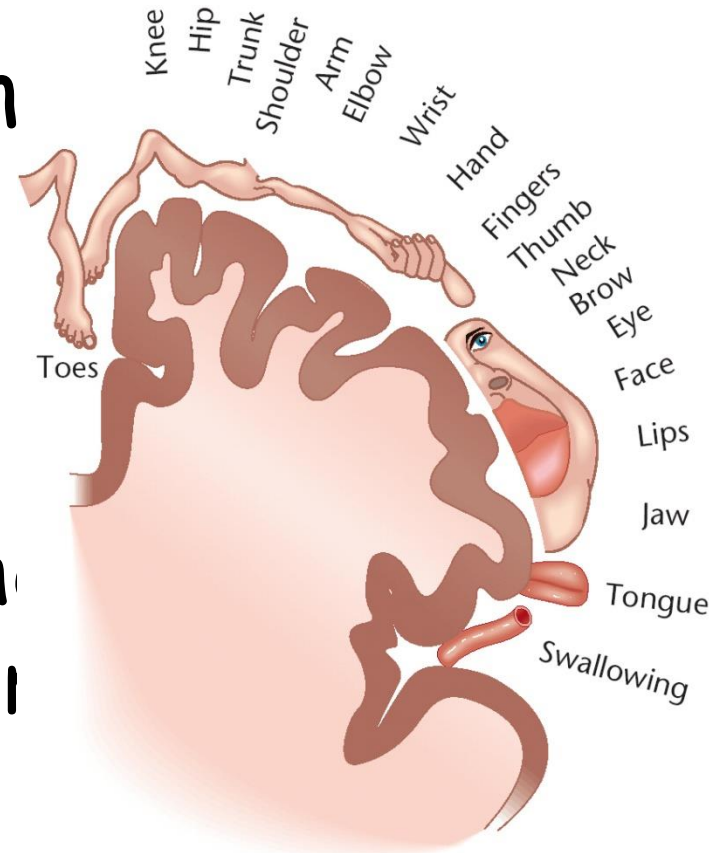


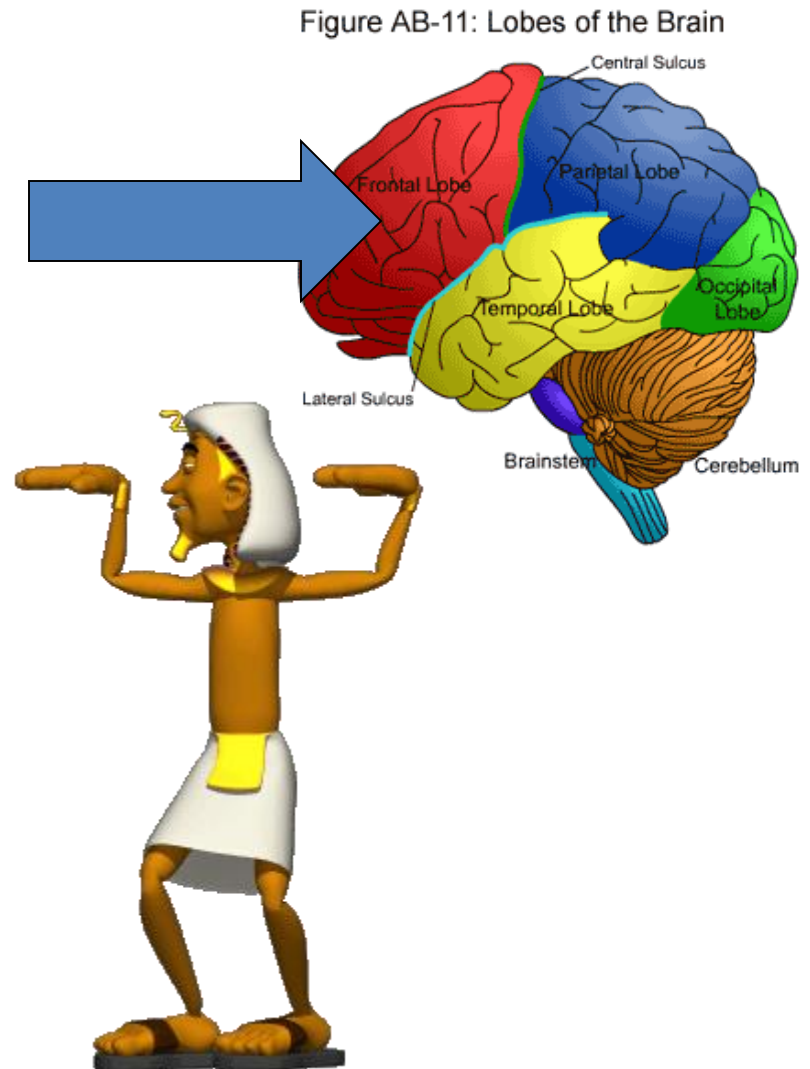
Structure of the Cortex

- What do you notice about the proportion depicted in the aforementioned homunculus?
- The more sensitive the body part, the greater the area devoted to the body part.



Structure of the Cortex

- frontal lobe: the brain lobe located behind the forehead
 - Deals with:
 - planning,
 - maintaining emotional control
 - abstract thought
 - personality
 - Contains Motor Cortex.
 - Traditionally considered to be the seat of intelligence.



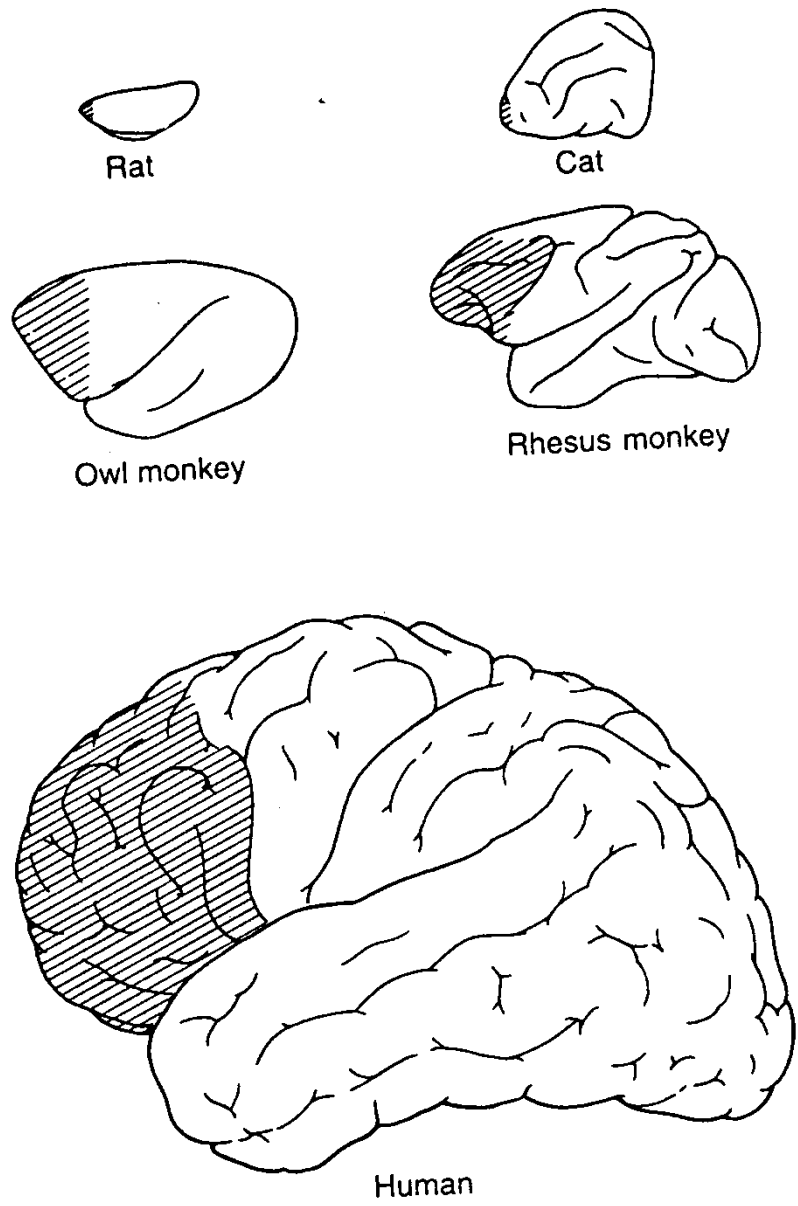


FIGURE 53-4
Proportion of the brain taken up by the frontal association cortex (hatched area) in five species.

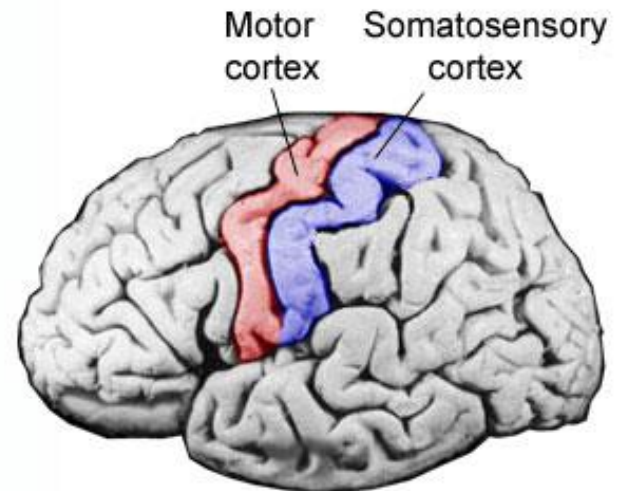
Structure of the Cortex

- motor cortex: the gyrus immediately in front of the central sulcus

- controls fine movements and is organized by body part (just like the sensory cortex)
- Man asked to keep hand opened when motor cortex was stimulated was not able to - his hand formed a fist.

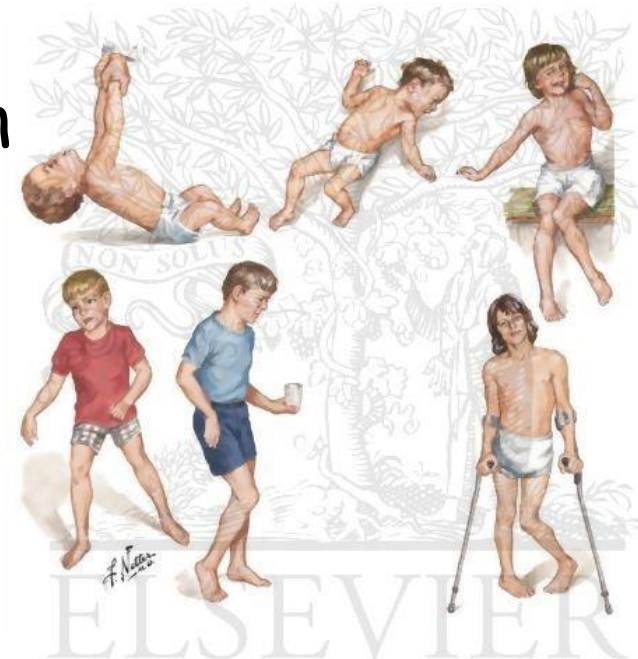
Probe the Brain activity

Figure F-3: Motor and Somatosensory Cortex



Cerebral Palsy

- A group of neurological disorders that appear in the first years of life and result in the inability to control movement and posture.
- Is typically non-progressive
- 75% of cases are due to motor cortex damage.
 - Lack of muscle coordination
 - Stiff or tight muscles
 - Walking on toes
 - Tremors
 - Difficulty with precise movements



Cerebral Palsy

- Severity depends on the degree of damage to the motor cortex.
 - Mild = slightly awkward movements
 - Severe = inability to walk, control facial muscles



➤ A form of CP may also result from damage (holes,) in the white matter, disrupting the flow of nerve signals (neural impulses.)



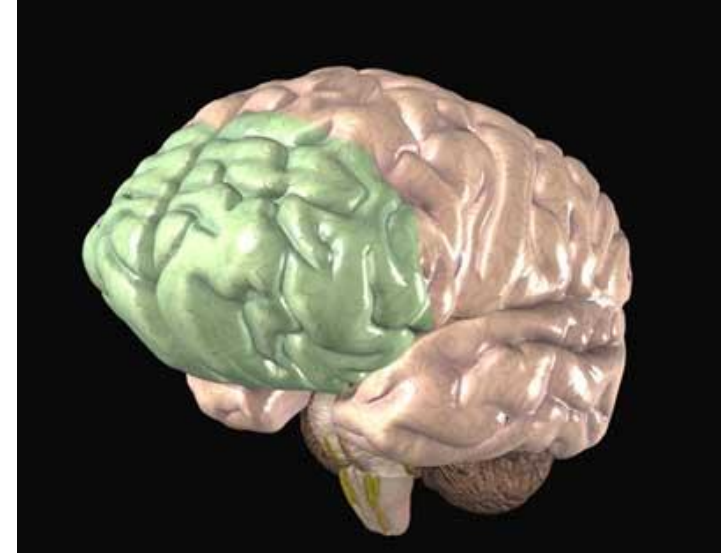
➤ This happens because white matter is "in charge" of transmitting signals to muscles.

KEY POINT

- sensations reach perception only if received and processed by a cortical area.
 - ▶ Motor cortex
 - ▶ Somatosensory cortex
 - ▶ Prefrontal cortex
 - ▶ Auditory Cortex
 - ▶ Visual Cortex

Pre-frontal cortex

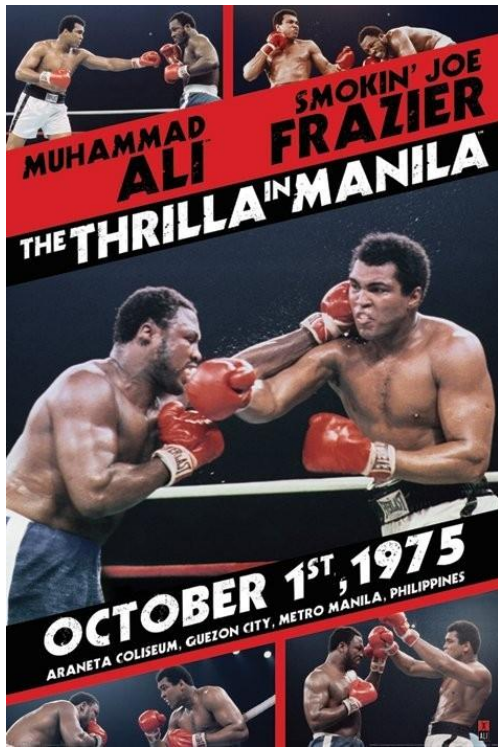
Functions carried out by the pre-frontal cortex area are "executive functions"



- abilities to differentiate among conflicting thoughts,
- determine good and bad, better and best, same and different.
- future consequences of current activities,
- working toward a defined goal,
- prediction of outcomes,
- expectation based on actions,
- social "control" (the ability to suppress urges that, if not suppressed, could lead to socially-unacceptable outcomes).

Some context:

Famous boxing match "Thrilla in Manila"



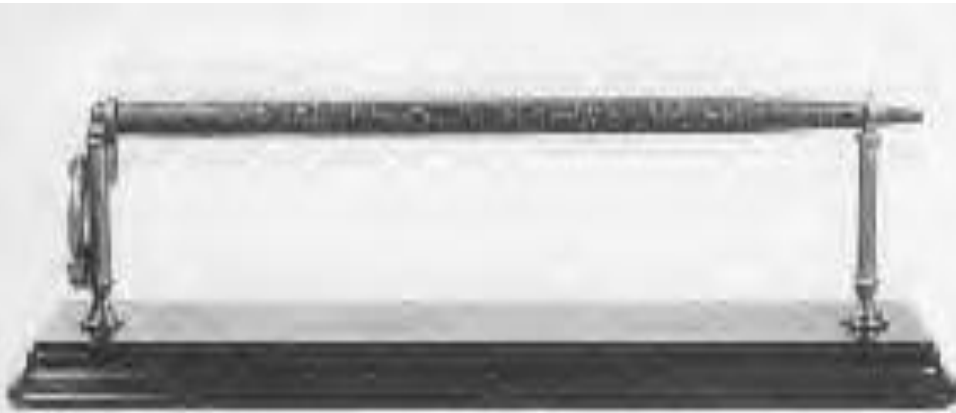
Some more context:

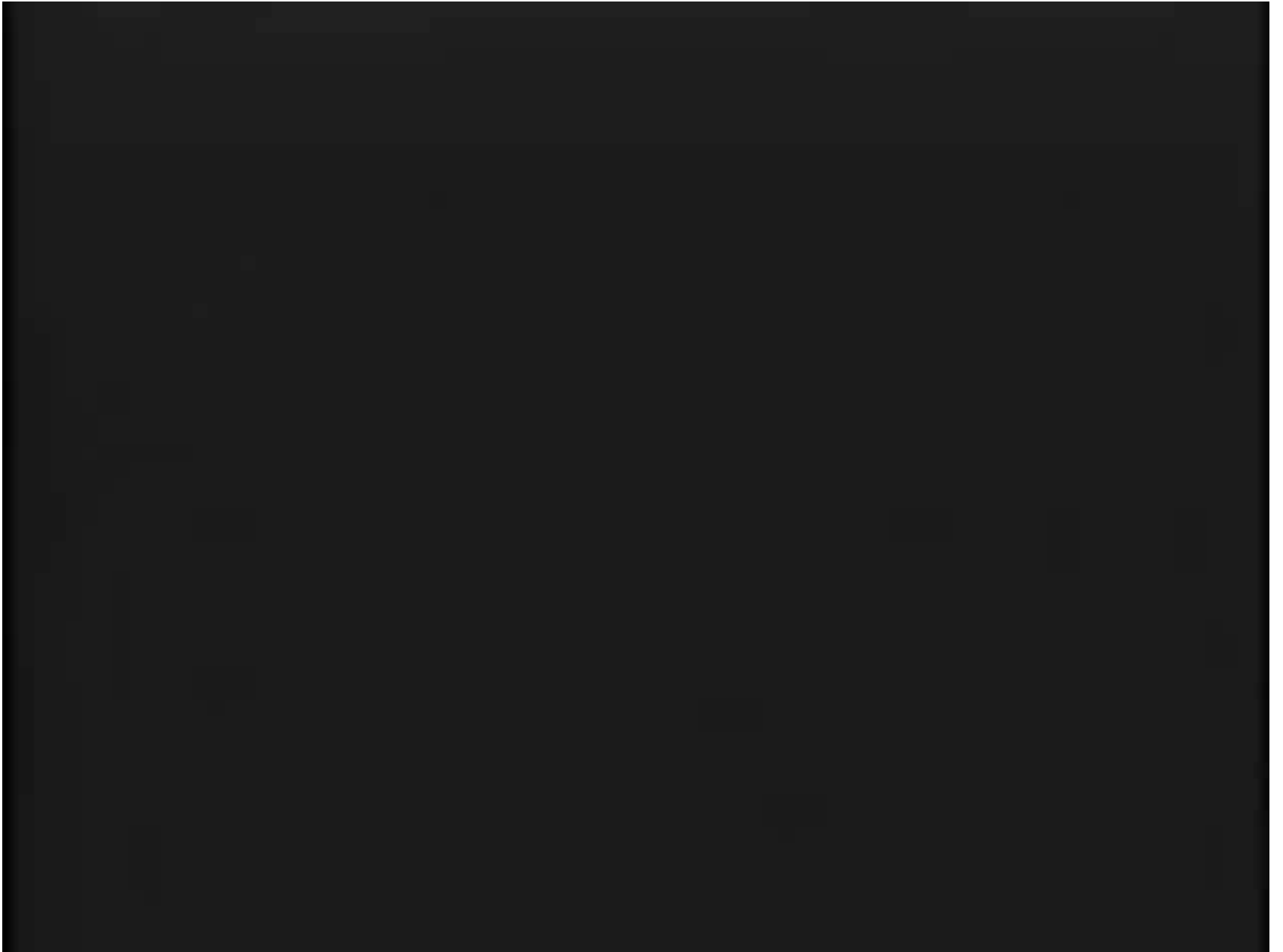
Some girl is interested in Penny's boyfriend. (Penny is driving.)



Frontal lobe damage

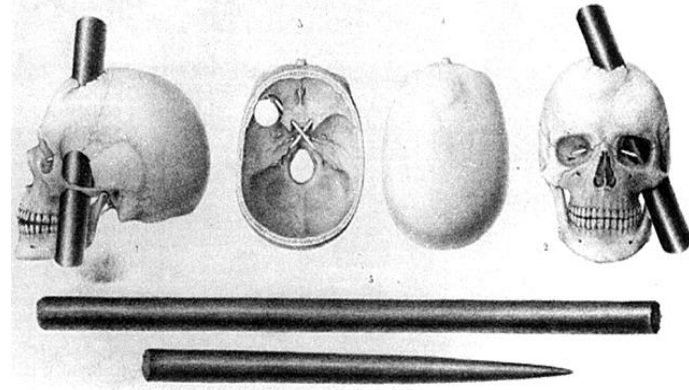
The strange case of Phineas Gage







Phineas Gage



- Railroad foreman
- Well-respected, hard-working
- 1848: tamping iron accident
- He never lost consciousness, and had no obvious neurological symptoms
- "perseveration" (repeating a response despite cessation of a stimulus.)
- But he was "no longer Gage"

Key Points:

- Connection between limbic system and frontal lobes were severed, allowing the LS to fire unrestrained.
- 4% of cerebral cortex damaged, but 10% of white matter.
- Demonstrated that physically changing the brain can result in changing more "abstract" personality of an individual.

Personality changes

- Damage to the pre-frontal cortex/frontal lobes may result in the failure to make inappropriate mappings between events and their outcomes.
- The following are some additional problems:
 - Lack of concern for the future
 - Working memory deficits
 - Lack of social graces
 - Irritability
 - Mild euphoria
 - Pseudo depression.