Shared Mechanisms Underlying Age-Related Change in Cognition/Vision/Hearing

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MRI
PET Amyloid Plaques
PET Tau
Disclosures

- Current Funding: NIA IRP Employee
- No Conflicts
Overview

- Cognitive and Brain Aging in Unimpaired Older Adults
- Hearing Loss and Neurodegeneration
- Imaging Alzheimer’s Pathology *In Vivo*
- The Temporal Sequence of Sensory Loss and Accelerated Cognitive and Brain Aging?
- Future Opportunities
Cross-Sectional Age Differences in Some but Not All Cognitive Functions

Park and Gutchess, 2002
Cross-Sectional Age Associations: Age 8 to 96
Sex Differences in Cognitive Aging

Levels: Men Show Lower Mental Status, Verbal Memory, and Executive Function but Higher Visuospatial Performance

Slopes: Men Show Greater Decline in Mental Status, Executive Function and Visuospatial Performance

McCarrey et al. 2016
After ICV adjustment, males show faster volume loss in all four regions.
Hearing Impairment is Associated with Greater Rates of Volume Loss in BLSA

- Whole Brain
- Temporal Gray
  - R>L
  - STG
  - MTG
  - ITG
  - PHG

NeuroImage Lin et al, 2014
Evolution of AD Pathology: Amyloid Pathology in Normal Cognition

![Graph showing the prevalence of Alzheimer disease and amyloid positivity over age.](image)

Prevalence of amyloid positivity in normal cognition

Prevalence of AD-type dementia

Amyloid Accumulation Over Time in BLSA Participants with Normal Memory

Increasing Amyloid

180 Participants
446 PET Scans
PET Scan Imaging of Plaques and Tangles

Amyloid PiB

Normal Memory

Alzheimer’s Disease

Tau AV-1451

Sperling et al., Neuron 2014
Temporal Sequence of Associations between Sensory Loss and Brain and Cognitive Changes

Brain Changes

Cognitive Decline

Sensory Loss
Gaps and Opportunities

Knowledge Gaps:

- To what extent are associations between hearing/vision loss and cognition due to shared brain changes? (central vs peripheral)
- What are the temporal relationships between sensory loss and accelerated cognitive and brain changes?

Research Opportunities:

- Addition of hearing assessment to ongoing prospective studies of cognitive and brain health
- Clinical trials embedded within observational studies