Attentional Control in the Early Stages of Memory Change

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Research aims

Are changes in attentional control present in the earliest stages of memory change?

1. Is there a significant difference in the subjective experiences of attention in everyday life between those receiving a diagnosis of MCI, reporting subjective memory change and healthy controls?
2. Do carriers of the *APOE* e4 allele report greater attentional problems in everyday life?
3. Does performance on a cognitive task assessing attentional control and resource differ in those reporting memory change, and does this interact with *APOE* status?
4. Does cognitive reserve interact with clinical group or genotype in affecting the profile of attentional control?

Background

Mild cognitive impairment (MCI) is defined as the presence of subjective and objective cognitive impairment, in the absence of dementia, which fails to impact on daily living[1]. MCI is associated with an elevated risk of developing dementia[2, 3,].

MCI is associated with a heterogeneous range of symptoms, most commonly memory impairment, but are changes to attention also important in the initial stages of memory change?

- Attention, although less commonly reported, is most consistently reported in the preclinical stages of dementia[4].
- 20 month longitudinal study found changes in attentional control, divided attention and target detection in both amnesic and non-amnesic MCI volunteers[5].

The *APOE* e4 gene is associated with age-related cognitive decline and an increased risk of Alzheimer's disease[6].

- Attention is reported to be sensitive to the effects of *APOE e4* gene across the lifespan[7, 8, 9, 10, 11], but the nature of the genotype effect appears dependent on age.

Methods

Phase 1

~ 200 service-users with diagnosis of MCI or no diagnosis but subjective memory complaints
~ 200 age-matched controls

Cognitive Failures Questionnaire
Attentional Control questionnaire

Phase 2

~ 100 service-users with diagnosis of MCI or no diagnosis but subjective memory complaints
~ 100 age-matched controls

Card-sort prospective memory task.
Cognitive reserve questionnaire
Measure of baseline IQ: NART
Buccal swab for genotype analysis

Card-sort Prospective memory (PM) paradigm

- Ongoing task; participants required to sort decks of cards according to suit
- PM task; participants required to make an additional response to any '7' card, whilst continuing to sort decks according to suit.
- Across decks, manipulation of frequency of PM cues included to see how this alters attention allocation across ongoing and PM task.

Previous research

- In healthy mid-age adults (45-55 years) e4 carriers show poorer retrieval of PM intention on card-sort task (p=.048)
- e4 carriers trend towards reporting significantly lower scores on the cognitive failures questionnaire (p=.081), and report lower scores on the attentional control scale (p >.05).
- This indicates e4 carriers show subjective and objective differences within the domain of attention by mid-adulthood.

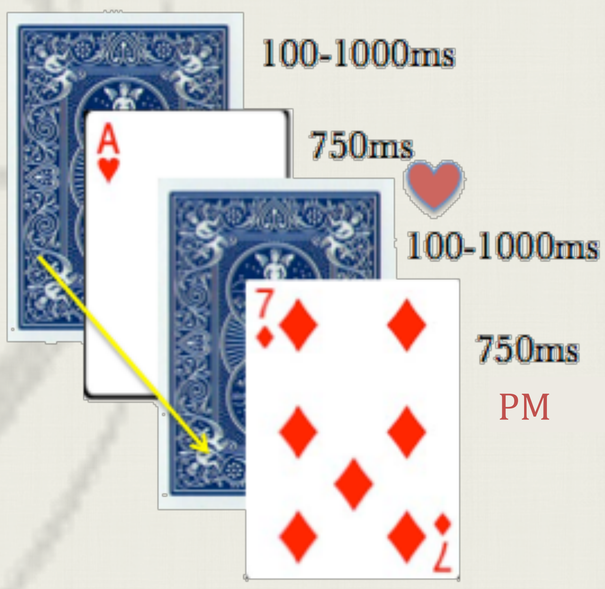

Figure 1. Illustration of prospective memory task

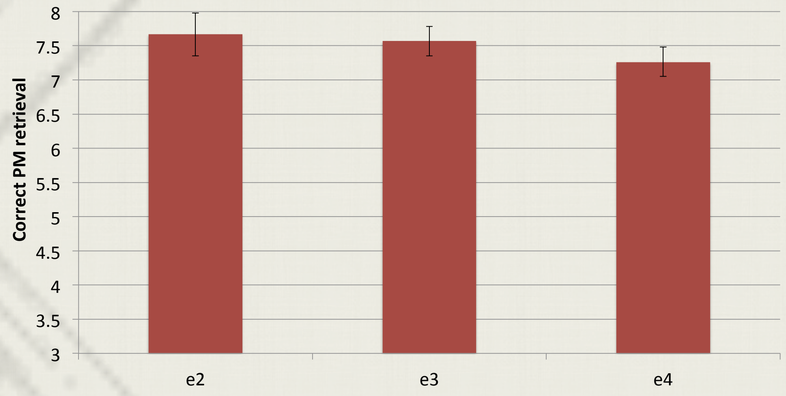

Figure 2. Genotype difference in PM retrieval seen in healthy mid-age adults.

Predictions

MCI/subjective memory impairment

e4 carrier

Greater subjective problems with attentional control

Lower performance on the ongoing sort-task

Poorer retrieval of PM intention, despite showing a similar cost of dividing attention between two tasks for ongoing task performance

Reduced flexibility of attentional allocation strategy on basis of top-down expectancies

Interaction

Cognitive reserve and NART will mediate effect of clinical group status and *APOE* status on attentional performance.

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