



Age-Related Reductions in the Episodic Specificity of Past and Future Events



Donna Rose Addis, Alana T. Wong & Daniel L. Schacter

Athinoula A. Martinos Center for Biomedical Imaging, MGH/MIT/HMS and Department of Psychology, Harvard University

INTRODUCTION

- > **Constructive episodic simulation hypothesis**^{1,2} contends that:
 - (1) past & future events draw on similar information stored in episodic memory
 - (2) episodic memory supports simulation by extracting details from past events & recombining into novel episodes
- > Patient studies – deficits for past events can extend to future events³
- > Past and future events engage a common neural network, including the hippocampus, which supports relational processing – the linking together of elements in an episode⁴
- > Does future event simulation change with healthy aging?
 - > Older adults show deficits in relational processing⁵
 - > Older adults show reduced episodic specificity of past events⁶
- > **Hypotheses:**
 - > Older adults will show reduced episodic specificity of past AND future events
 - > These deficits will be correlated with performance on a relational memory task

METHODS

Participants

- > 13 young adults (mean age = 25 yrs; 5 males)
- > 12 older adults (mean age = 73; 6 males)

Neuropsychological testing

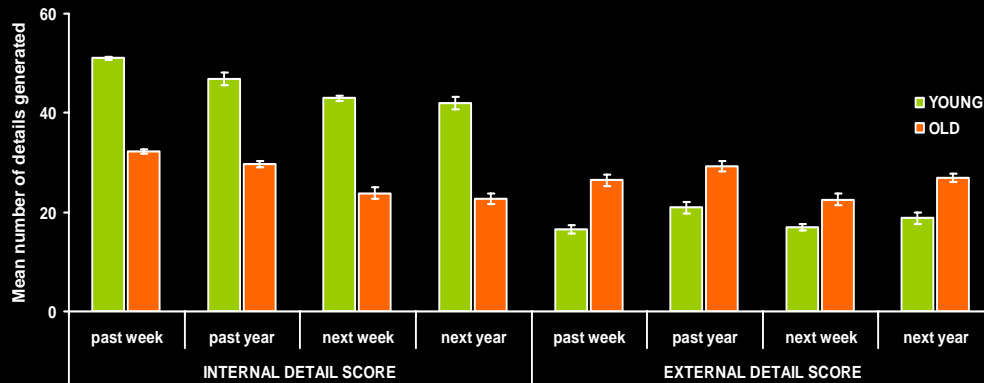
- > Relational memory ability: Verbal Paired Associates I (VPA)
- > Executive functioning: Wisconsin Card Sort Test (WCST) and Verbal Fluency (FAS)

Adapted Autobiographical Interview⁶

- > Cue word presented
- > 3 minute time limit
- > Generated four events in each time-period:
 - * Past few weeks
 - * Past few years
 - * Next few weeks
 - * Next few years
- > **Scoring:**
 - > Events transcribed; segmented into details; classified as **internal** (episodic) or **external**

RESULTS

(1) Adapted Autobiographical Interview



DETAIL x AGE-GROUP (p = .001)

- > Older: fewer internal details (p = .004)
- > Older adults also show trend to more external details (p = .110)

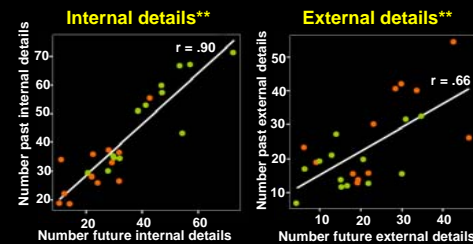
DETAIL x TIME-PERIOD (p = .006)

- > More distant future events have more external details than temporally closer events

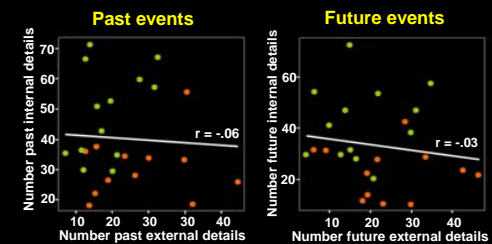
DETAIL x PAST-FUTURE (p = .049)

- > Past events comprised more internal and external details than future events

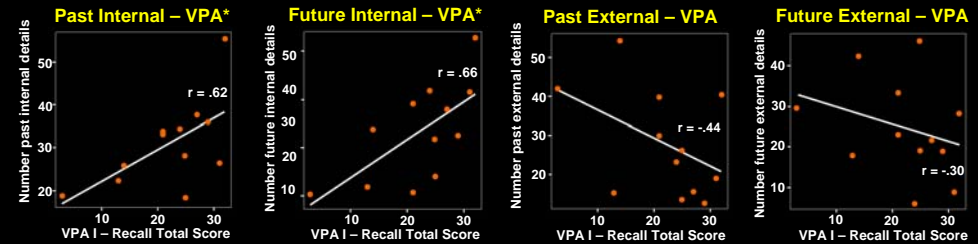
(2) Past & Future scores strongly correlated:



(3) Internal & External scores uncorrelated:



(4) Past & Future Internal scores significantly correlated with Relational Memory ability (VPA) but not executive functions (e.g., WCST, FAS) in older adults:



• Young adults • Older adults ** p < .001 * p < .05

CONCLUSIONS

- > This study demonstrates that the age-related reduction in episodic specificity of past events extends to future events
- > The number of internal and external details were strongly correlated across past and future events, consistent with other studies showing close links between past and future events
- > In older adults, the ability to produce internal episodic details for past and future events was strongly correlated with relational memory ability, but not executive functioning
- > These findings support the constructive episodic simulation hypothesis, particularly the idea that flexibly recombining details from past events into novel scenarios is an important component of episodic simulation

REFERENCES

- Schacter & Addis (2007). Constructive Memory: The ghosts of past & future. *Nature*, 445, 27.
- Schacter & Addis (2007). The cognitive neuroscience of constructive memory: Remembering the past and imagining the future. *Phil Trans R Soc B*, in press.
- Williams et al. (1996). The specificity of autobiographical memory and imageability of the future. *Mem Cogn*, 24, 116-125.
- Addis et al. (2007). Remembering the past and imagining the future: Common and distinct neural substrates during event construction and elaboration. *Neuropsychologia*, 45, 1363-1377.
- Chalfonte & Johnson (1996). Feature memory and binding in young and older adults. *Mem Cogn*, 24, 403-416.
- Levine et al. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psych Aging*, 17, 677-689.

ACKNOWLEDGEMENT: NIA grant AG008441

CONTACT: daddis@wjh.harvard.edu