Introduction

- Visual working memory (VWM) displays substantial decline across the adult life-span [1].
- Older adults exhibit a clear associative deficit [2, 3] – some VWM decline may be due to impaired ability to bind object features into a unitised representation [4].
- However, VWM for colour-shape conjunctions appears no more age-sensitive than individual features [4-6].
- Conjunctive binding deficit appears to differentiate early Alzheimer’s disease from healthy ageing [7, 8].
- There remain boundary conditions where older adults may struggle to detect conjunction changes [9, 10].
- Cowan et al. [10]: small colour-location binding deficit when trials were blocked. Mixing colour and binding changes resulted in large binding deficit – older adults missed binding changes.
- As previous studies have only used blocked trials Experiment 1 assessed whether this is true for colour-shape conjunctions.
- To quantify evidence against age-group by memory condition interactions we report default Bayes factors [11].

Experiment 1

- Does mixing feature and conjunction changes affect older adults’ ability to detect changes to colour-shape binding?
- Method: Change detection task. 48 younger (20.92 ± 2.76) and 48 healthy older adults (70.61 ± 5.00). Half saw blocked, half mixed.

Discussion

- We find substantial-strong evidence against a differential effect of age on VWM for features and conjunctions.
- Mixing feature and binding trials did not affect older adults’ ability to distinguish conjunction changes.
- Experiment 1 adds to growing body of evidence against colour-shape binding deficit [4-6].
- Experiment 2 adds to mixed findings regarding object-location binding deficits. Some find older adults less able to detect object-location changes [12, 13], whereas others have not [14].
- Future work should address factors contributing to presence/absence of object-location deficit. Possibly stimulus complexity.
- The absence of age-related binding deficit for within-object (intrinsic) features is in stark contrast to the deficit found for between-object (extrinsic) associations in LTM [2] and WM [3].
- The magnitude of age-related binding deficit may depend on extent to which feature conjunctions are represented as a unitised object [e.g. 15]. Future work should directly compare the effect of age on intrinsic and extrinsic binding in VWM.

Notes:
- Bayes factors were calculated using the BayesFactor package (http://CRAN.R-project.org/package=BayesFactor) in R (http://www.R-project.org). * All older adults scored over 27 on the MMSE. ** For both experiments our conclusions are not changed by analyzing BF, hit rate, or proportion correct instead of hits minus false alarms (Ps). Further, there was no differential effect of age on measures of bias (c, d) for features and conjunctions.

References: