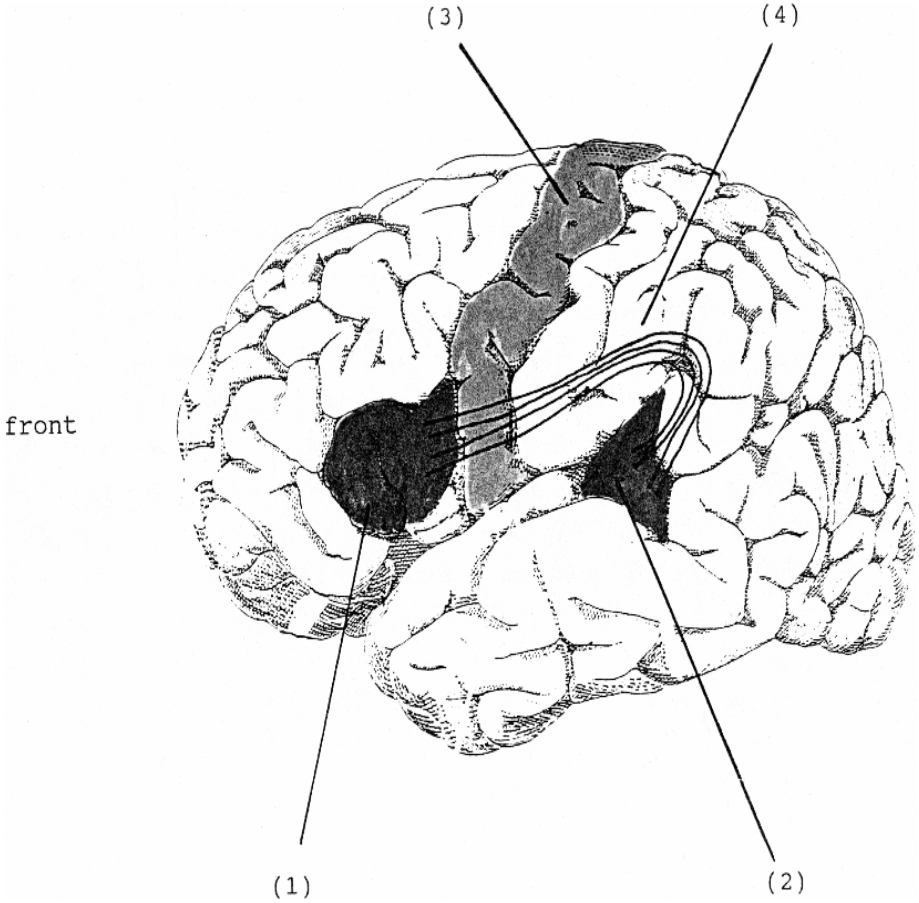
Language and the Brain

1. Introduction:

- The study of the relation between language and the brain is called *Neurolinguistics.*
- The first attempts to account for the parts of brain responsible for the ability to produce speech were made on the basis of unfortunate accidents in which people suffered some damage in the brain, which enabled scientists to exclude the damaged brain parts from linguistic investigations if the injured remained capable of language production.

2. Parts of the Brain:

- It has been found that the *left hemisphere* of the brain plays a major role in language comprehension and production, and more specifically the area that is above *the left ear*.
- In the following diagram, the grey areas indicate the parts of brain responsible for language comprehension and production:



2. Parts of the Brain:

- The part marked as (1) is known as **Broca's area** or 'anterior speech cortex'. It is responsible for *speech production.*
- The part marked as (٢) is known as **Wernicke's area**, or 'posterior speech cortex'. It is responsible for *speech comprehension.*
- The part marked as (٣) is known as **motor cortex** (3) and it is generally responsible for all the muscular movements. The part that is close to the Broca's area is responsible for the articulatory muscles of jaw, face, as well as tongue and larynx.
- The part marked as (٤) is known as the **arcuate fasciculus** which is a bundle of nerve fibers connecting Wernicke's and Broca's areas.

3. How:

- It was suggested that the brain activity connected with the perception and production of language would follow certain pattern.
- Speech is heard and comprehended via the *Wernicke's area*. Then the signal is transferred via the *arcuate fasciculus* to *Broca's area* where preparations are made to produce it. Finally, the signal is sent to the motor cortex to articulate the word .

4. Speech Errors investigated in Neurolinguistics:

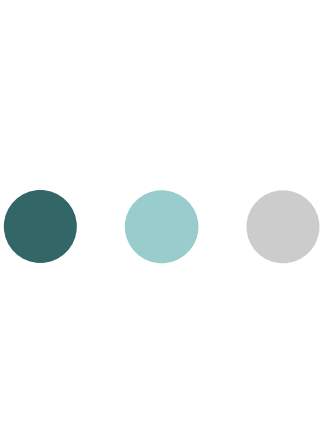
- *The tip of the tongue:* knowing a word but being unable to say it.
- *The slip of the tongue:* speech error in which sounds of few words are interchanged.
- *The slip of the ear:* processing error in which one word or a phrase is heard as another.

5.Aphasia:

- Neurolinguistics deals with various language disorders, which are known as‘ **aphasia** ’
- It is impairment of language functions due to some brain damage leading to difficulties in either *producing or understanding* linguistic forms.
- There are different aphasias depending on the language impairment and the damaged part of brain.

5.Aphasia:

- The **Broca's aphasia** is characterized by a reduced amount of speech, slow pace of speaking and distorted articulation .
- **Wernicke's aphasia** is characterized by quite fluent, yet incomprehensible speech and difficulties in finding appropriate words .
- **Conduction aphasia** is connected with damage to arcuate fasciculus and it is connected with mispronouncing words, disrupted rhythm because of hesitations and pauses .



Good Luck