Age Differences in the Understanding and Memory of Everyday Activity

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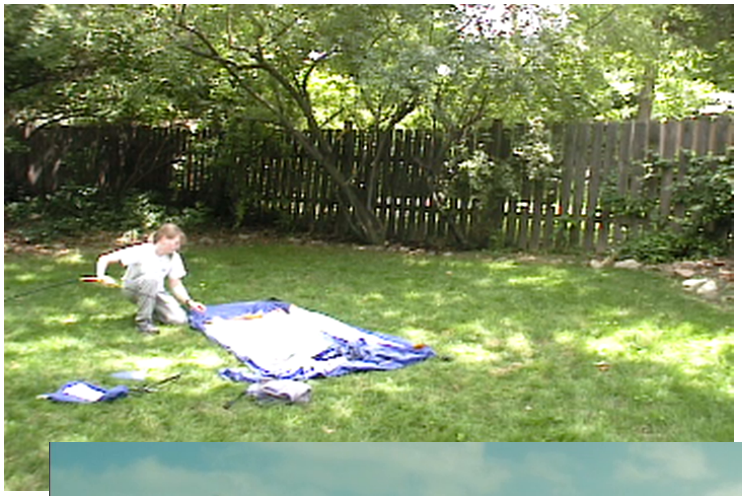
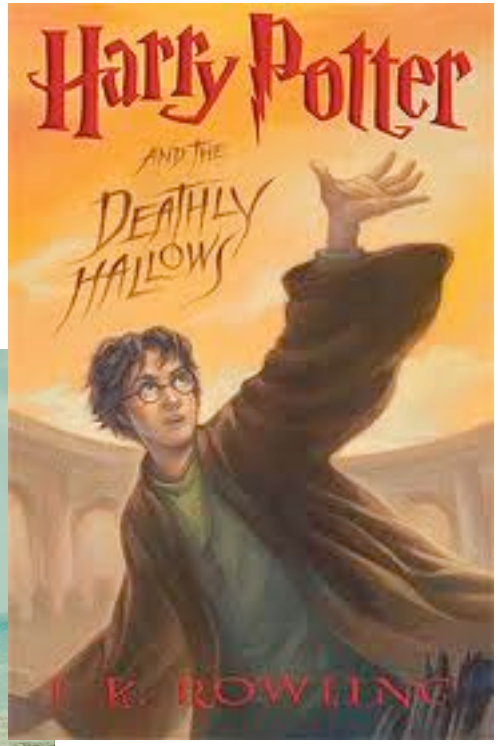
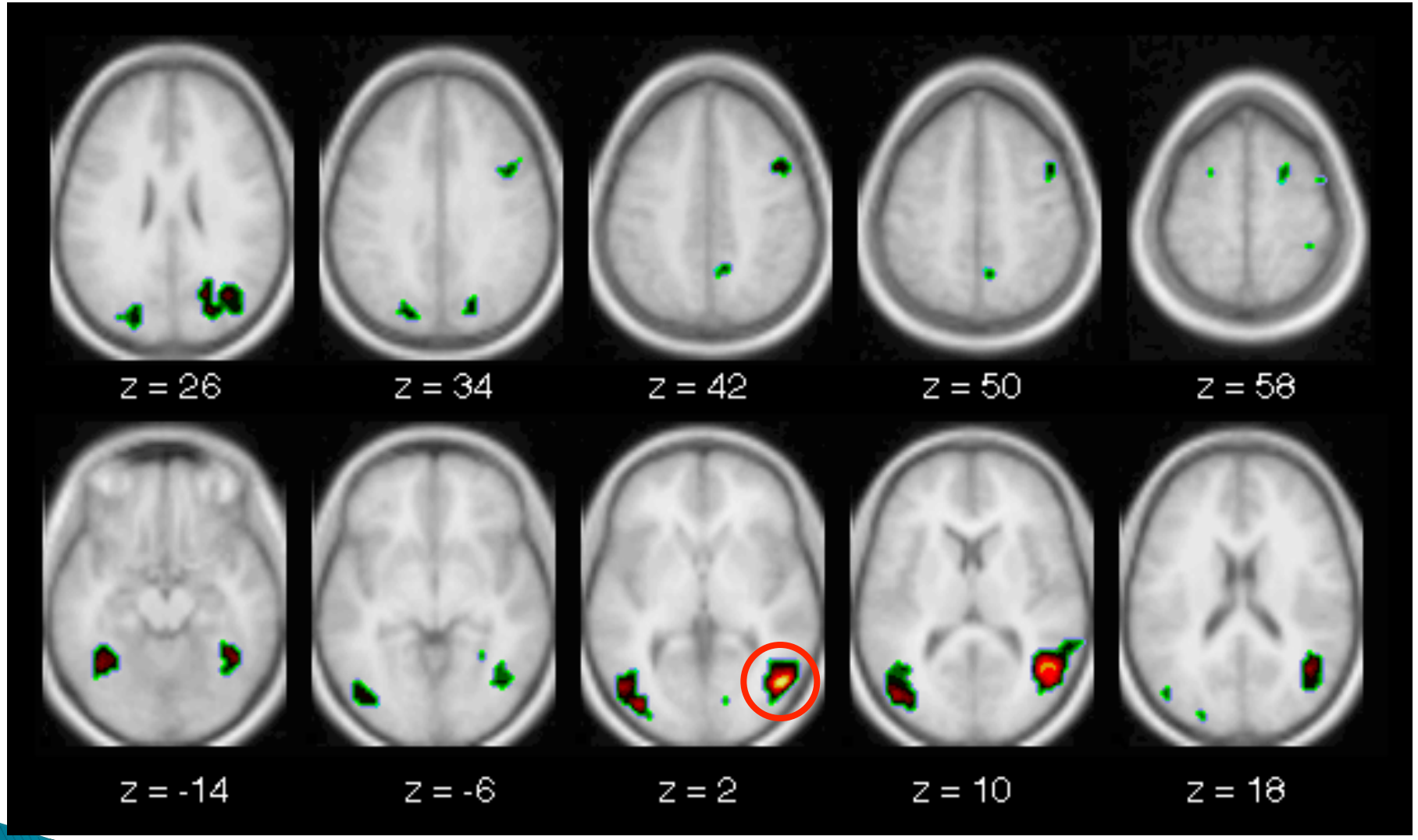
- How do we understand the complex, continuously moving world around us?





- We break up life into separate episodes or *events*

How can we tell when people perceive an event boundary?

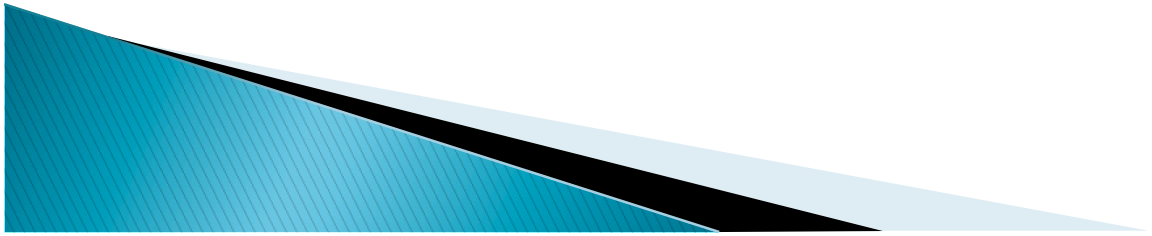


Zacks et al. (2001) *Nature Neuroscience*

- Event segmentation may determine the episodes in episodic memory (Kurby & Zacks, 2008; Zacks, Speer, Swallow, Braver & Reynolds, 2007)

- The complaints that older adults provide in the memory clinic (Galvin, 2005) may be related to event segmentation problems
  - Difficulty following TV programs or conversations
  - Difficulty remembering events
  - Difficulty using new tools and appliances

- Are there age differences in event segmentation ability? Are those differences related to memory?



Older adults may segment events less well than younger adults

- Reductions in working memory and prefrontal cortex structural and functional integrity (e.g., Raz, et al., 1997)
- Reductions in midbrain dopamine functioning (Fearnley & Lees, 1991; Raz, 2005; Sakata, Farooqui, & Prasad, 1992)
- Older adults may have difficulty forming and maintaining event representations

Segmentation task

(Zacks et al., 2006, *Psych & Aging)*

Recognition Memory Test

Order Memory Test



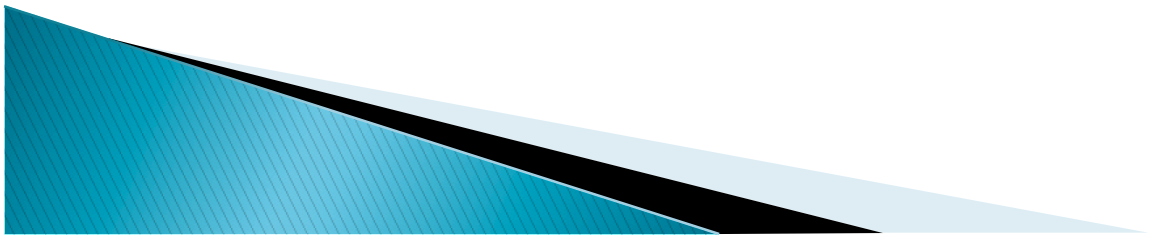


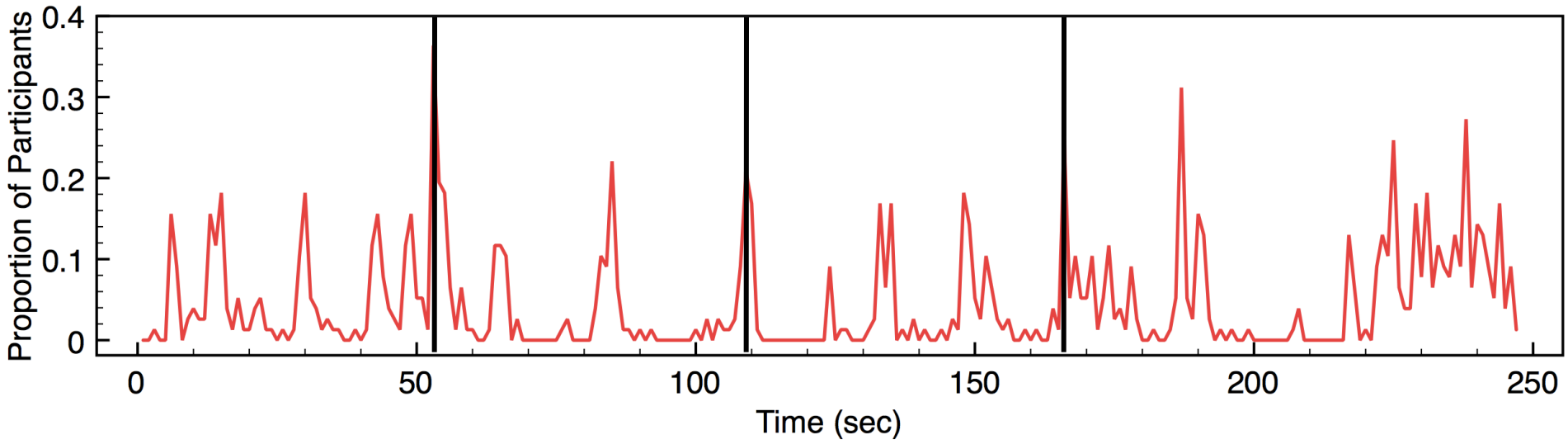


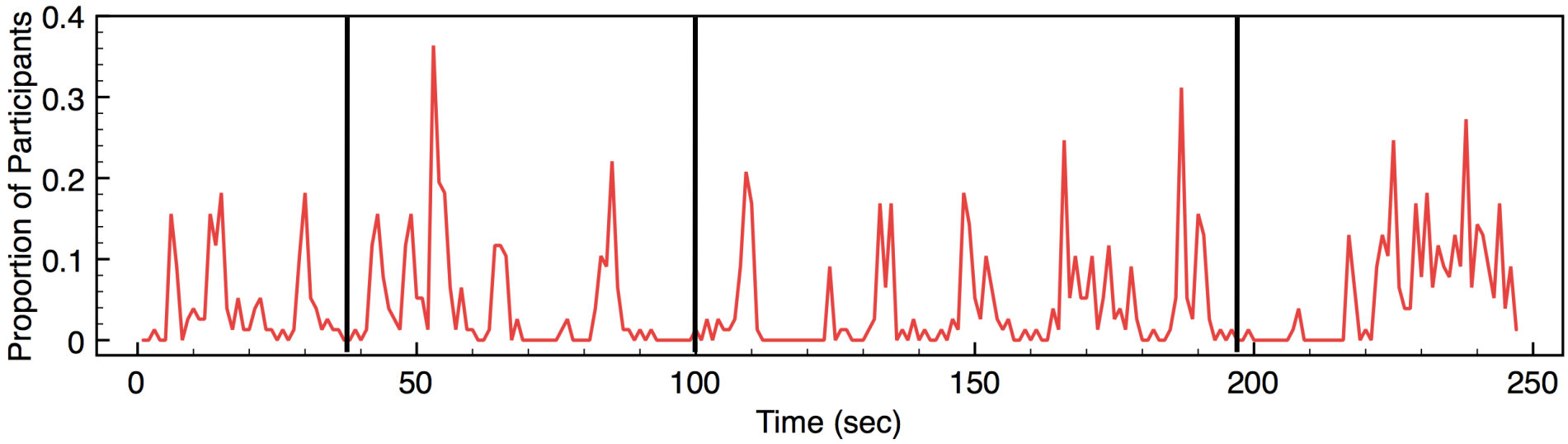




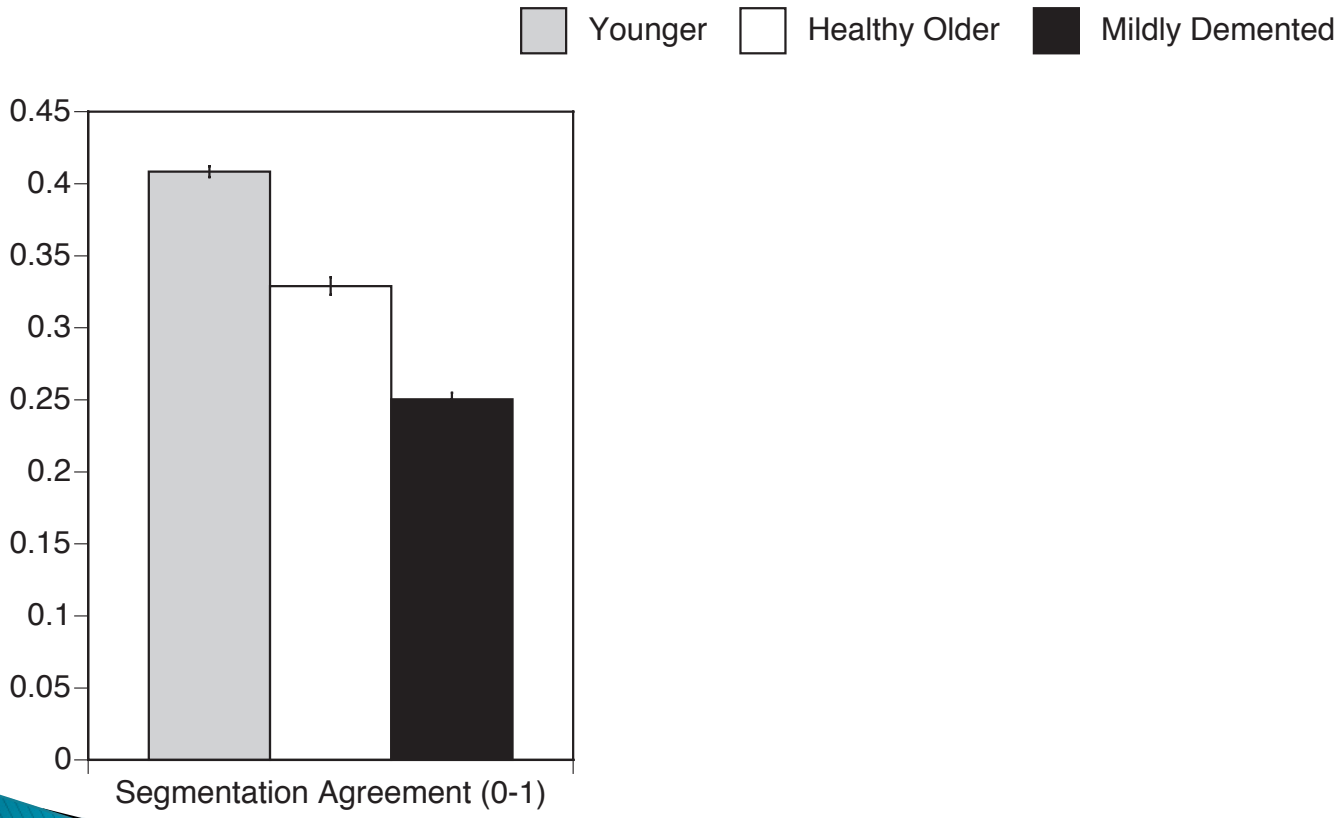

- How can we tell whether someone is segmenting events well or poorly?
- Previous studies have shown that participants show high agreement regarding how events should be segmented (Speer, Swallow, & Zacks, 2003)
- Compute a norm (across age)
  - Compare their segmentation to the norm




Proportion of Participants
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
Time (sec)

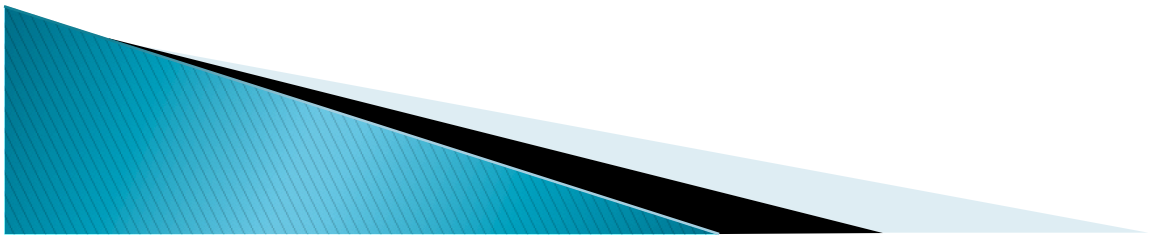

Proportion of Participants
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
Time (sec)

Results

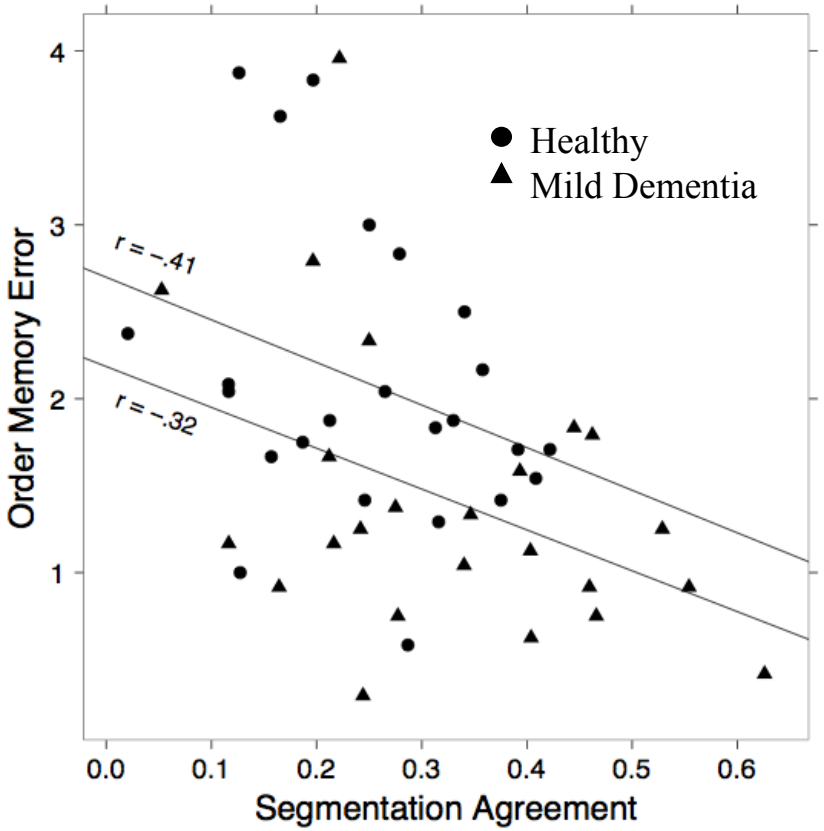

Younger
Healthy Older
Mildly Demented
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Segmentation Agreement (0-1)

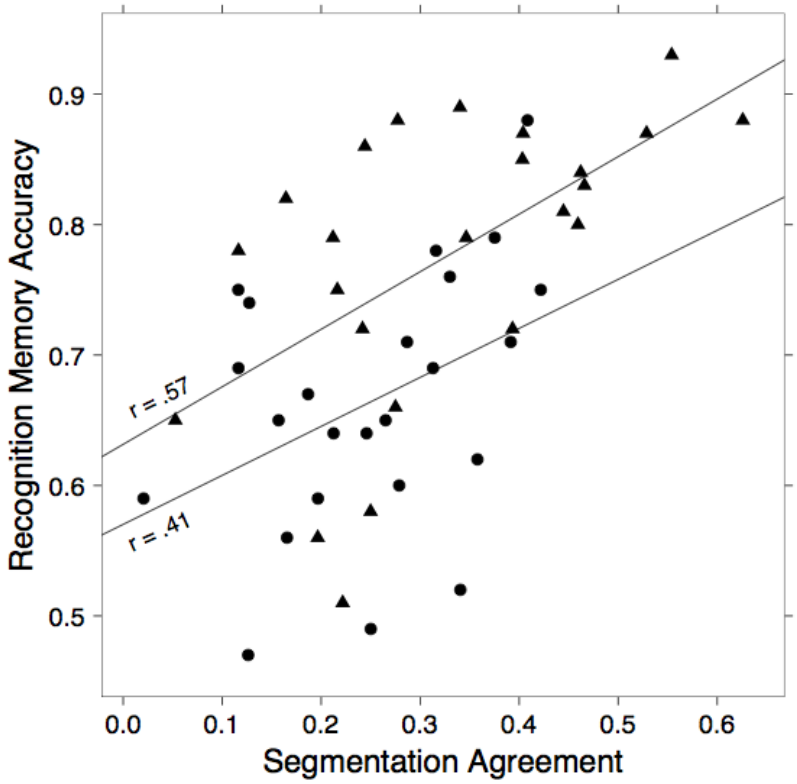
- Two possibilities regarding what age differences in segmentation agreement reveals:

  1) Segmentation ability declines with age
  2) Older adults “see” the world differently than younger adults



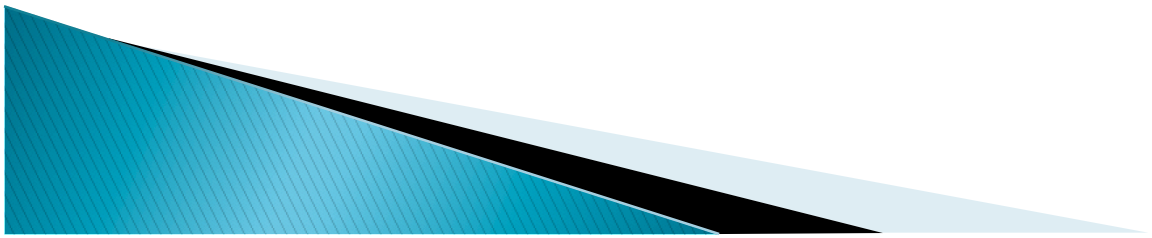
Agreement predicts recognition and order memory



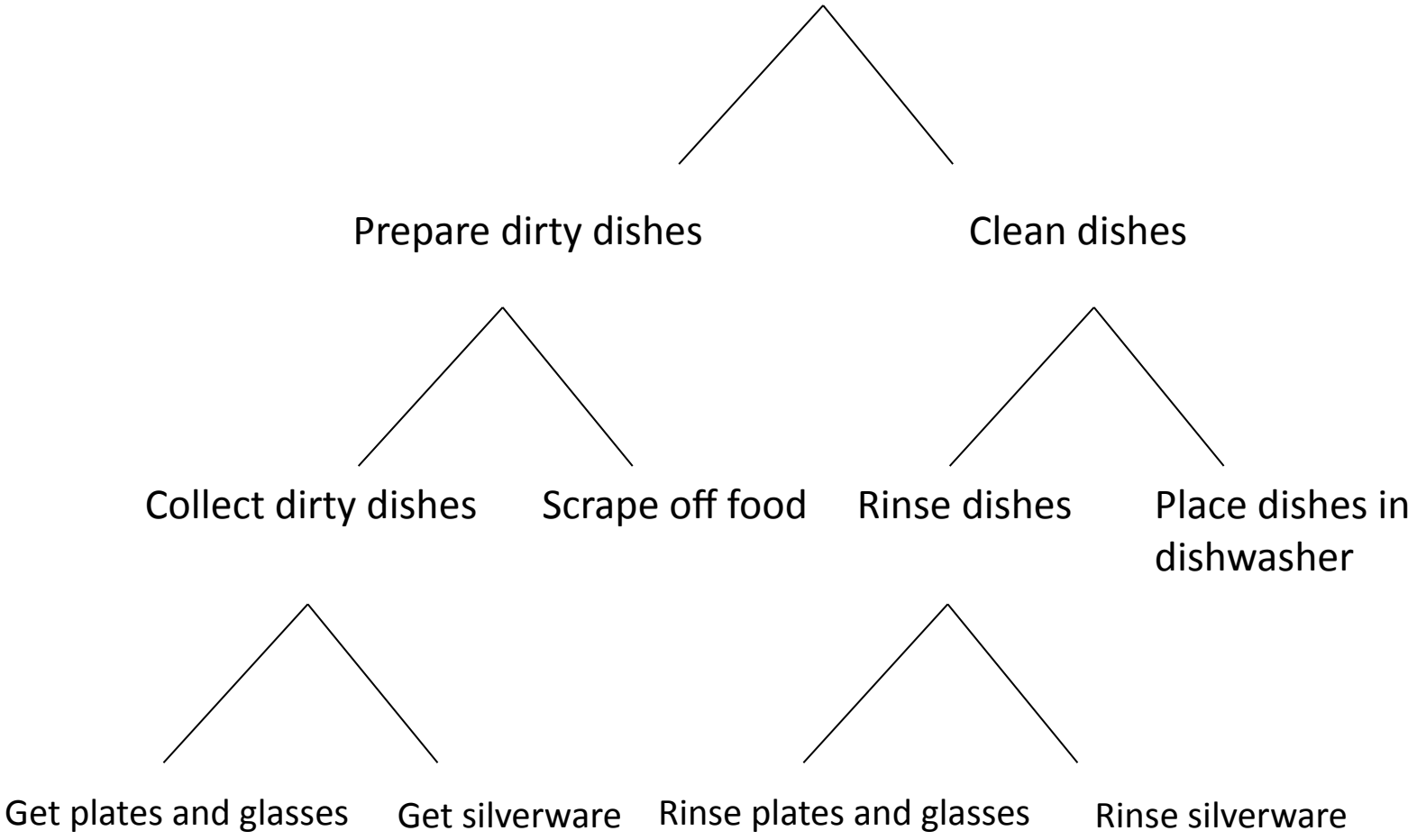


Agreement still predicted recognition significantly after controlling for dementia status, executive function, memory, and spatial ability.

- Does reduced segmentation ability with age reflect a reduced quality of event understanding?
  - Reduced ability to perceive how events “make up” an activity?



Washing dishes

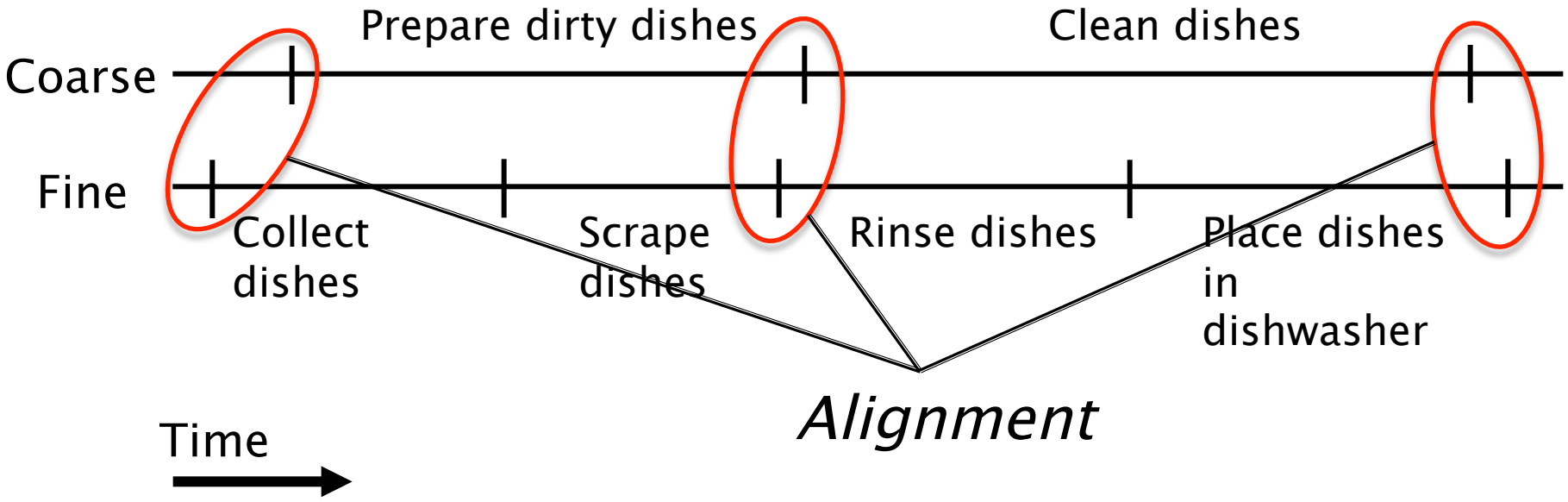


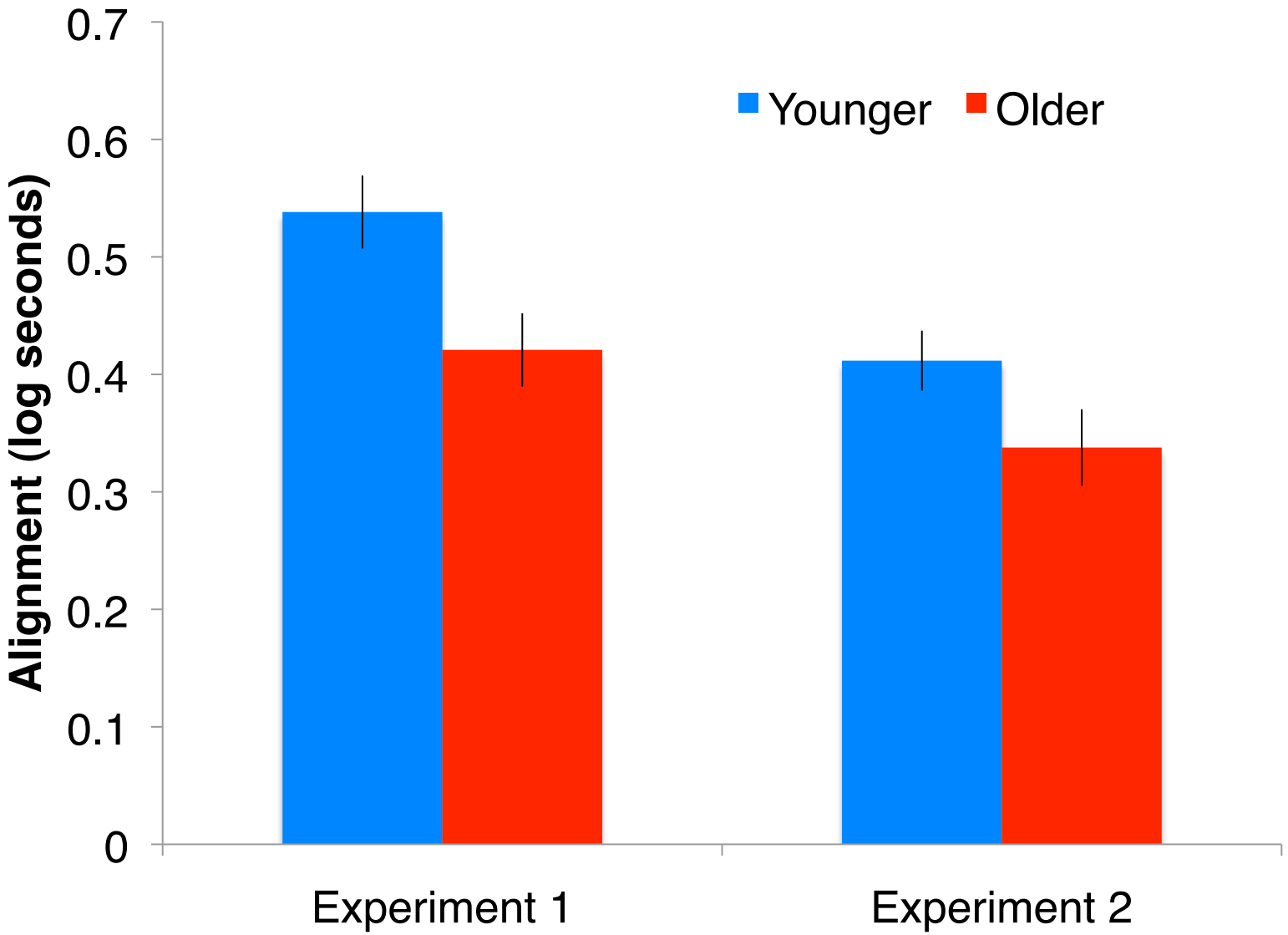
- Kurby & Zacks (2011), *Memory & Cognition*
  - Younger and older adults
  - Segment movies at *coarse* and *fine* grain
  - Order memory and recognition memory

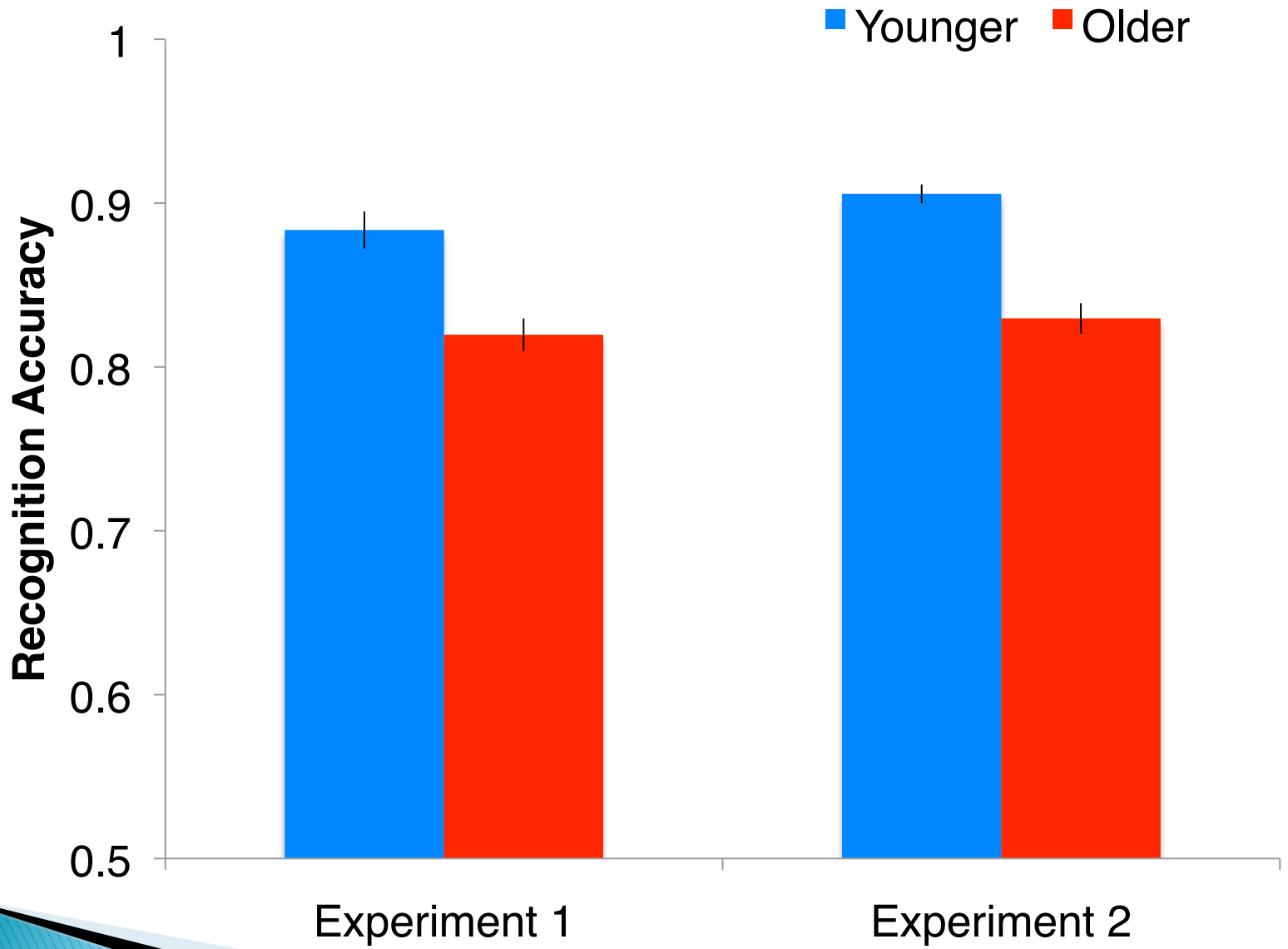


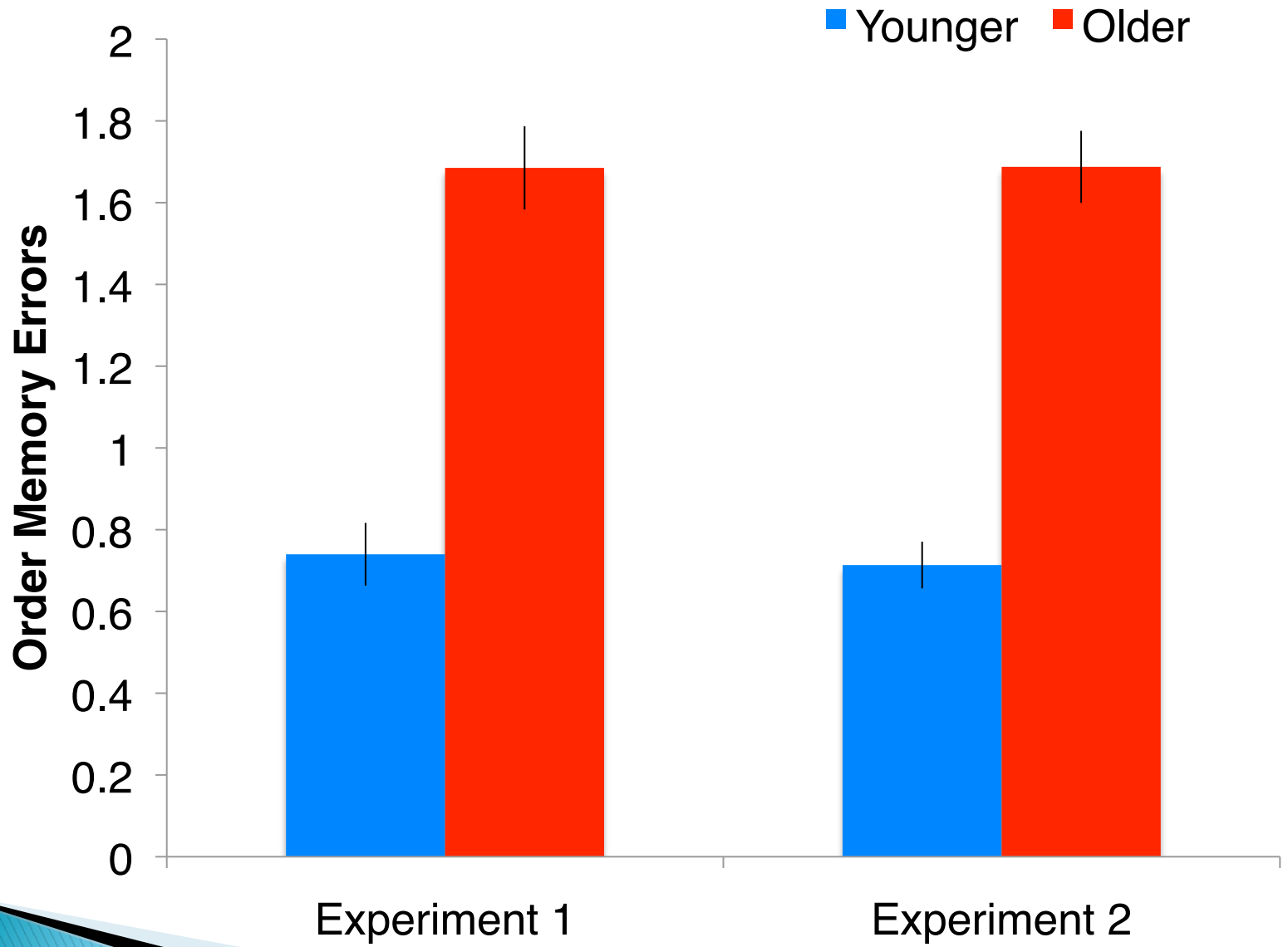


- Kurby & Zacks (2011), *Memory & Cognition*

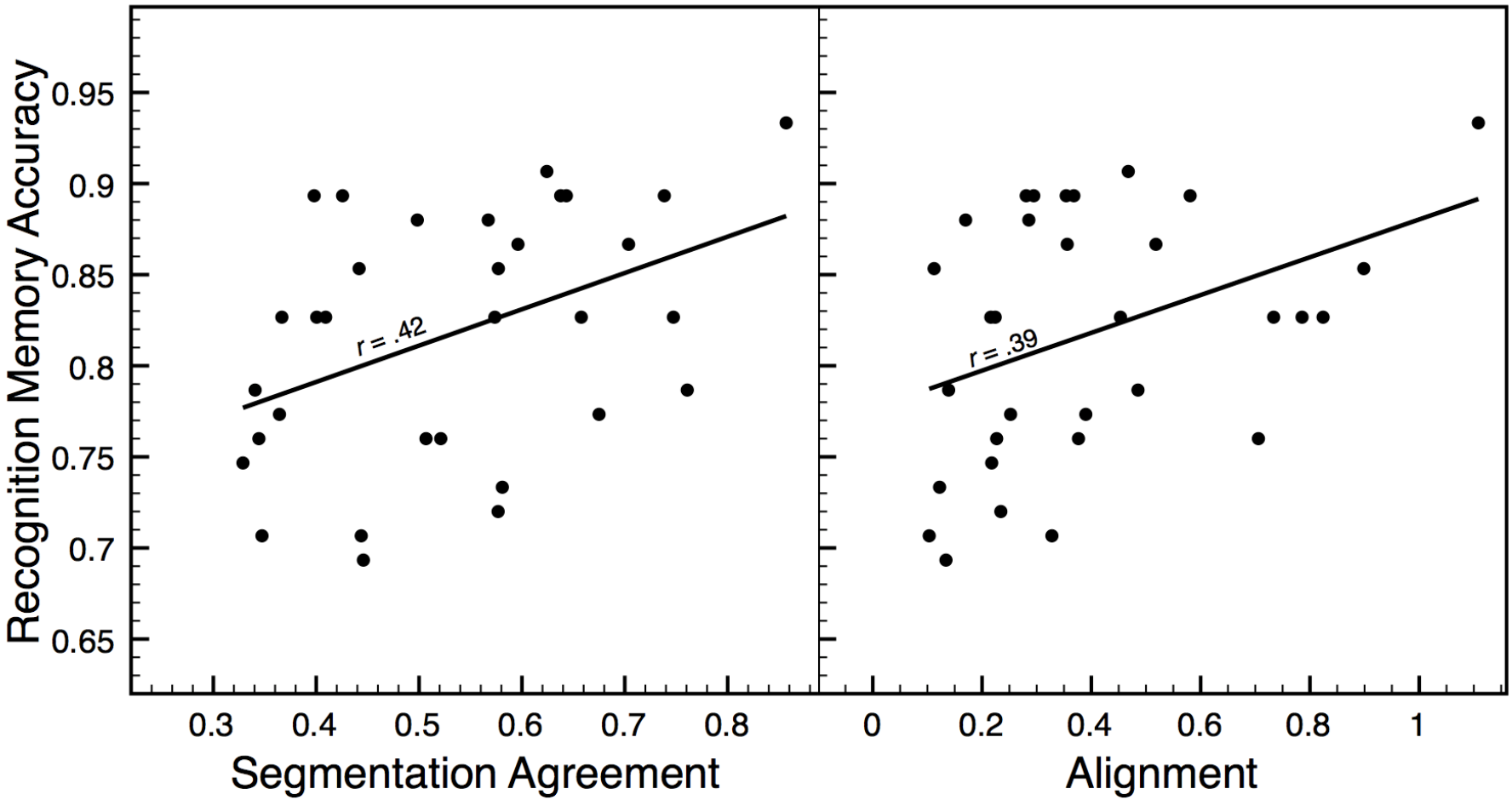



0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Alignment (log seconds)
Younger
Older
Experiment 1
Experiment 2

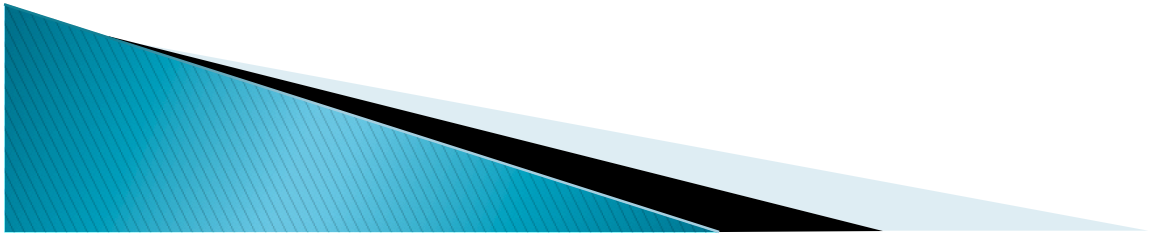

Younger
Older
Recognition Accuracy
1
0.9
0.8
0.7
0.6
0.5
Experiment 1
Experiment 2


Younger
Older
Order Memory Errors
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Experiment 1
Experiment 2

Better segmentation is related to better memory for older adults

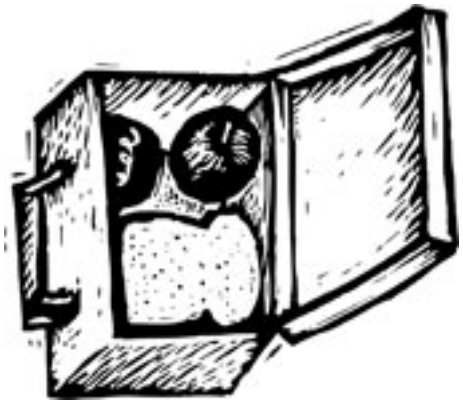


- Older adults segment activity less well
  - Less agreement on boundary locations
  - Segment less hierarchically
- How well events are segmented is related to how well they are remembered



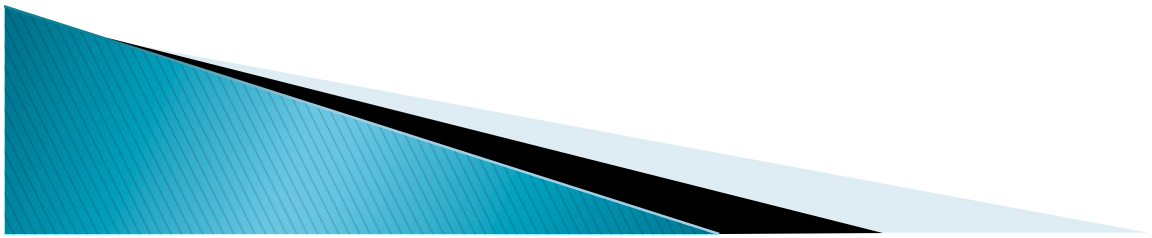
Current/Future Directions

- Is event segmentation related to how we perform everyday tasks?



Current/Future Directions

- Can we improve memory and comprehension by improving event segmentation?
  - Inserting pauses at appropriate times when watching instructional videos or TV shows
    - Inserting commercials during a movie in the middle of an event (the wrong time) reduces comprehension and memory (Boltz, 1992)



Current/Future Directions

- Can we improve memory and comprehension by improving event segmentation?

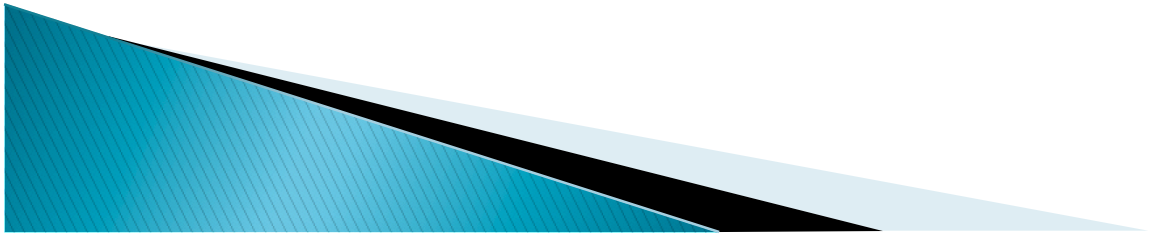
- Organizing instructions according to hierarchical structure improves building performance (Zacks & Tversky, 2003)

"IKEA" effect

Current/Future Directions

- Older adults may be able to improve their memory and comprehension of events by improving their perception of event structure (currently ongoing)

Thank you!!



GVSU Adult Participant Pool

- The Psychology Department at GVSU is very interested in continuing the study of how aging affects psychological functioning
- Join us!
  - We are currently building a participant pool of individuals interested in participating in research studies
- We have brochures with more information
- You can contact the Psychology Department at GVSU to join the pool, or for more information
  - 616-331-2195 (psydept@gvsu.edu)