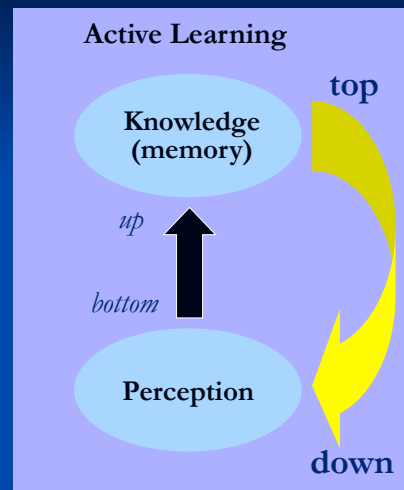


## Human Memory: How Do We Learn?

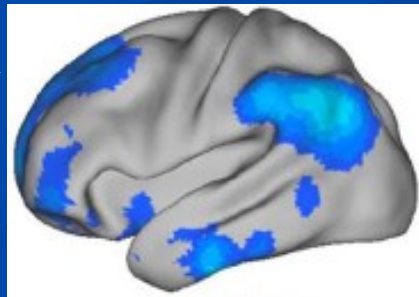
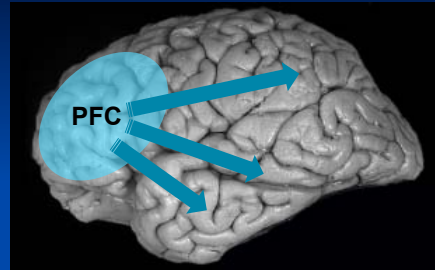
- **The Problem:** Most people view learning as a “bottom-up” process (*passive learning*)
- BUT, efficient learning depends on using knowledge to guide and organize perceptions (*active learning*).
- Psychologists call this *top-down processing*.

*Learning is an active process:  
We use top-down processing to select  
and elaborate on what is perceived.*



## Active Learning and the Brain

- Think of the brain as a large corporation.
- The prefrontal cortex (PFC) is your CEO that oversees processing.
- The PFC engages top-down processing by selecting and activating posterior regions.
- This PFC-posterior network is active when we recollect the past and think about the future →



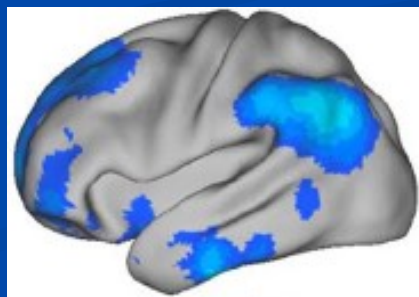
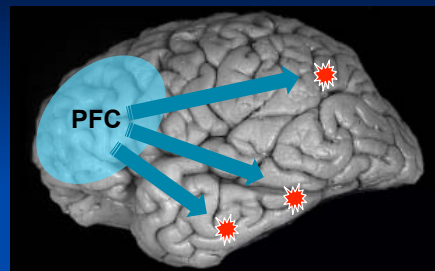
## Active Learning and the Brain

### *The Generation Effect*

- Self-generation of information IMPROVES MEMORY.
- Read: GARBAGE-WASTE
- Generate: QUARREL-F\_GHT

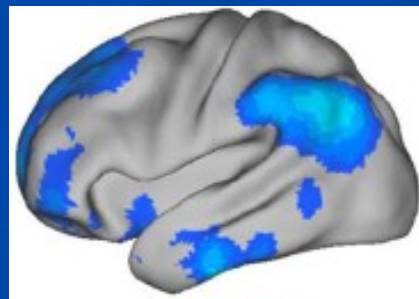
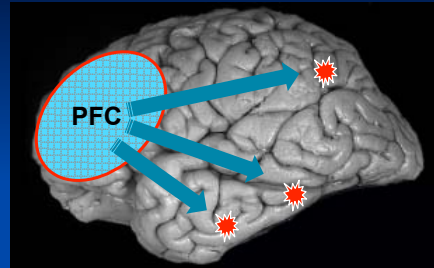


(Rosner & Shimamura, 2011)



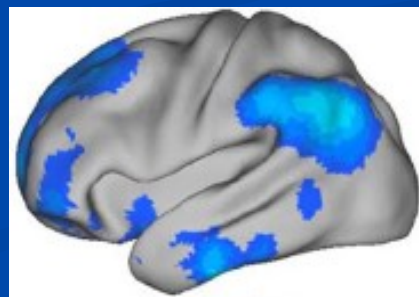
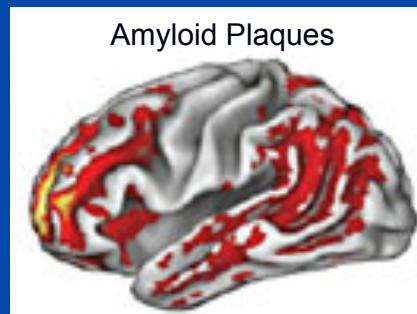
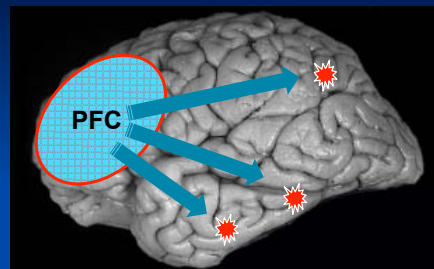
## Memory & Aging (the bad news)

- In normal aging, the PFC is the most vulnerable region associated with neuronal changes.
- These changes are related to frequent complaints among older individuals:
  - Word finding (e.g., names to faces)
  - Recollecting recent events (new learning)
  - Source memory (who? where? when?)
  - Planning to do things later (taking pills)



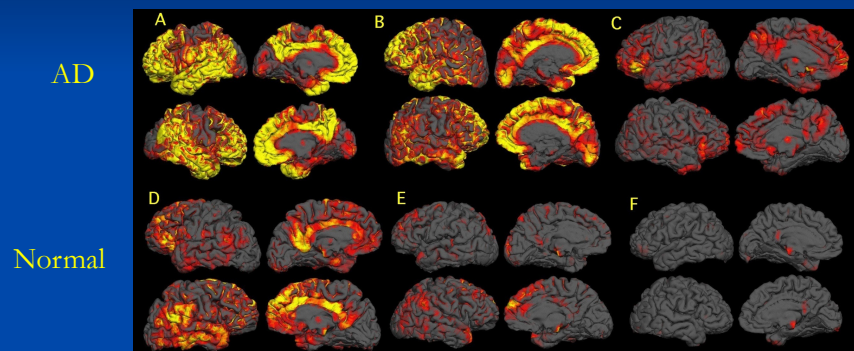
## Memory & Aging (the bad news)

- In normal aging, the PFC is the most vulnerable region associated with neuronal changes.
- In Alzheimer's Disease it is the PFC-posterior network that is particularly affected.



## Recent Findings From Alzheimer's Research

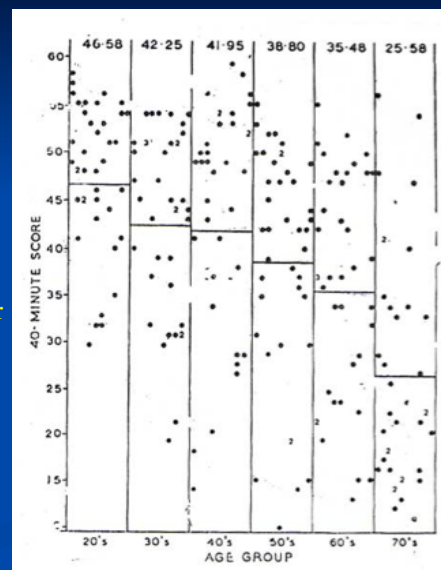
- A new marker for amyloid plaques: Pittsburgh Compound B (PiB).
- Used during PET scans to identify regions with plaque deposits.



- Dr. William Jagust (UC Berkeley) is a leader in Alzheimer's research.

## Aging & Cognitive Decline: It Varies!

- Cognitive performance across the adult lifespan.
- Performance declines slowly across the years.
- BUT, there is significant variability amongst older adults.
  - Some show large declines, others perform as well as 20 yr olds.
- Although your genes play a large role, there are things you can do to facilitate successful aging...





PSYCHOLOGICAL SCIENCE, VOL. 6, 1995

Research Article  
**MEMORY AND COGNITIVE ABILITIES IN  
UNIVERSITY PROFESSORS:  
Evidence for Successful Aging**

Arthur P. Shimamura, Jane M. Berry, Jennifer A. Mangels,  
Cheryl L. Rusting, and Paul J. Jurica  
University of California, Berkeley

Some aspects showed normal aging declines in professors:

- 1) motor reaction time
- 2) arbitrary memory associations (e.g., new names and faces)

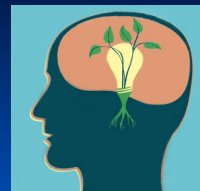
Some aspects of memory did not show typical aging declines:

- 1) conceptual memory (add new facts to existing knowledge)
- 2) susceptibility to interference

## Mnemonic Tips for Remembering

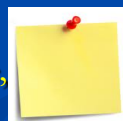
- **Pay Attention**

- Faces & names
- Preventing “car amnesia”
- **Never** put things in “special” places



- **Rely on Technology**

- Paper notes/Post-its
- Smart phones: phone #s, people, places, parking, facts (resolving arguments)



- **Be Responsive (generation effect)**

- Use your knowledge!
- Tell people about what you've learned
- The best way to learn is to teach





**Get SMART**  
*A 5-Step Program for Successful Aging*

★ Get Social!

- Meet with friends
- Join a club
- Volunteer your services
- Meet someone new and chat...



## Get SMART

### *A 5-Step Program for Successful Aging*

★ Get Moving!

- Exercise daily!
- Walk with a friend or a dog
- Join a health club
- Get physical!






## Get SMART

### *A 5-Step Program for Successful Aging*

★ Get Artistic!

- Get out those paints or that camera!
- Practice that old instrument or learn a new one!
- Join a crafts/music group
- Dance, sing, cook, be creative!







## Get SMART

### *A 5-Step Program for Successful Aging*

★ Get Responsive!

- React to your environment!
- Tell someone what you know every day (generation effect)
- Join a discussion group: Knowledge & aesthetics (book club, movies)
- Teach! Blog!





## Get SMART

### *A 5-Step Program for Successful Aging*

★ Get Thinking!

- Learn something new every day (& write it down--keep a diary)
- Best way to learn is to **teach**
- Go to a museum, lecture, library
- Use YouTube! & other internet sources









Don't Forget....  
**USE IT OR LOSE IT!**