

Attentional Control in the Earliest Stages of Cognitive Decline

Dementia Research Seminar

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Why Attentional Control?

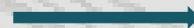
- Cognition in **daily life**
 - Errors in everyday life often reflect attentional control impairment

This study:



Phase 1: Self-report questionnaires

- Emphasis placed on wider scope of 'lapses' in daily life than episodic memory

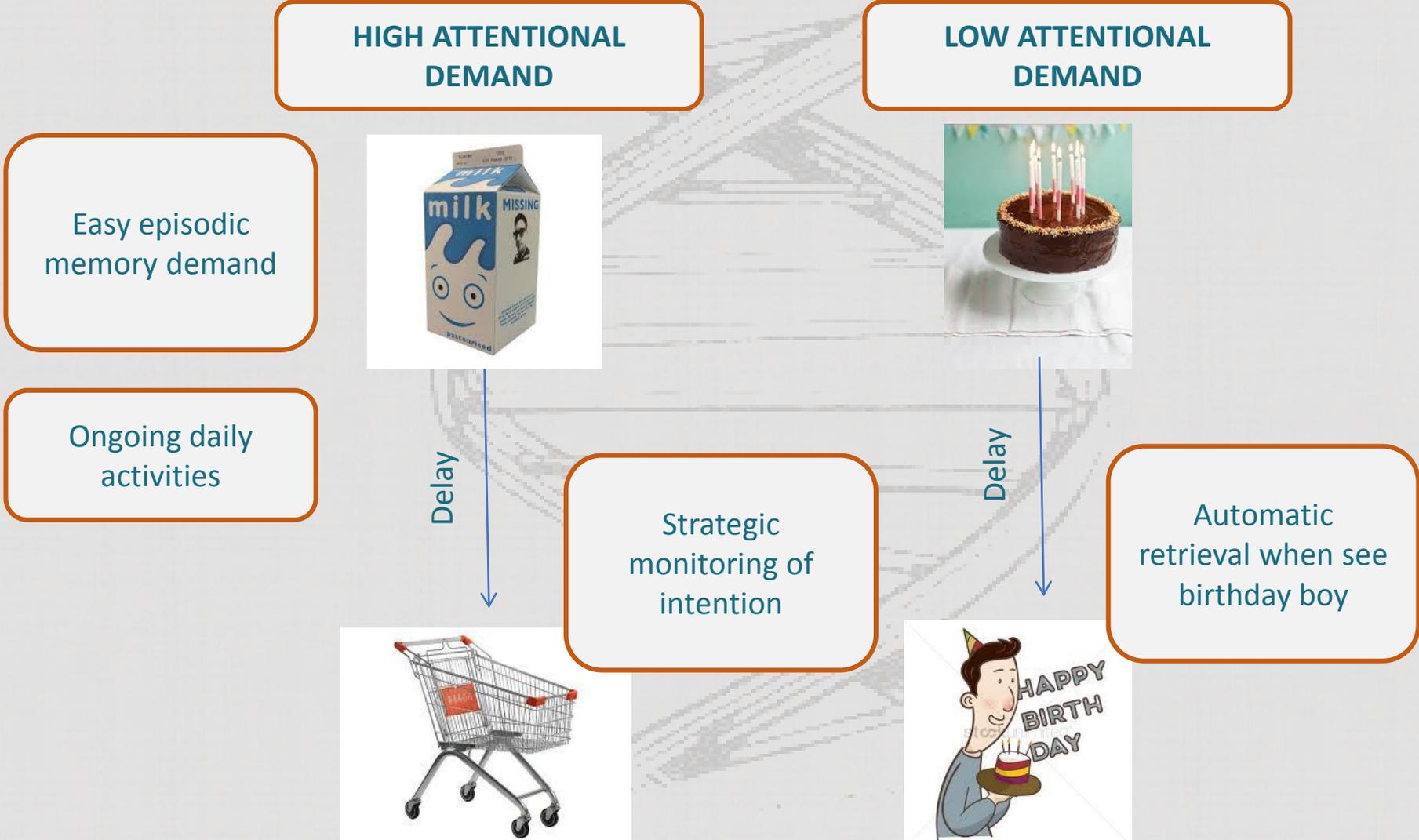


2. Behavioural paradigm embedded in 'naturalistic' scenario

- Prospective memory

Prospective Memory

- Remembering to act on an earlier formed intention at the right moment.



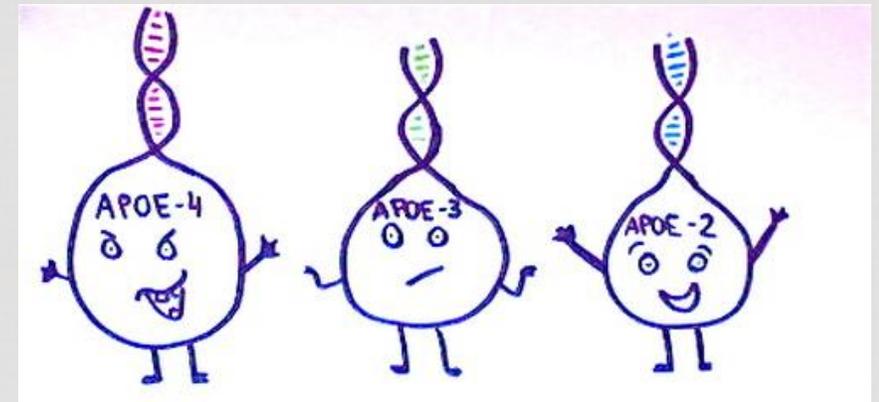
Prospective Memory and risk of Alzheimer's Disease

- Individuals with Mild Cognitive Impairment (MCI): mixed evidence for impairment in prospective memory with high attentional control demand (Costa et al. 2011; McDaniel et al., 2011; Tam et al., 2013).
- Individuals with Subjective Cognitive Impairment (SCI): limited evidence for impairment (Rabin et al., 2014; Lee et al., 2018)

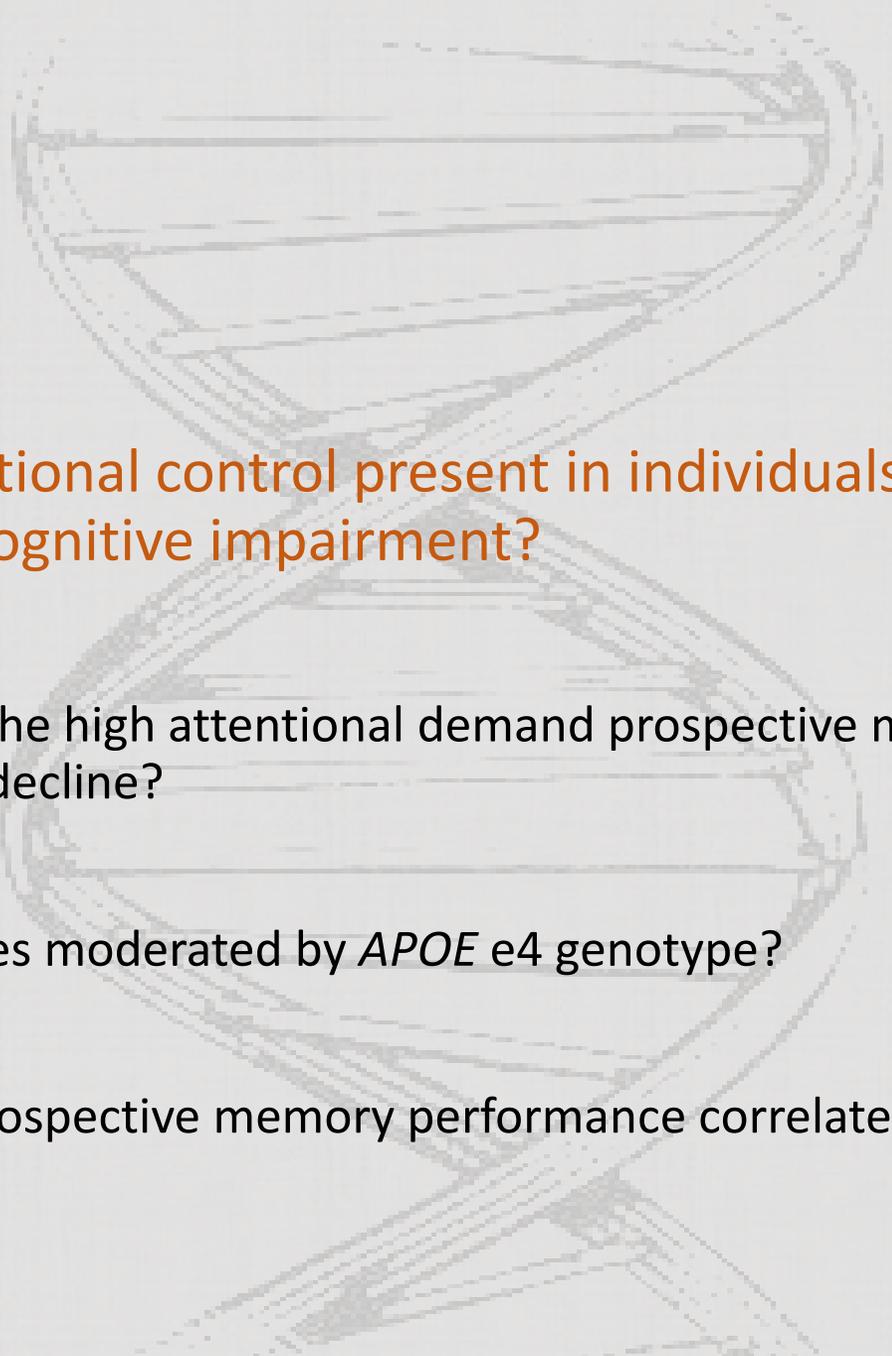
Failure to account for cost?

Genetic risk for Alzheimer's disease and Prospective Memory:

- Carriers of an *APOE* e4 allele show differential profiles of prospective memory with high attentional demand in mid-adulthood
 - Lower PM accuracy (Lancaster et al., 2016)
 - Greater age-related increase in cost (Lancaster et al., unpublished)



Research Aims



Are changes in attentional control present in individuals with subjective cognitive complaints or mild cognitive impairment?

1. Is performance on the high attentional demand prospective memory task sensitive to the early stages of cognitive decline?
2. Are these differences moderated by *APOE* e4 genotype?
3. Do differences in prospective memory performance correlate with subjective reports of errors in daily life?

Methods

Participants – Phase 1

87 **memory assessment service users** (MAS group)

- Recruited within 9 months of referral
- MCI ($n=59$) or SCI ($n=28$)
- 55 healthy older controls

Participants – Phase 2

48 MAS group

- 24 e3/e3, 20 e4 carriers

45 healthy older adults

- 33 e3/e3, 12 e4 carriers

Self-report: Everyday Cognition

1. Cognitive Failures Questionnaire

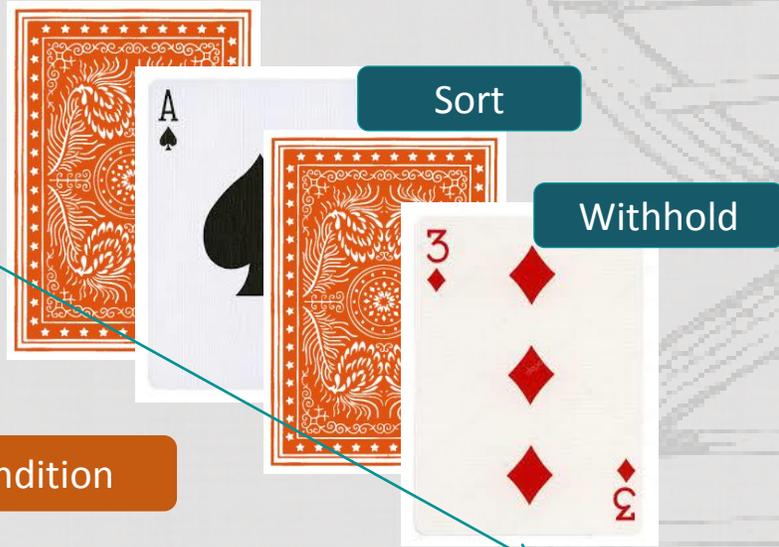
“Do you read something and find you haven’t been thinking about it and must read it again? “

2. Attentional Control Scale

“After being interrupted or distracted, I can easily shift my attention back to what I was doing before. “



Methods: Prospective Memory Task

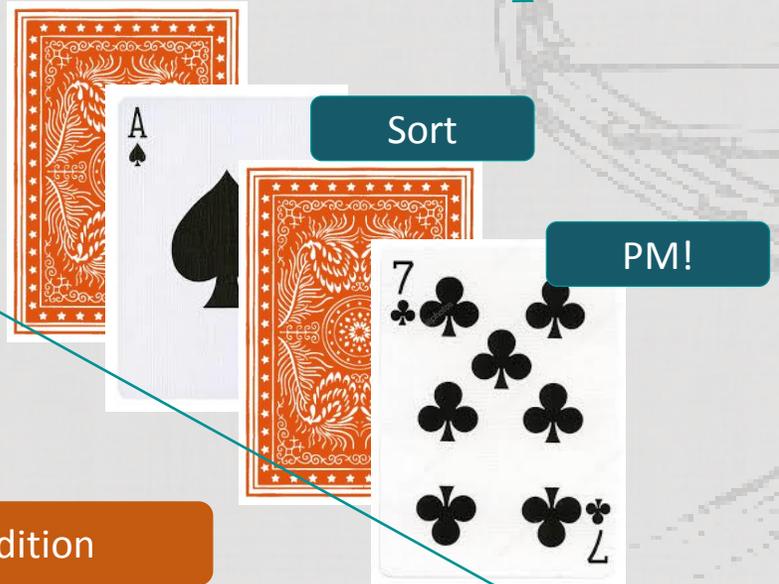


Control Condition
Speeded decision-making: sort the cards according to suite

Sort: accuracy and speed

Prospective memory instruction

Delay

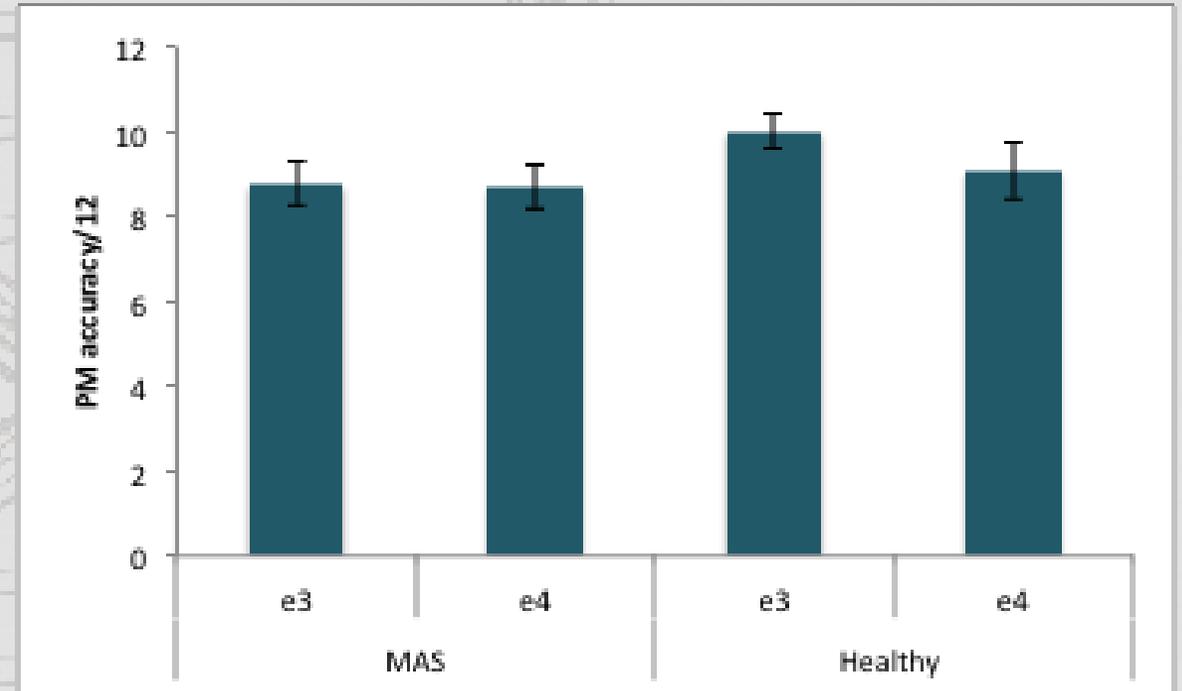
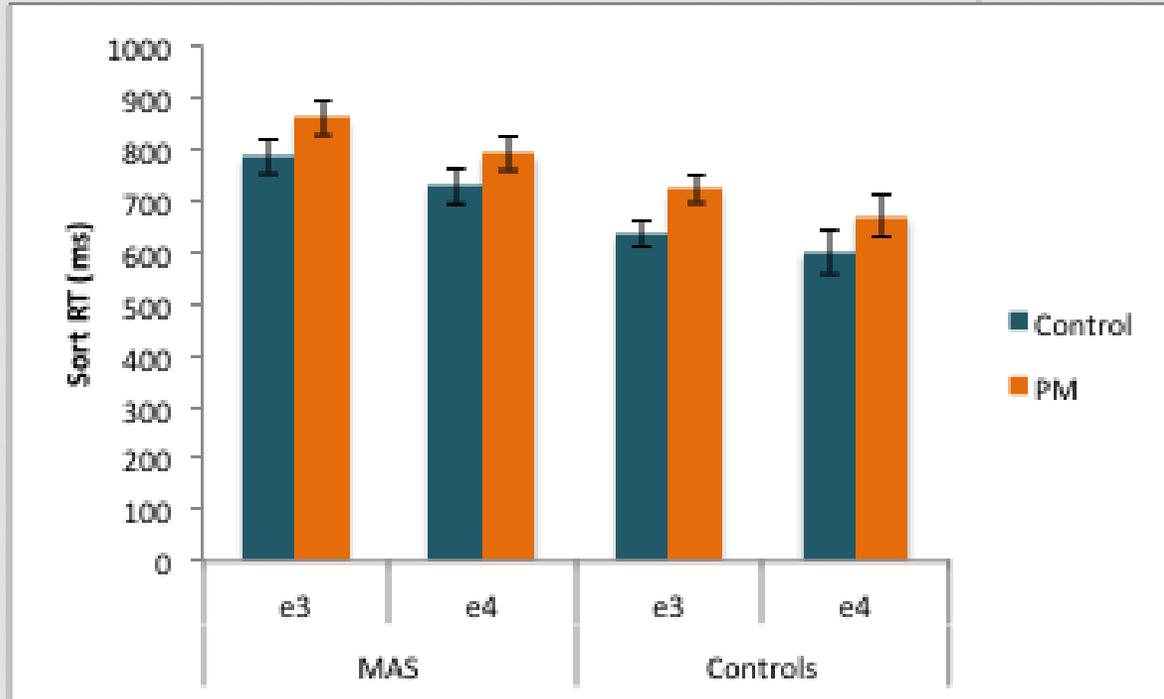


Prospective Memory Condition
Speeded decision-making: sort the cards according to suite
Prospective memory: make additional response for every '7' card

PM accuracy
PM cost

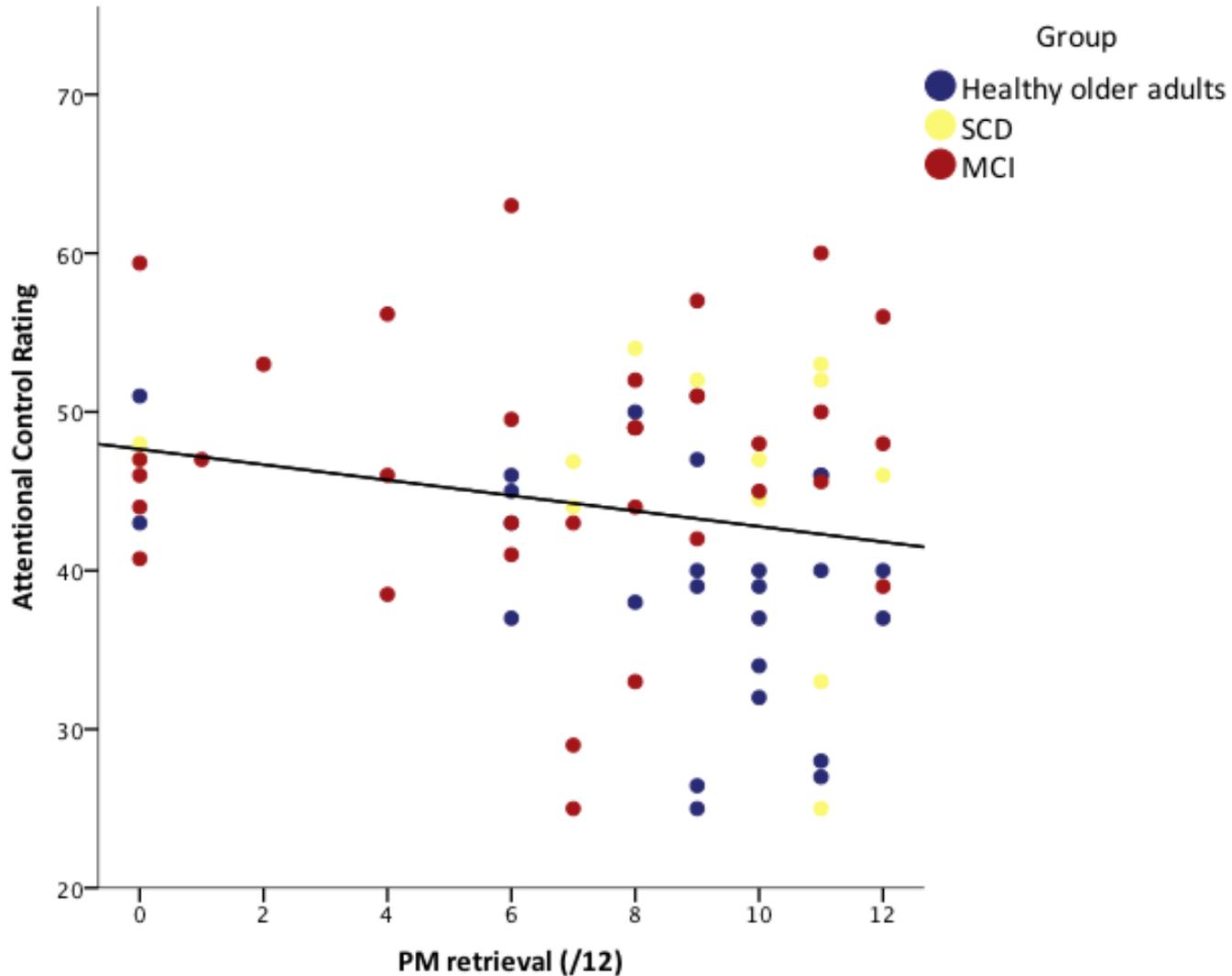
Prospective memory instruction: recall

Results



- MAS group were less accurate and slower to perform the control card-sorting task.
- Introduction of a PM instruction did not differentially impact card-sort performance in the MAS group.
- No effect of genetic risk
- No difference in PM accuracy in the MAS group.
- No effect of genetic risk.

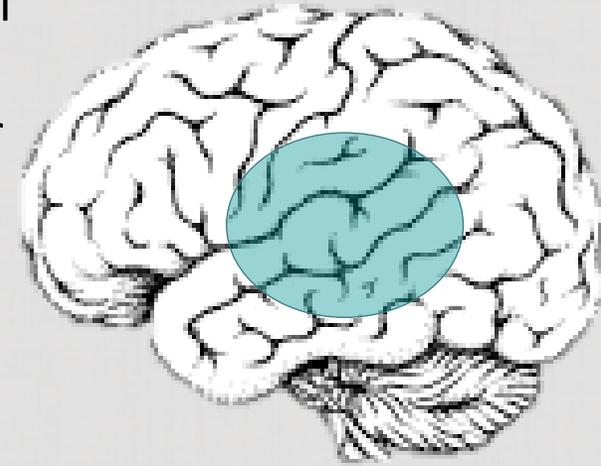
Results



- MAS group reported significantly worse attentional control than healthy control participants.
- MAS group reported significantly more cognitive errors in daily life.
- Correlation between attentional control in everyday life and prospective memory retrieval.

Conclusions

- Prospective memory with high attentional demand is intact in the earliest stages of cognitive decline.
- Evidence of age-related decline in prospective memory with high attentional demand.
- Is automatic, stimuli-triggered prospective memory a more sensitive marker of early cognitive impairment?
- Do disadvantages emerge in situations placing greater burden on executive control?
 - Longer delays, embedded in real-life?
- *APOE* genotype did not moderate prospective memory in this group
- PM retrieval correlated with reports of poor attentional control in daily life.



Acknowledgments...

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...Questions?

