

# Language

## The Left Hemisphere plays a leading role in language processing

- Table presents the percentages of left- and right-handed people who have left-hemisphere, right hemisphere, and bihemispheric control of speech output as determined by the Wada test
- (*Wada test involves the injection of sodium amobarbital, a barbiturate, into one of the two carotid arteries, causing only one of the hemispheres to become anesthetized*).

**TABLE 9.1**

Control of Speech Output in a Sample of Left- and Right-Handed Patients as Determined by the Wada Technique

Handedness	No. of Cases	Speech Representation (%)		
		Left	Bilateral	Right
Right	140	96	0	4
Left	122	70	15	15

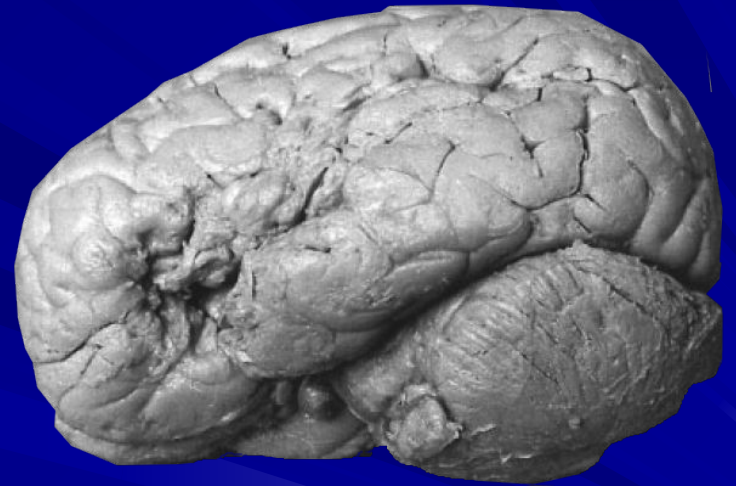
# Language

## Neural Organization of Language

### *Classical Neurological Conceptions*

#### ***Broca's aphasia***

- People with Broca's aphasia have great difficulty producing words.
- Their difficulty with speech output was not accompanied by motoric problems of the vocal musculature, such as paralysis.
- Broca conceptualized the region of the brain as the area that is critical for programming speech output.
- Telegraphic speech



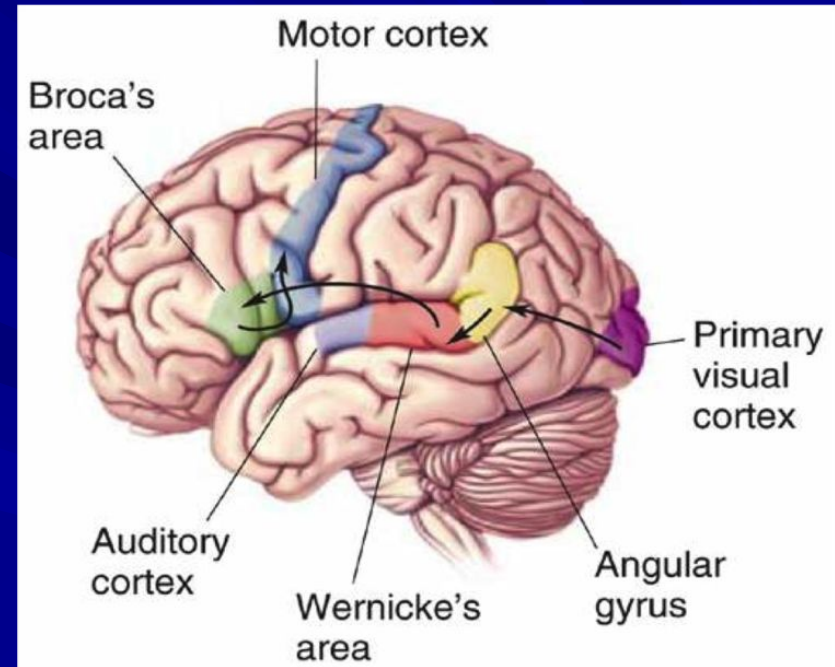
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## Neural Organization of Language

### *Classical Neurological Conceptions*

#### ***Wernicke's aphasia***

- Disrupted speech comprehension along with fluent (but nonsensical) speech output
- Word salad (the words are combined in a way that makes little sense)



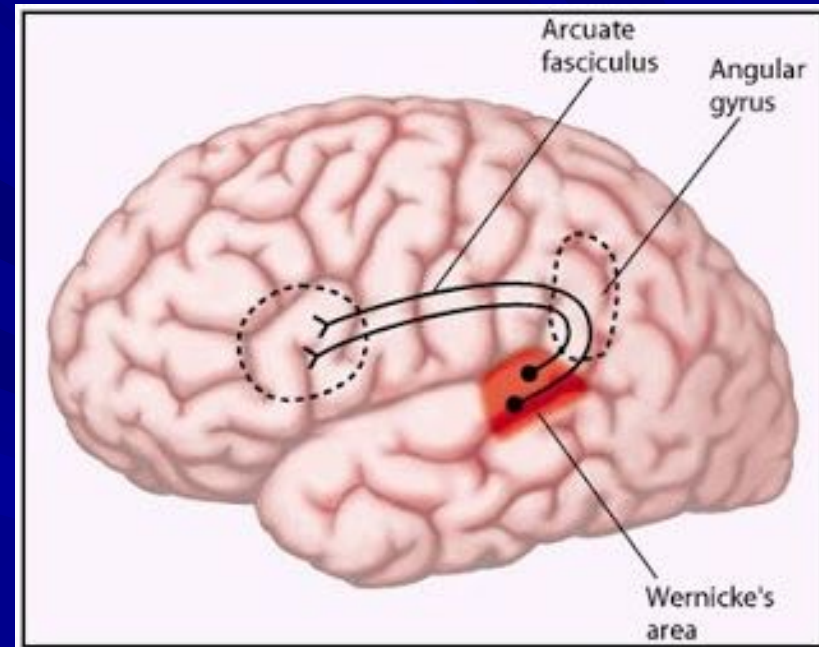
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## Neural Organization of Language

### *Classical Neurological Conceptions*

#### **Conduction aphasia**

- Person can not repeat what was just heard, because sound images received by Wernicke's area could not be conducted forward to Broca's area to be produced
- Conduction aphasia is an example of a disconnection syndrome
- The deficit arises from an inability to relay information from one intact area to another intact area
- Large nerve-fiber tract - arcuate fasciculus.



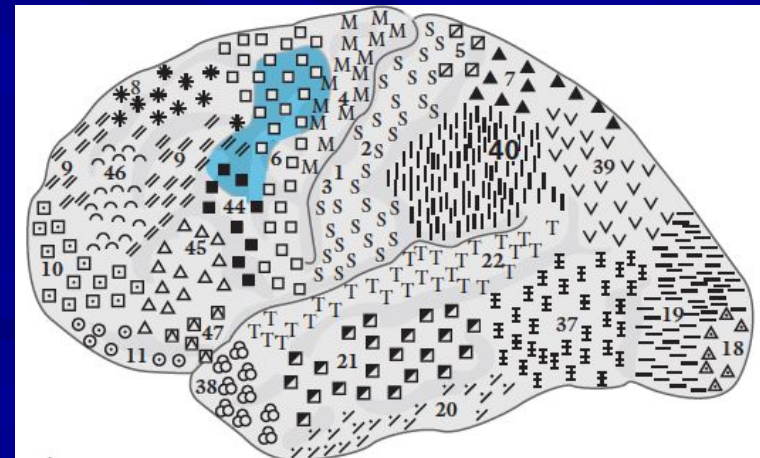
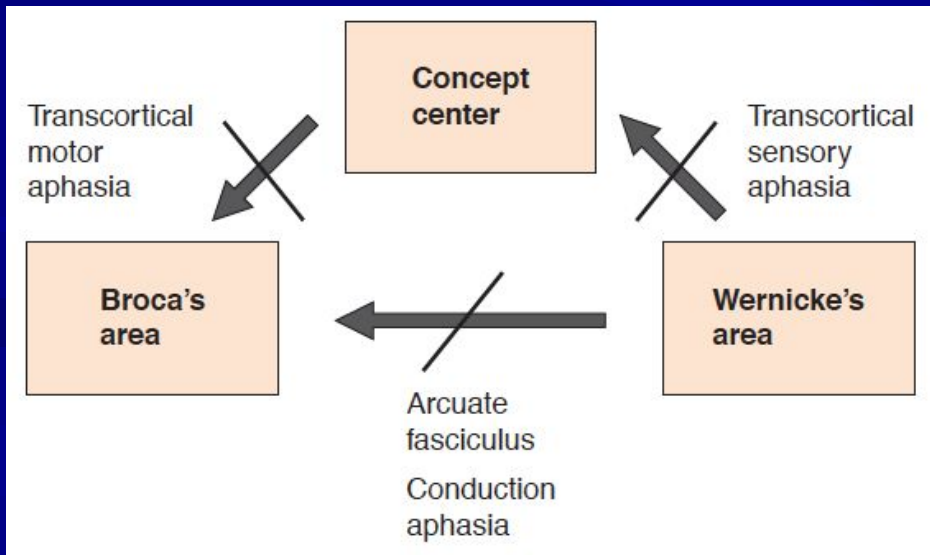
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## Neural Organization of Language

### *Classical Neurological Conceptions*

#### *Lichtheim three-part model*

- The concept center is the place in the brain where meanings are stored and from whence they originate
- Transcortical motor aphasia – people have deficits in initiation and maintenance of conversations, which results in reduced speech output.
- Ideas can not translate into speech.
- intact repetition





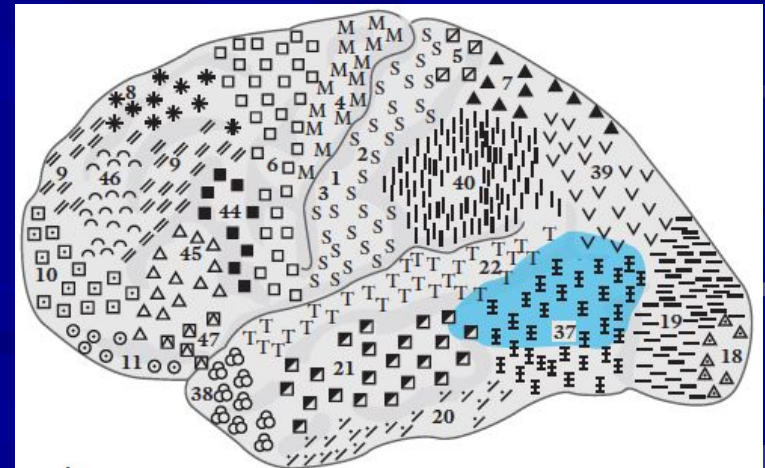
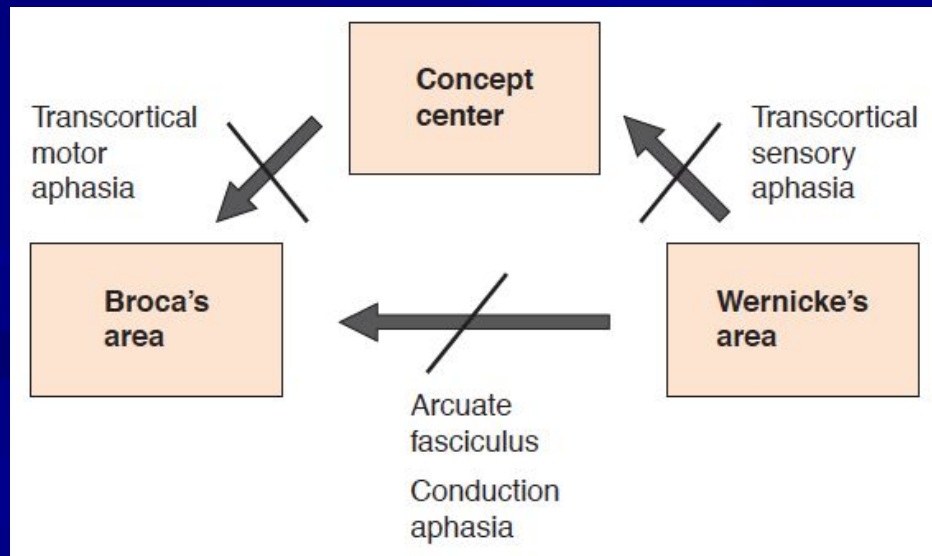
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## Neural Organization of Language

### Classical Neurological Conceptions

#### *Lichtheim three-part model*

- Transcortical sensory aphasia – such a disconnection should prevent an individual from interpreting the meaning of words.
- Patients have symptoms similar to those of patients with Wernicke's aphasia, except that they can repeat words.



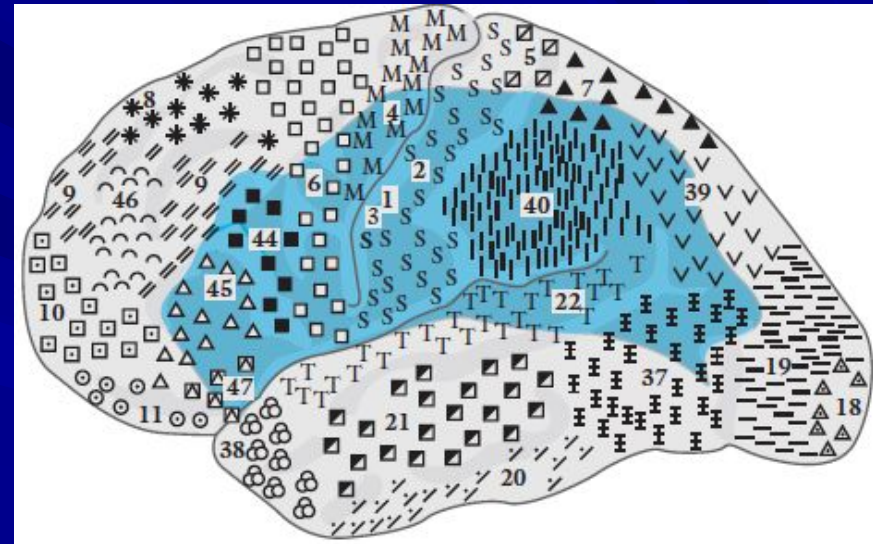
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## Neural Organization of Language

### *Classical Neurological Conceptions*

#### ***Global aphasia***

- People who had extensive damage to multiple parts of the system have neither the ability to comprehend language nor the ability to produce it.
- This syndrome is associated with extensive left hemisphere damage that typically includes not only Wernicke's and Broca's areas, but the area between them as well



# Language

## Neural Organization of Language

### *Classical Neurological Conceptions*

- Table 9.2 lists the major aphasic syndromes observed clinically and their characteristics

**TABLE 9.2**

**Basic Characteristics of the Major Aphasic Syndromes**

Type of Aphasia	Spontaneous Speech	Paraphasia	Comprehension	Repetition	Naming
Broca's	Nonfluent	Uncommon	Good	Poor	Poor
Wernicke's	Fluent	Common (verbal)	Poor	Poor	Poor
Conduction	Fluent	Common (literal)	Good	Poor	Poor
Transcortical motor	Nonfluent	Uncommon	Good	Good (echolalia)	Poor
Transcortical sensory	Fluent	Common	Poor	Good (echolalia)	Poor
Global	Nonfluent	Variable	Poor	Poor	Poor

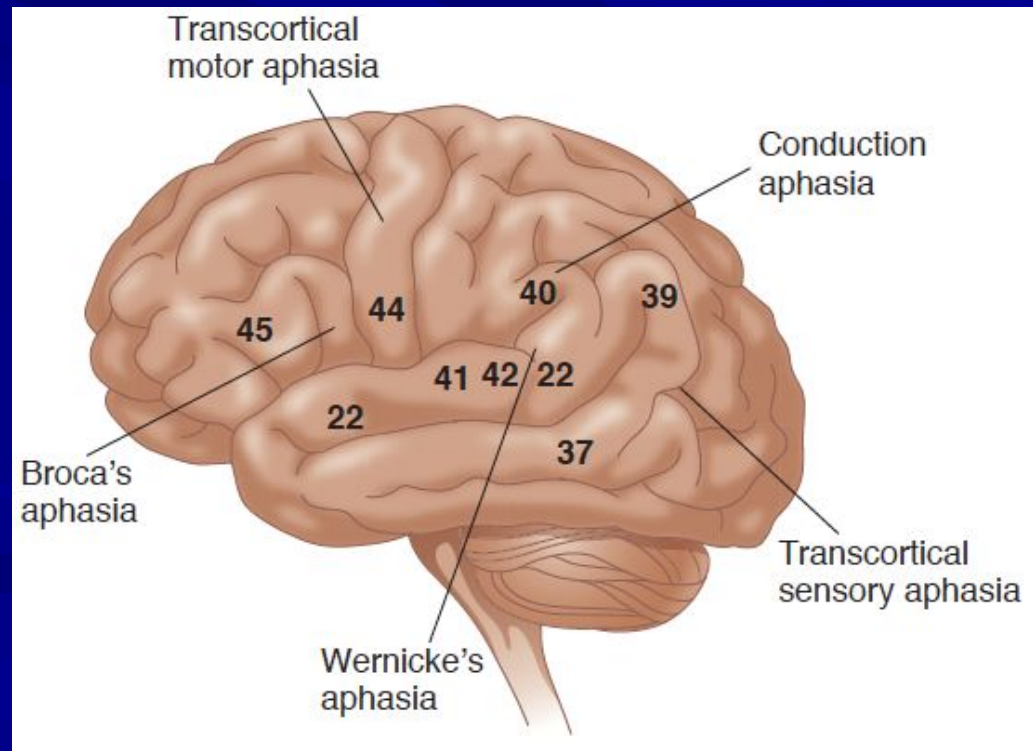


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## Neural Organization of Language

### *Classical Neurological Conceptions*

- Picture provides a summary schematic of the typical lesion locations for each type of aphasia



# Language

## **Luria's classification of aphasia**

### I. Efferent aphasia

1. Efferent motor aphasia
2. Dynamic aphasia

### II. Afferent aphasia

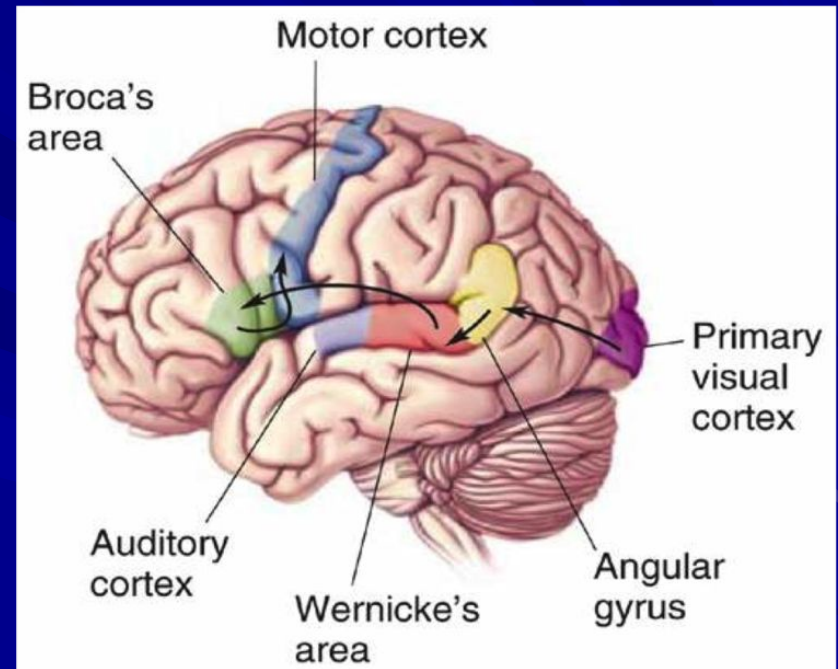
1. Sensory aphasia
2. Acoustic-mnemonic aphasia
3. Semantic aphasia
4. Afferent motor aphasia

# Language

## Luria's classification of aphasia

### Efferent motor aphasia

- *Brain localization*- Broca's area.
- *The primary defect* is the breakdown of the word articulatory programme
- In severe cases, patients who are able to imitate individual movements of the tongue and lips and repeat isolated sounds are unable to pronounce a serially organised set of articulations that make up a word.

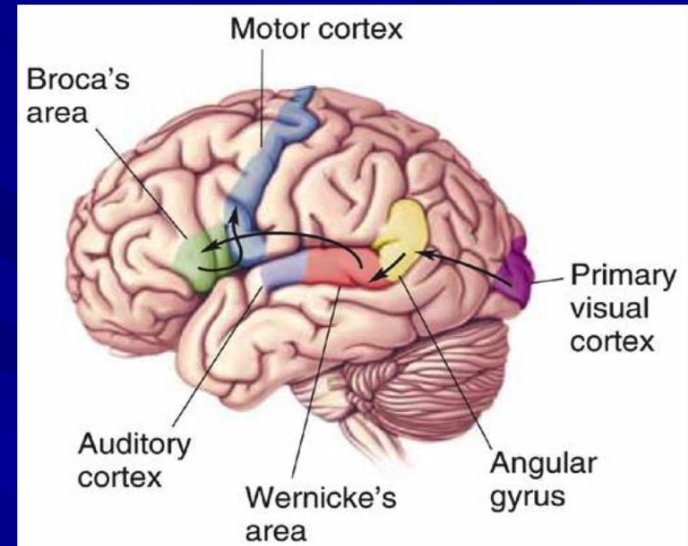


# Language

## Luria's classification of aphasias

### Dynamic aphasia

- Brain localization- prefrontal cortex near to Broca's area.
- Luria hypothesised that patients with this form of aphasia were suffering from an impairment of the inner schema of an utterance, as a result of which general thought could not get embodied in an inner speech schema and thus could not serve as the basis for constructing a narrative
- Motor aspect of speech is not impaired.
- In severe cases, a patient cannot and does not attempt to initiate speech





# Language

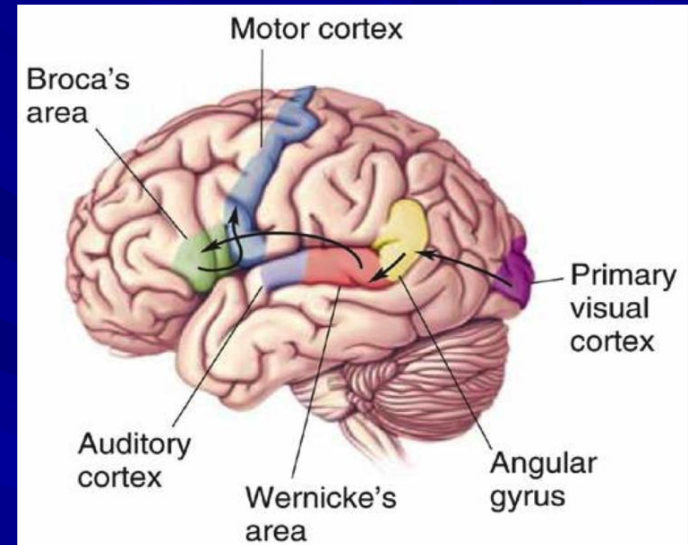
## Luria's classification of aphasia

### Sensory aphasia

- **Brain localization**- posterior third of the upper-temporal gyrus of the left hemisphere.
- **Mechanism** of sensory aphasia
- is a deficit of phonemic hearing in the absence of elementary hearing deficits.

- **Symptoms**

1. Impaired understanding
2. Patients can repeat (imitate) the pronunciation of a word, but cannot understand its meaning
3. In severe cases, patients perceive other people's speech as inarticulate noise
4. In mild cases, patients have difficulty only in recognizing "oppositional" phonemes: (b-p)

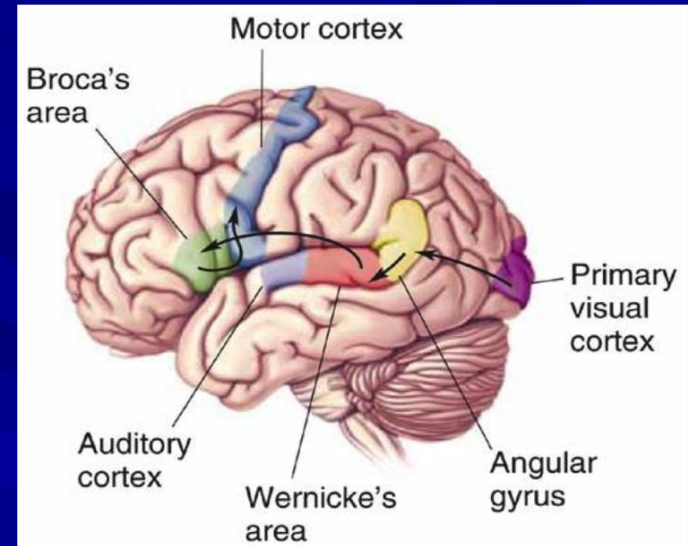


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## Luria's classification of aphasia

### Semantic aphasia

- **Brain localization**- lesion of the juncture of parietal-temporal-occipital areas of the left cerebral hemisphere
- **Mechanism**  
Luria has hypothesised that the mechanism underlying the semantic form of aphasia involves simultaneous synthesis defect
- **Symptoms**  
Difficulties in understanding of logical-grammatical constructions (for example, a patient understands the meanings of the words “father” and “brother,” but the meaning of “father’s brother” is beyond him).



# Language

## Luria's classification of aphasia

### Afferent motor aphasia

- **Brain localization**- lesion of the lower portions of the postcentral area
- **Mechanism**

The primary deficit of afferent motor aphasia is connected to the afferent aspect of motor processes

### Symptoms

1. In severe cases, motor problems are so bad that patients cannot produce a single articulate sound.
2. It is usually seen within a syndrome that also includes apraxia of pose and oral apraxia

