Agenda
Memory and Aging
Age-Related Memory Decline:
Episodic Memory
Age-Related Memory Decline:
STM vs. LTM
Age-Related Memory Decline:
Span and LTM Measures
Age-Related Memory Decline:
Nondeclarative vs. Declarative Memory
Age-Related Memory Changes:
MTL Dysfunction?
Age-related memory declines partially resemble those following MTL insult:

• memory is affected independently of intelligence

• LTM is impaired more than STM

• memory deficit is greater for recent than for remote events

• declarative memory is impaired more than nondeclarative memory
Age-Related Decline in Binding?
Age-Related Decline in Binding?
Age-Related Decline in Binding?
Age-Related Decline in MTL Binding?
Age-Related Decline in MTL Binding?
Age-Related Decline in MTL Binding?
Age-Related Memory Changes:
Frontal Dysfunction?
Age-related declines resemble frontal deficits:

• Wisconsin Card Sort Task impairments

• verbal fluency decreases with age

• greater Stroop interference

• problems w/ memory for temporal order and relative recency

• recall < cued recall < recognition < younger adults

• impaired source memory, even with intact item memory

• increased false memory
Age-Related Decline in Executive Control

Age-Related Episodic Memory Deficits: Source > Item Impairments?
Age-Related Episodic Memory Deficits: Source > Item Impairments
Age-Related Episodic Memory Deficits: Recollection > Familiarity?
Exclusion paradigm: Recollection and Familiarity in opposition
Age-Related Episodic Memory Deficits: Recollection > Familiarity?
"Ironic effects" of repetition

- the elderly's difficulty excluding items increases with repetition

- the young's ability to exclude increases with repetition
  - increased recollection / retrieval of correct source
  - diminished with speeded responding

Nature of Age-related Cognitive Decline
Reduced Attentional Resources?
Memory Decline: Reduced Processing Speed?
Assessing Processing Speed?

- Letter Comparison – perceptual speed test

Z ___ G Write "S" or "D"
N ___ N on line
Y ___ U

Reduced Processing Speed?
Reduced Processing Speed as a Mediator of Age-Related Decline
Impact of Processing Speed on Cognition
Limited Time Mechanism

- the time to perform later operations is greatly restricted when a large proportion of the available time is occupied for executing earlier operations
  - can account for the "complexity effect": positive relation between task complexity and the magnitude of age-related differences in speed

Age-related Neuroanatomic Changes
Anterior–posterior gradient

- volumetric reductions
  - frontal > temporal > parietal & occipital
  - positive correlation b/w hippocampal volume and episodic memory
  - no apparent correlation b/w frontal or temporal volume & memory

- metabolic declines
  - frontal > temporal & parietal > occipital

- cerebral blood-flow declines
  - frontal > temporal & parietal > occipital

- neurochemical changes
  - cholinergic & dopaminergic declines in striatal and frontal regions

- functional neuroanatomic changes?

White Matter Changes & Cognitive Decline

White matter abnormalities in non-demented older adults

- hyperintensities as indexed with MRI
  - multiple likely sources
    - including subclinical ischemia, axonal degeneration, demyelination
    - perhaps influences cognition by reducing speed of of neural transmission

White Matter Changes & Cognitive Decline

- **global functioning**
  - Mini-Mental State Exam
- **processing speed**
  - Simple and Choice RT
  - Stroop color and word trials
- **executive function**
  - WCST
  - Stroop interference score

Functional Compensation or Dedifferentiation: Brain Imaging and Aging

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