Background

Memory problems are among the most common complaints as we grow older. However, not all types of memory are equally affected, suggesting that our memories reflect multiple processes, supported by distinct brain networks, which have differential life-span trajectories (e.g., La Voie & Light, 1994).

Furthermore, while memory for emotional information is generally better than for neutral information, the relative advantage of positive- versus negatively-valenced information increases with age (‘positivity-bias’).

As part of the large Cam-CAN project (www.cam-can.com), we report preliminary results from an experiment to test these hypotheses that was run on n=205 (to date) population-representative individuals approximately equally distributed from 18 to 88 years of age.

Experiment

Study Phase

120 trials of:
- 40 Objects on Positive Pictures
- 40 Objects on Neutral Pictures
- 40 Objects on Negative Pictures

8 secs per trial to make a link

Test Phase

160 trials: 120 Studied + 40 New Objects
1. Name degraded version of Object (to measure priming)

2. Decide whether Object was studied (to measure familiarity)

3. Decide whether background picture at study was Positive, Neutral or Negative (to measure recollection)

(4. Describe background)

Recollection and familiarity dramatically impaired with age; Priming however appeared unaffected by age (even though overall naming, e.g. of unstudied items, decreases with age):

\[ R(\text{rec}) = -0.61, p<0.001 \]
\[ R(\text{fam}) = -0.56, p<0.001 \]
\[ R(\text{pri}) = -0.11, p=0.13 \]

But is lack of age effect on priming simply because priming is a noisy measure? (Berry et al, 2012) - No - see Structural Equation Modelling Results...

Conclusions

Three different types of memory (recollection, familiarity and priming) show differential effects of age (even when using same metric): recollection is most impaired; priming is spared. These types of memory also show differential sensitivity to emotional valence: negative information enhances recollection; positive information enhances familiarity (of associated object).

Our results suggest that different brain networks support these types of memory, with differential potential for reorganisation or compensation with age; issues that are currently being explored with structural and functional MRI data on the same individuals. Focusing on intact priming may help ameliorate memory problems as we age.

References
