

# **Language and Brain**

# EXPERIENCE =

**USABILITY/ANALYTIC + DESIGN/CREATIVE**

## Left-Brain Functions

Analytic thought

Logic

Language

Science and math

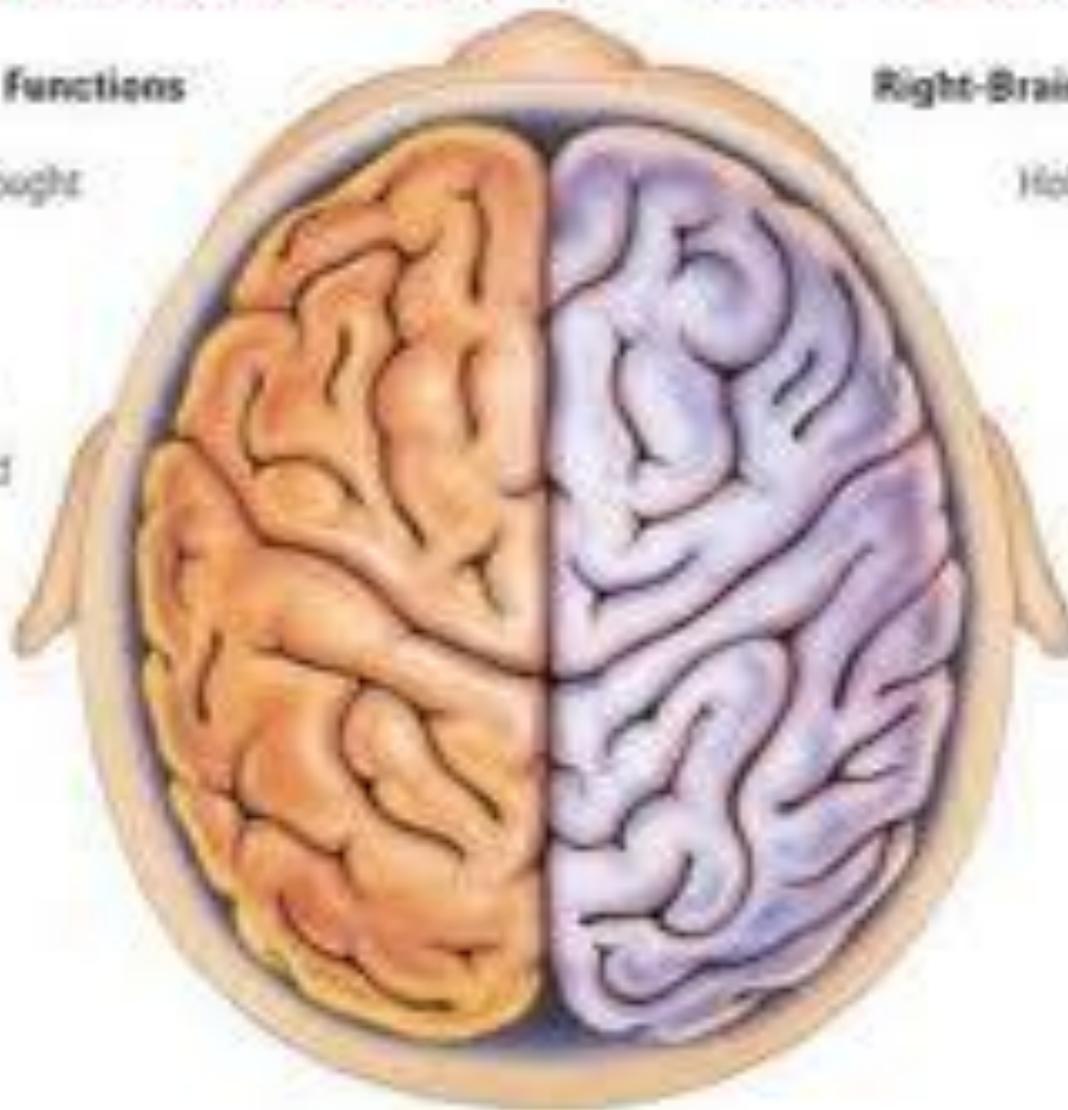
## Right-Brain Functions

Holistic thought

Intuition

Creativity

Art and music



## Left and Right Brain Functions

### Left-Brain Functions

Analytic thought

Logic

Language

Science

Math

### Right-Brain Functions

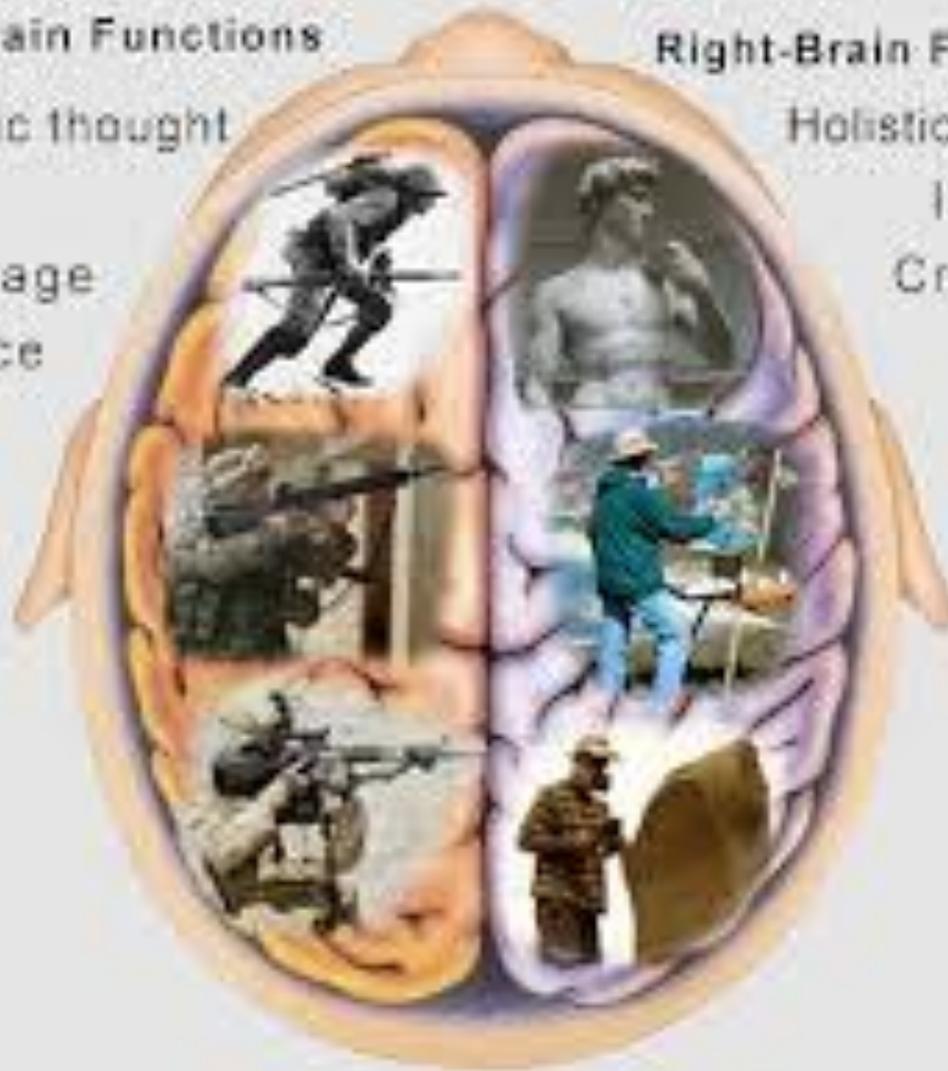
Holistic thought

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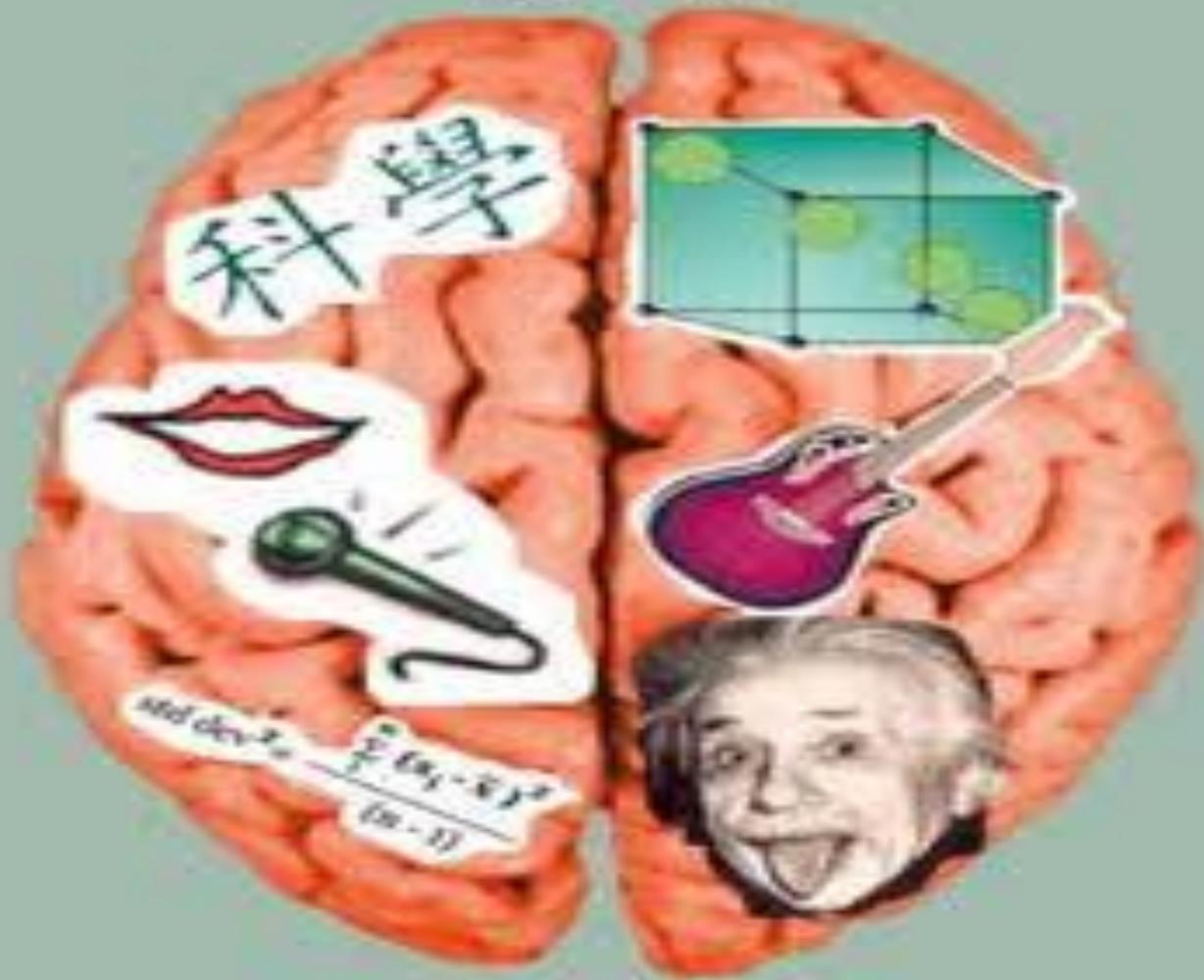
Creativity

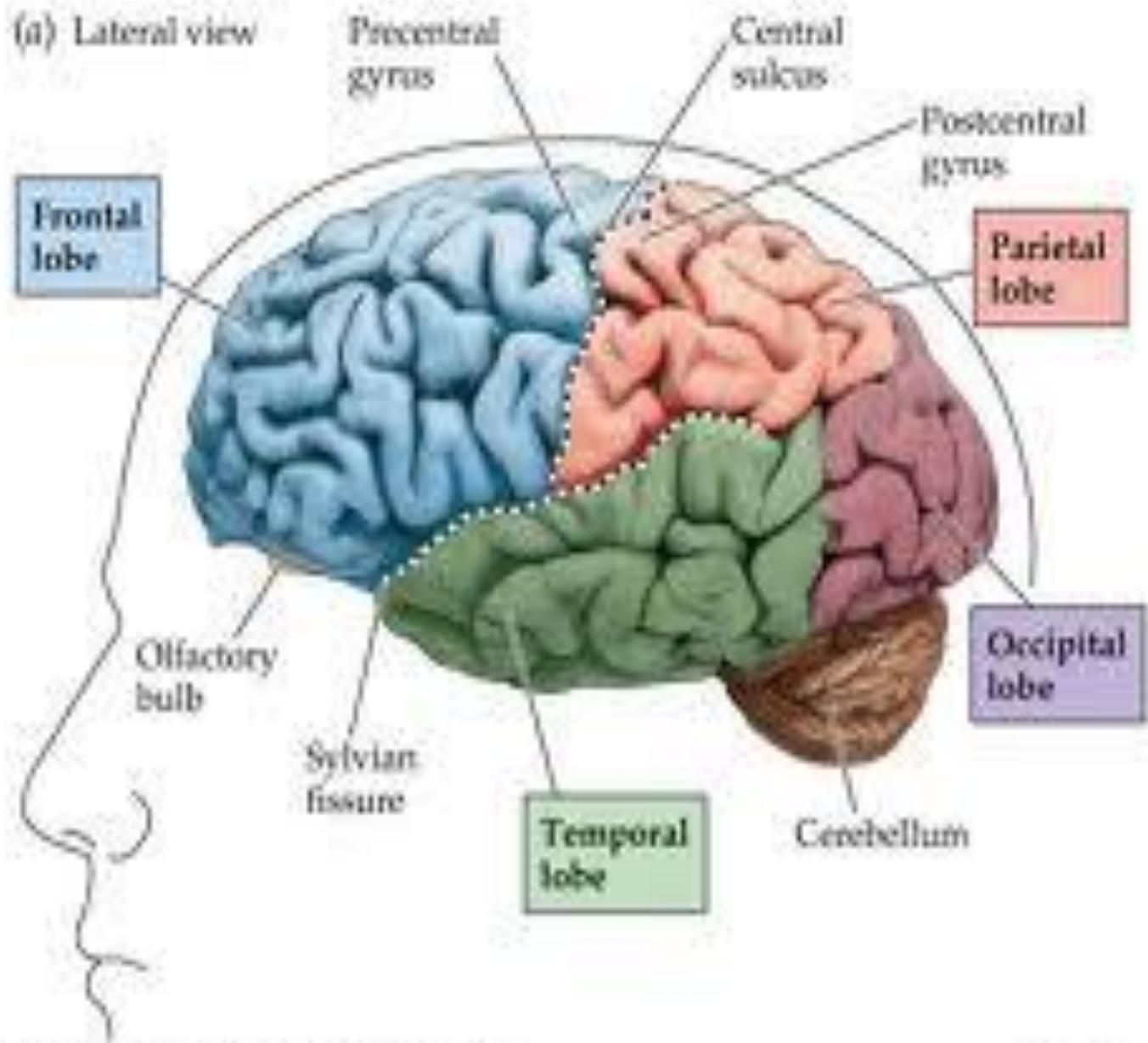
Art

Music

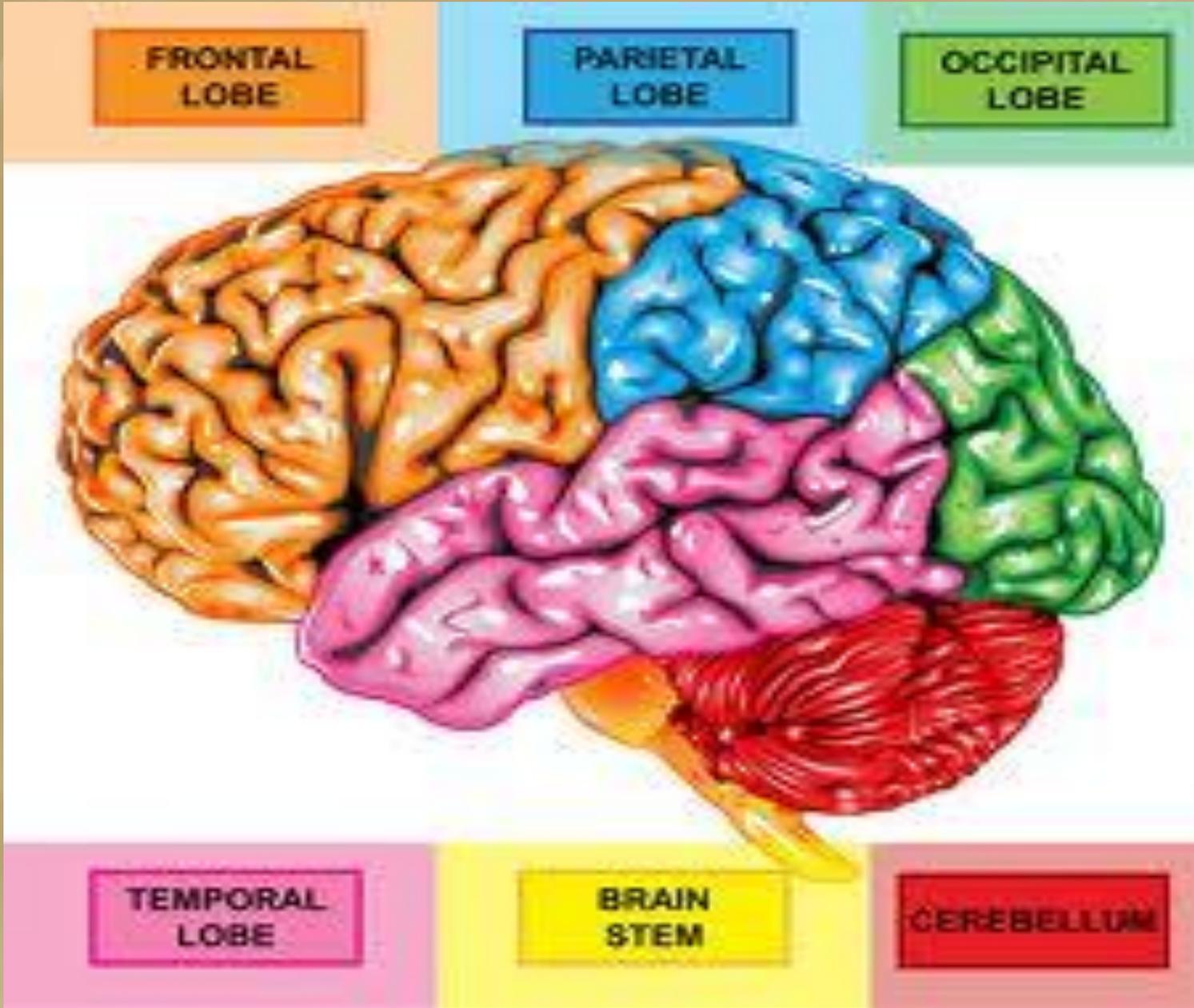


L R





Biological Psychology 6e, Figure 2.12 (Part 1)



# Broca's Area



It is described as “ anterior speech cortex ”.

**Paul Borca** , a French surgeon , reported in 1960 that damage to this specific part of the brain was related to extreme difficulty in producing speech.

# Wernick's Area



It is described as “ posterior speech cortex ”.

**Carl Wernick** was a German doctor who , in the 1870s , reported that damage to this specific part of the brain is related to speech comprehension difficulties .

# Motor Cortex

An area that generally controls movement of muscles ( for moving hands , feet , arms , etc. ).

Close to Broca's area is the part of the motor cortex that controls the articulatory muscles of the face , jaw , tongue and larynx .

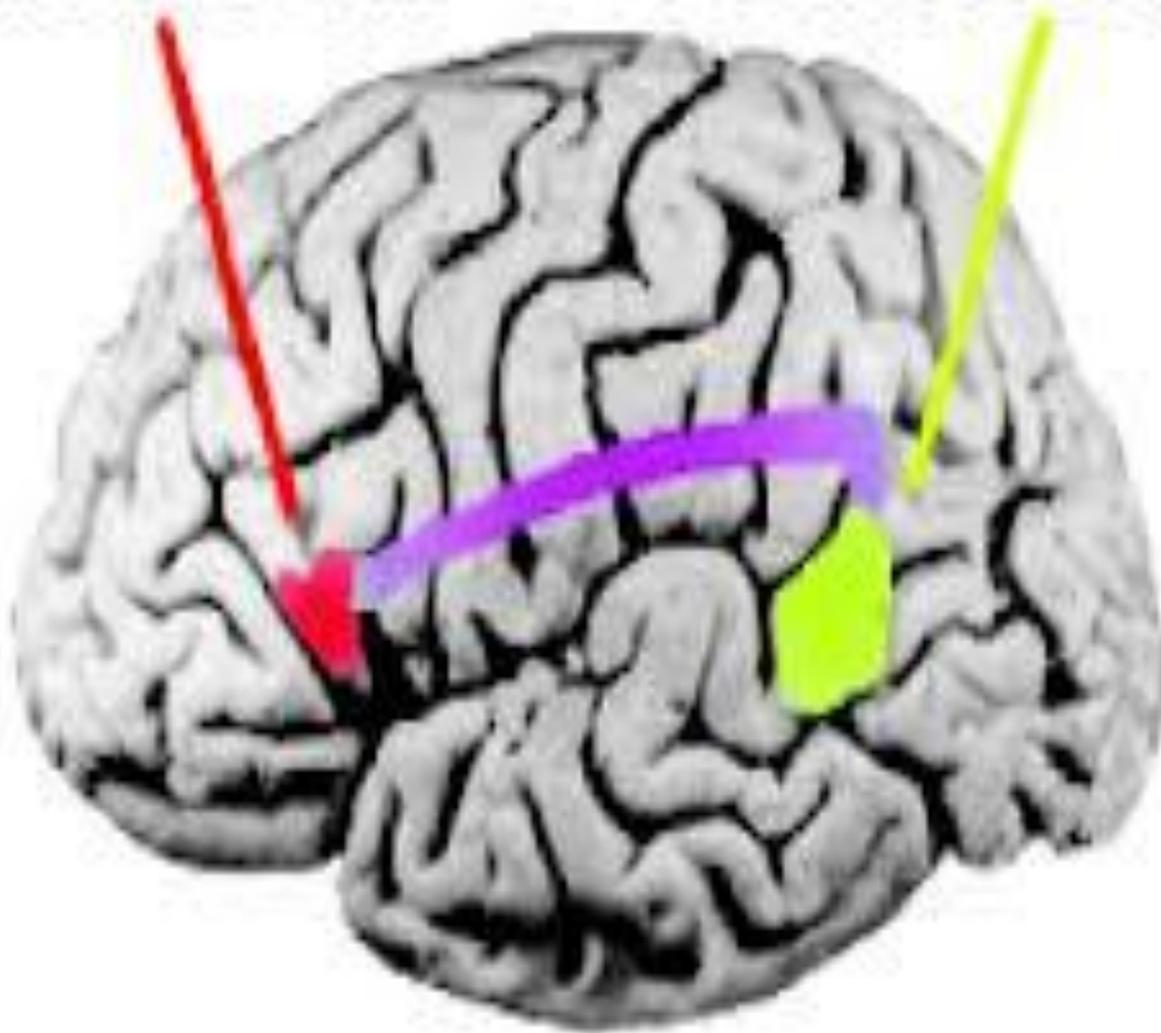
Work by Penfield and Robert in 1959 gave the evidence that this area is involved in the physical articulation of speech. They found that they could identify areas where the electrical stimulation would interfere with normal speech production.

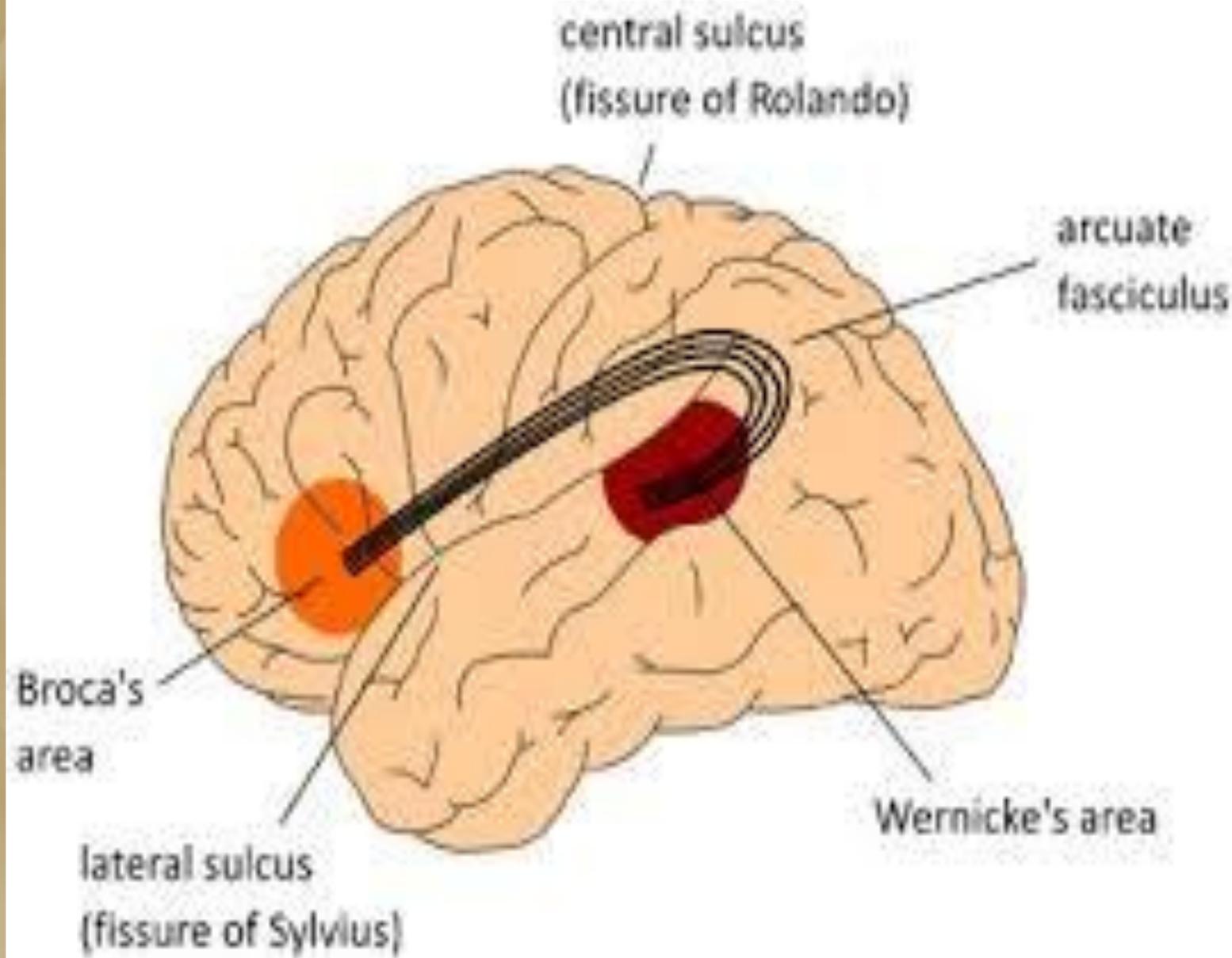
# **Arcuate Fasciculus**

Is a bundle of nerve fibers discovered by Wernick and now is known to form a crucial connection between Wernick's and Broca's areas

**Broca's area**

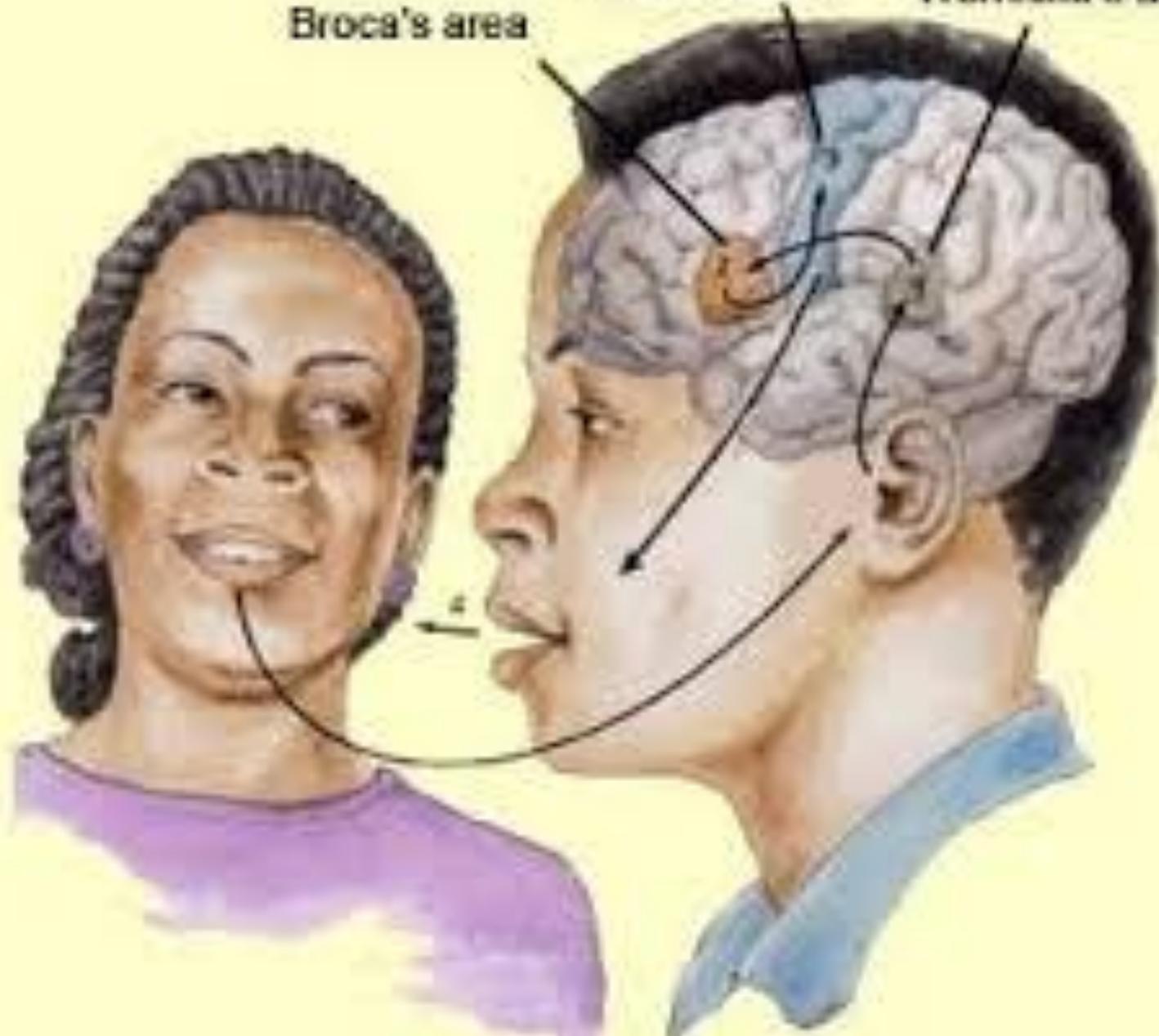
**Wernicke's area**







Broca's area      motor cortex      Wernicke's area



# The Tip of the Tongue Phenomenon

The **tip-of-the-tongue** phenomenon, (**TOT**), is the failure to retrieve a word from memory, combined with partial *recall* and the feeling that retrieval is imminent. The phenomenon's name comes from the saying,

**“ It's on the tip of my tongue.”**

People in a tip-of-the-tongue state can often recall one or more features of the target word, such as the first letter.

It is possible to hold the **meaning** of a word in one's mind without necessarily being able to retrieve its **form**.

Example:

"What's the name of that stuff I wanted to tell your mother to use?"

"Wait a second. I know."

"It's on the **tip of my tongue**," she said.

"Wait a second. I know."

"You know the stuff I mean."

"The sleep stuff or the indigestion?"

"It's on the tip of my tongue."

"Wait a second. Wait a second. I know."

Example:

"You know, the actor guy! Oh, what is his name? See, the thing is, the thing is, the thing is that when I say his name, you'll go, 'Yes! The actor guy, love him, adore him . . . .' But I can't think of his name. It's on the **tip of my tongue**. You know who I mean. He's got the hair, the eyes, a bit of a nose, and a mouth, and it's all held together with, like, a face!"

# The Slip of the Tongue

It is a speech error which is  
sometimes called  **Spoonerisms**

## Examples :

**Target:** I saw you light a fire.

**Error:** I saw you fight a liar.

**Target:** clear blue sky

**Error:** glear plue sky

**Target:** spoon feeding

**Error:** foon speeding

# Examples

- a cup of tea → a tup of tea
- black boxes → black bloxes
- feel better → beel fetter

# Slips of the ear

An error of misperception in listening :  
mistaking a word or phrase for a similar-  
sounding word or phrase in speech or  
conversation.

Example :

- “Mine is a long and sad *tale* !” said the Mouse, turning to Alice, and sighing.
  
- “It is a long *tail* , certainly,” said Alice, looking down with wonder at the Mouse's **tail**; “but why do you call it sad?”

Example :

- Great ape
- Gray tape



# Aphasia

It is an impairment of language function due to localized brain damage that leads to difficulty in understanding and / or producing linguistic forms.

Difficulty  
**understanding**

Difficulty  
**reading**

Difficulty  
**Speaking**

Difficulty  
**writing**

**A P H A S I A**

Language Disability Caused By Brain Injury

The most common cause of aphasia is a stroke ( when a blood vessel in the brain is blocked or bursts )

Someone who is aphasic has difficulties in understanding which leads to difficulties in production.

# Broca's Aphasia

It is also called “motor aphasia”. It is characterized by a reduced amount of speech, distorted articulation and slow , often effortful speech. Speech of this type is called “agrammatical” ( the grammatical markers are missing ).

Example :

I eat eggs and drink coffee for breakfast.

In Broca's aphasia, comprehension is much better than production . This type of disorder can be quite severe and result in speech with lots of hesitation and really long pauses.

## People with Broca's aphasia :

- Can have great difficulty forming complete sentences.
- May get out some basic words to get their message across, but leave out words like “is” or “the.”
- Often say something that doesn't resemble a sentence.
- Can have trouble understanding sentences.
- Can make mistakes in following directions like “left, right, under, and after.”

## **Wernick's Aphasia**

It is also called “ sensory aphasia”. It is the type of language disorder that results in difficulties in auditory comprehension .

Someone suffering from this type can actually produce very fluent speech which is difficult to make sense.

People with Wernick's aphasia suffer from anomia.

**Anomia** is the difficulty in finding the correct word .

To overcome anomia , speakers use different strategies such as trying to describe objects or talking about their purpose.

# Conduction Aphasia

A type of aphasia that has been associated with damage to the arcuate fasciculus.

What the speaker hears and understands can't be transferred successfully to the speech production.

People suffering from this disorder mispronounce words , but do not have articulation problems. They are fluent , but may have disrupted rhythm because of pauses and hesitation.

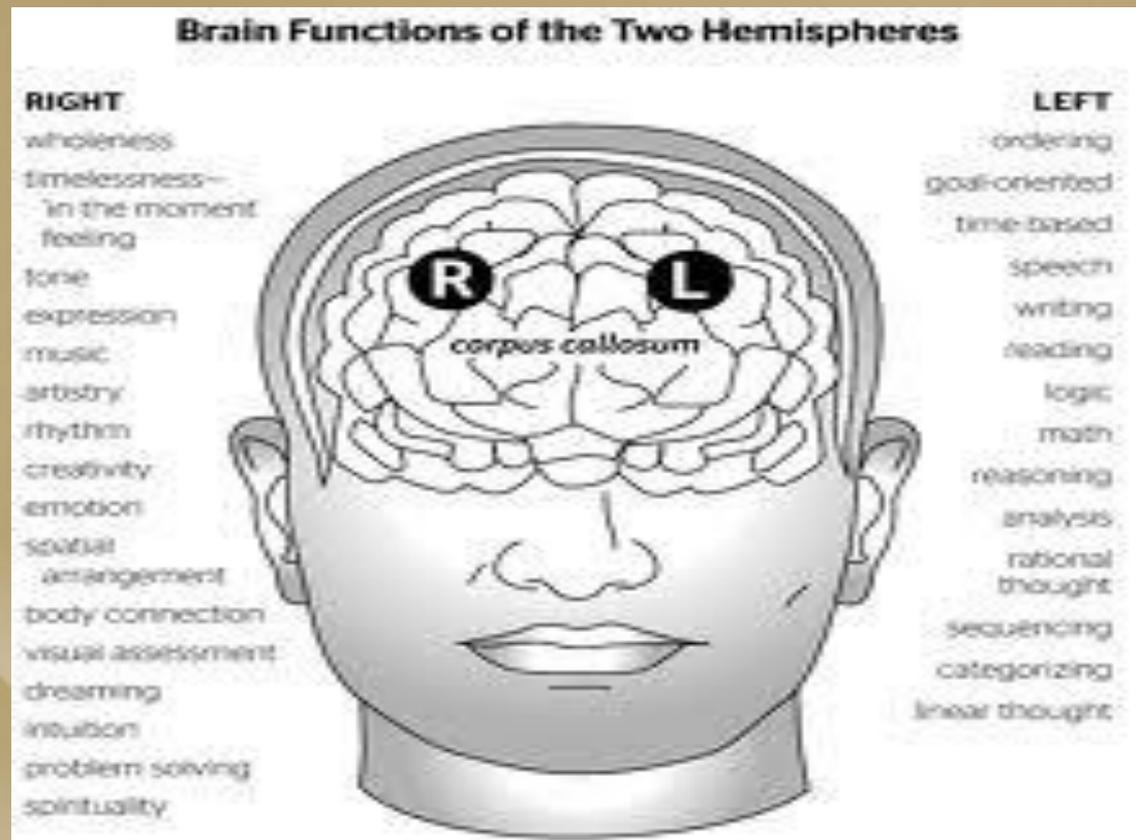
Comprehension of spoken words is normally good . The task of repeating a word or phrase spoken by someone else creates major difficulty.

# Dichotic Listening

An experimental technique that has demonstrated a left hemisphere dominance for syllable and word processing.



Anything experienced on the right-hand side of the body is processed in the left hemisphere, and anything on the left side is processed in the right hemisphere.



## **The right ear advantage**

When an individual is asked to say what was heard , he/she more often correctly identifies the sound came via the right ear

## **The Critical Period**

It is the period , during childhood , when the human brain is most ready to receive input and learn a particular language . It lasts from birth until puberty. If a child does not acquire language during this period , for any reason , then , he/she will find it almost impossible to learn language later on .