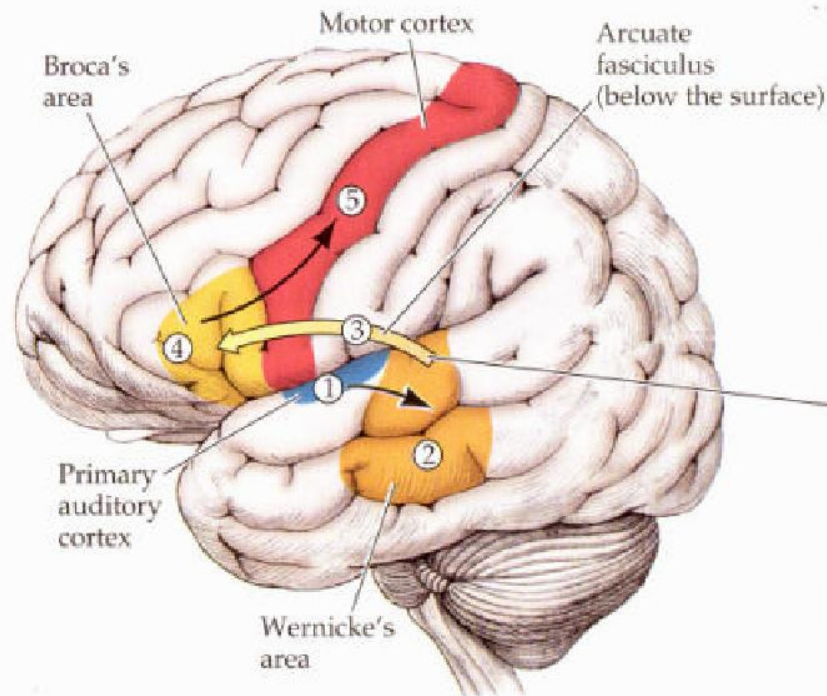
1. Repeating a spoken word

(a) Speaking a heard word

1. Information about the sound is analyzed by primary auditory cortex and transmitted to Wernicke's area.

2. Wernicke's area analyzes the sound information to determine the word that was said.

3. This information from Wernicke's area is transmitted through the arcuate fasciculus to Broca's area.



4. Broca's area forms a motor plan to repeat the word and sends that information to motor cortex.

5. Motor cortex implements the plan, manipulating the larynx and related structures to say the word.

Lesions of the arcuate fasciculus disrupt the transfer from Wernicke's area to Broca's area, so the patient has difficulty repeating spoken words, but may retain comprehension of spoken language (because of intact Wernicke's area) and may still be able to speak spontaneously (because of intact Broca's area).

- Arcuate fasciculus is the bridge from the Wernicke's area to the Broca's area

Wernicke-Geschwind Model

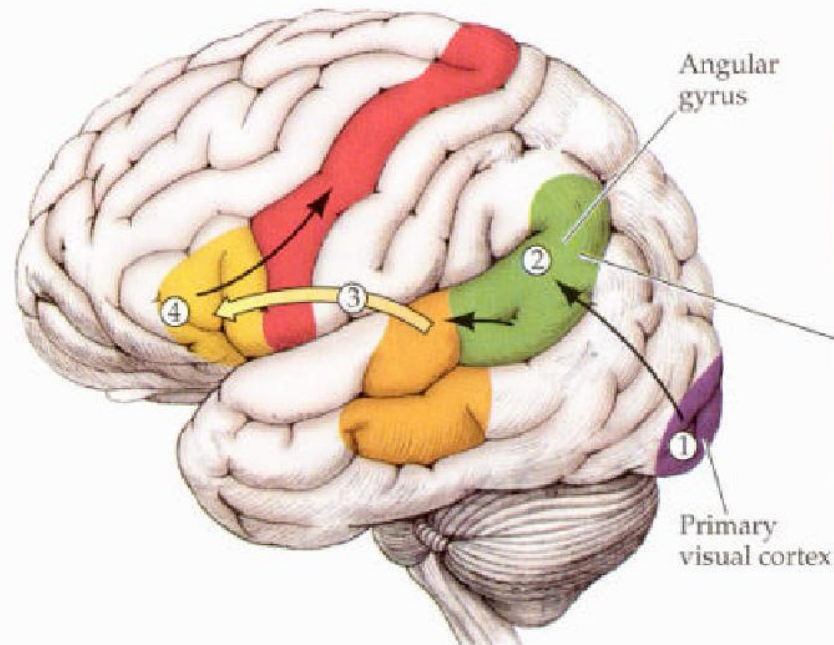
2. Repeating a written word

(b) Speaking a written word

1. Visual cortex analyzes the image and transmits the information about the image to the angular gyrus.

2. The angular gyrus decodes the image information to recognize the word and associate this visual form with the spoken form in Wernicke's area.

3. Information about the word is transmitted via the arcuate fasciculus to Broca's area.



4. Broca's area formulates a motor plan to say the appropriate word and transmits that plan to motor cortex for implementation.

A lesion of the angular gyrus disrupts the flow of information from visual cortex, so the person has difficulty saying words he has seen but not words he has heard.

- Angular gyrus is the gateway from visual cortex to Wernicke's area
- This is an oversimplification of the issue:
 - not all patients show such predicted behavior (Howard, 1997)