

## Basics of Cortical Organization

### Brain Review Part 2

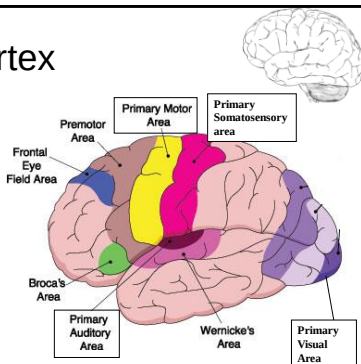
## Basics of brain functional organization



- **Brain is organized based on the location of the primary input & output areas**
- There is a primary sensory cortex for each sense
  - The one called Sensory strip is just for touch
- 1 primary motor cortex
  - Provides the “machine” language to tell muscles exactly what to do.

## Primary Cortex

- There is a primary sensory cortex for each of the senses (minus taste and smell):
  - These receive **direct** input from the senses
- There is one primary motor cortex:
  - This outputs **directly** to the muscles of the body to tell them what to do.
  - Executes actions



Primary cortices connect directly to the outside world

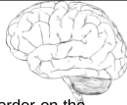
## Basic Principle of Cortical Organization



- How we interface with the world determines how the brain is organized
  - INPUT → from senses (Primary Sensory Cortices)
  - OUTPUT → reaction, movement (Primary Motor Cortices)
  - These have the most concrete representations, most likely to be “uni-modal”
- As you move further away from these primary cortices the more “abstract” representations become
  - i.e., The more likely it is that that area receives input from several modalities.

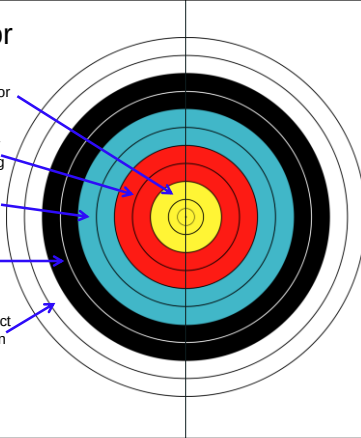
## Association Cortex (unimodal)

- Cortex just outside of the primary areas (border on the primary cortices).
  - Essential for functions beyond detecting basic sensory stimulation or the direct motor execution
- Sensory association cortex receives predominant input from primary sensory cortex.
  - Complex information from the senses
    - Somatosensory association cortex
    - Visual association cortex
    - Auditory association cortex
- Motor association cortex projects predominantly to primary motor cortex.
  - Plan and organize movements
    - Motor association cortex

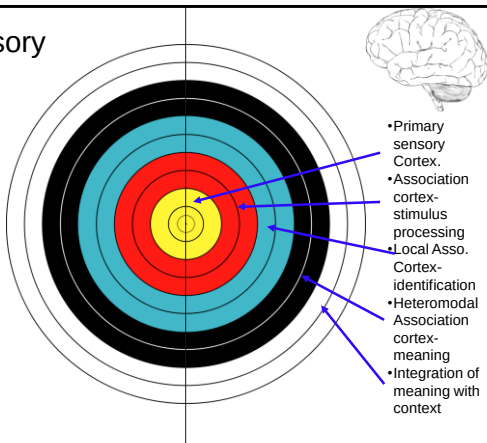


## Motor

- Primary motor Cortex.
- Association cortex-Motor programming (SMA)
- Motor Planning (Pre-SMA)
- Reaction planning
- Stimulus analysis, cause & effect consideration

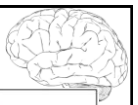
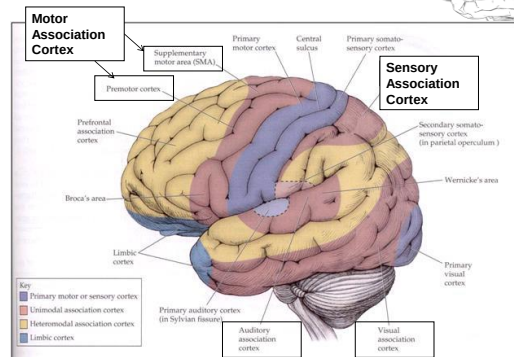


## Sensory



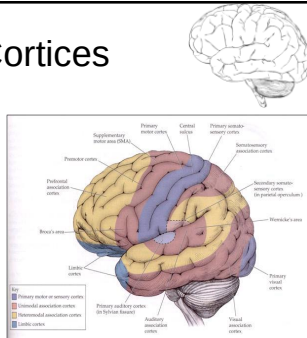
- Primary sensory Cortex.
- Association cortex-stimulus processing
- Local Asso. Cortex-identification
- Heteromodal Association cortex-meaning
- Integration of meaning with context

## Association Cortex



## Heteromodal Cortices

- Integrate sensory, motor and other information
- Get input from and borders on association cortices
- Input comes from >1 type of association cortex (generally where 2 lobes join)
- Perform the highest order mental functions
  - Abstract processing
    - Decision making
    - Figuring things out
    - Reading/language
    - Planning



Heteromodal cortices are shown in Yellow/tan

For more about the organization of the brain, go to The Motor Homunculus lecture.

