Attention, rather than Retrieval, contributes to Age differences in Emotional Memory

An Event-Related Potential (ERP) study

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Introduction

- Positivity effect = older adults have relatively increased memory for positive stimuli compared to younger adults[1]
- Research question: Do attentional or retrieval processes contribute to this positivity effect?
- This was tested using Event-Related Potentials
  - Late Positive Potential = index of attention[2]
  - Early frontal old/new effect = index of familiarity[3]
  - Parietal old/new effect = index of recollection[3]
  - Right frontal old/new effect = index of post-retrieval processes[3]

Method

- Twenty younger (17-27 years) and twenty older (63-77 years) participants
- Unpleasant, neutral and pleasant pictures (IAPS)
- Continuous recognition and free recall test
- 64-channel EEG registration (Biosemi)

Results

Memory performance

- Emotion did not influence recognition accuracy (Pr), see Fig. 1
- A positivity effect occurred in the free recall test, see Fig. 2.

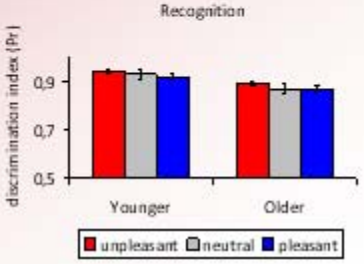

Fig. 1 Recognition performance

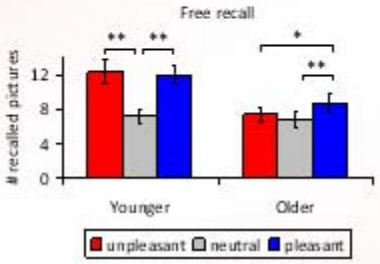

Fig. 2 Free recall performance
*** significant difference, all ps < .025*
** nearly significant difference, p = .063*

Late Positive Potential (LPP)

- The early LPP (400-700 ms) was enhanced for emotional compared to neutral pictures in both age groups, see Fig. 3
- The late LPP (700-900 ms) continued to be enhanced for emotional pictures in the older participants, but only for the unpleasant pictures in the younger participants, see Fig. 3

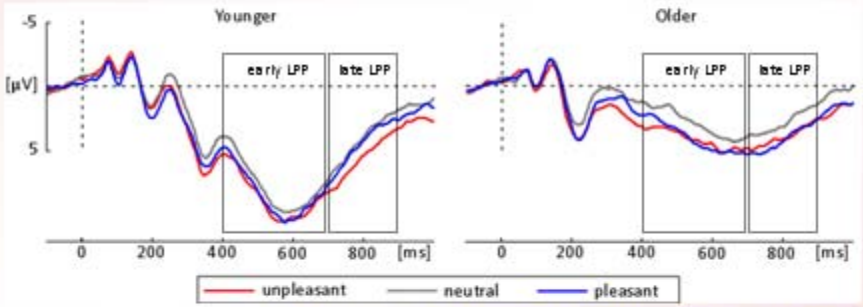

Fig. 3 Grand-average ERPs at the medial posterior electrode cluster

Old/new effects

- Parietal and right frontal old/new effects were absent in the older adults, see Fig. 4
- None of the old/new effects were modulated by emotion in a way consistent with the positivity effect, see Fig. 4

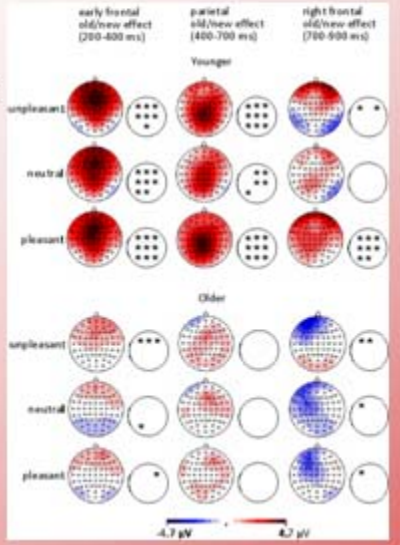

Fig. 4 Scalp topographies of the three old/new effects. Asterisks indicate significant old/new effects, all ps < .05

Discussion

- Retrieval processes did not contribute to the positivity effect
- Attention to pleasant stimuli was more sustained in the older participants, as in our previous study[4]
- This is in line with the notion that top-down, but not bottom-up controlled attention for emotional stimuli differs between younger and older adults[1]
- This suggest that attention plays an important role in the occurrence of a positivity effect

References

1) Mather & Carstensen (2005). *Trends Cogn Sci, 9*, 496-502.
2) Schupp et al. (2006). In Anders et al. (Eds.), *Progress in brain research: Understanding emotions* (Vol. 156, pp. 31-51). Boston: Elsevier Science.
3) Yonelinas (2002). *J Mem Lang, 46*, 441-517.
4) Langeslag & Van Strien (2007). Manuscript submitted for publication.

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