Emotional Language in Healthy Aging

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Introduction

Phenomenon: Healthy older adults prefer positive stimuli compared to negative ones - i.e. **"Positivity effect"**
- Greater attention [1]
- Better memory [2]

Theory: According to the **strength and vulnerability integration (SAVI) model**, such positivity effect may be modulated by emotional intensity/arousal [3]:
- High-arousing stimuli: increased emotional distress due to reduced physiological flexibility
- Low-arousing stimuli: increased emotion regulation after negative events

Neural correlate: Late positivity complex (LPC)
- Emotion literature: LPC reflects attentional re-allocation [4]
- Language literature: LPC reflects re-analysis of meaning [5]

A gap in knowledge: Past studies examined pictures and seldom controlled arousal. **What about emotional language?**

Research question: How does age affect the comprehension of emotional words with different **valence** and **arousal**?

Methods

Participants: Healthy, native English speakers, right-handed
- **22 younger** (aged 18-30, 12 males, M = 19.1 yo)
- **17 older** (aged 60-75, 9 males, M = 68.2 yo)
- Screening of cognitive functioning and mood status:
  - Mini–Mental State Examination (Score ≥ 27)
  - Digit Symbol Substitution task (Score ≥ 42)
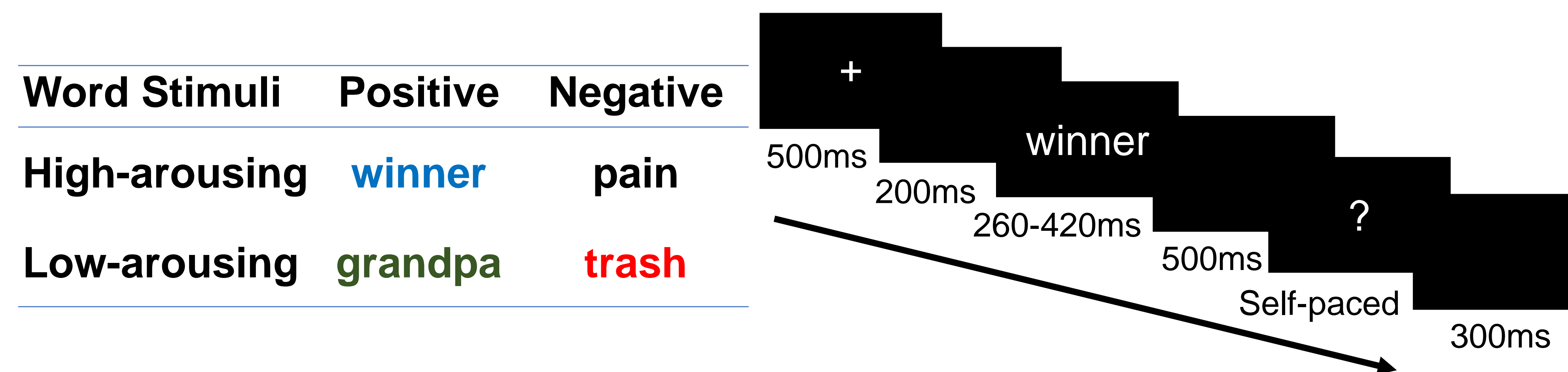 - Beck Depression Inventory (Score < 17)

Reference

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Stimuli & Lexical Decision Task

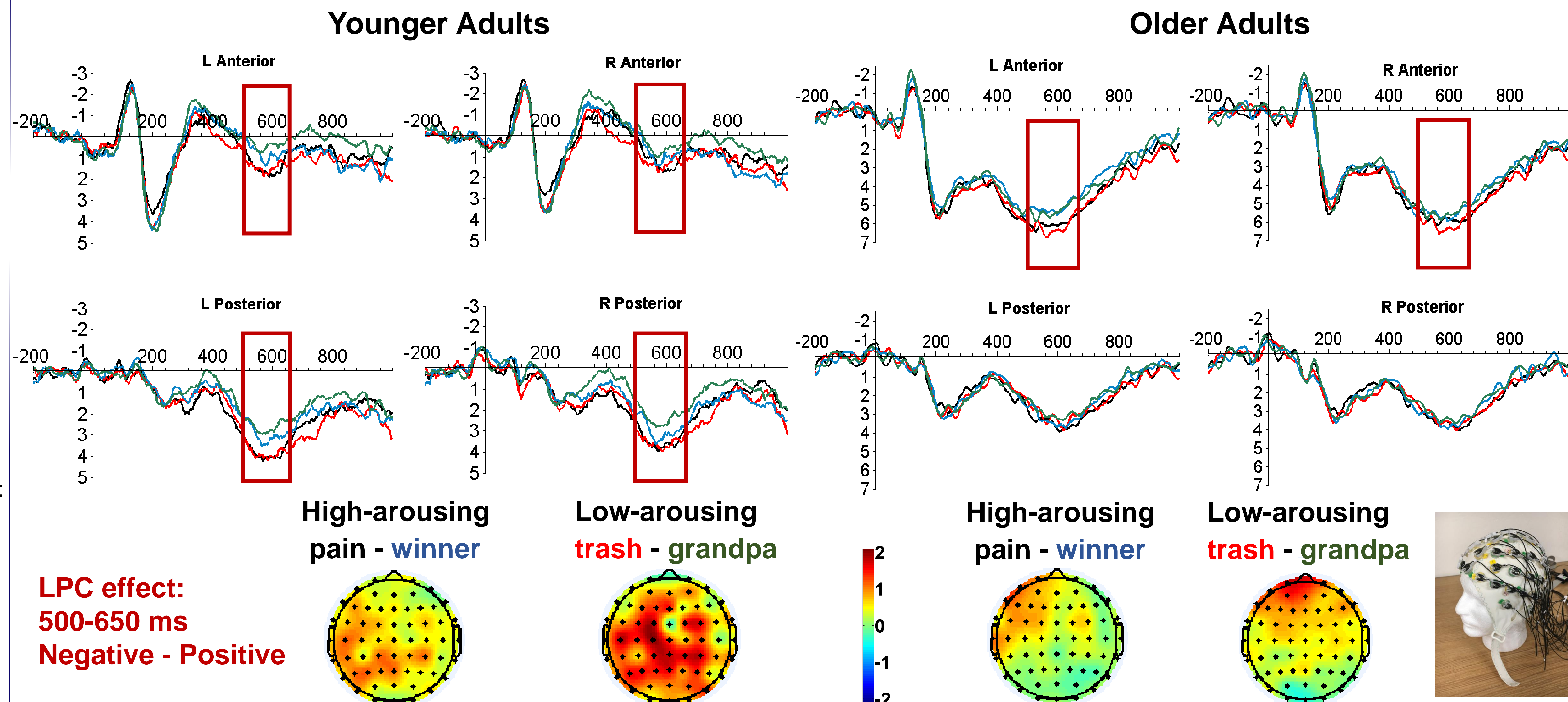**Design: 2 valence (positive, negative) X 2 arousal (high, low)**
- **180 words**: 36 words each condition, with **36 neutral (low-arousing) words**, e.g. *spot*
  - Affective norms for English words [6]; Glasgow norms [7]
- **180 pseudowords**: e.g. *dront, thack.* ARC non-word database [8]
- Words matched for: Valence and arousal ratings (between young & older adult ratings), word length, frequency, concreteness, imageability, and familiarity

Word Stimuli	Positive	Negative
High-arousing	winner	pain
Low-arousing	grandpa	trash

500ms / 200ms / winner / 260-420ms / 500ms / Self-paced / 300ms / ?

Results

Younger Adults

L Anterior / R Anterior / L Posterior / R Posterior

Older Adults

L Anterior / R Anterior / L Posterior / R Posterior

**High-arousing
pain - winner**

**Low-arousing
trash - grandpa**

**LPC effect:
500-650 ms
Negative - Positive**

**High-arousing
pain - winner**

**Low-arousing
trash - grandpa**

A five-way ANOVA of 2 valence x 2 arousal x 2 age x 2 hemisphere x 2 anteriority
1. **An interaction of Valence, Anteriority, and Age** ($F(1, 37) = 4.428$, $p = .042$, $\eta^2 = .107$)
   - Younger adults: Larger LPC for negative words than positive ones ($p = .004$)
   - Older adults: LPC effect, too, but at the anterior sites ($p = .046$)
2. **A Valence by Hemisphere interaction** ($F(1, 35) = 5.041$, $p = .031$, $\eta^2 = .12$)
   - In both groups, the LPC effects were left lateralized

Discussion

- LPC effects for negative words relative to positive words in both groups
  - Attention re-allocation, or meaning re-analysis?
  - Words vs. pictures
- Age affects the comprehension of **negatively valenced words**
  - LPC effects shifted to anterior regions in older adults
    - Posterior anterior shift in aging (PASA, [9]): the need to maintain top-down control to achieve the same task performance
- No support for positivity effect, i.e. the preference for positive words
- Age does not affect the arousal dimension of word stimuli
  - No support for the SAVI model

Acknowledgement

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