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)
  - Mental State Examination (Score ≥ 27)
  - Digit Symbol Substitution task (Score ≥ 42)
  - Beck Depression Inventory (Score < 17)

Stimuli & Lexical Decision Task

Design: 2 valence (positive, negative) × 2 arousal (high, low)
- 180 words: 36 words each condition, with 36 neutral (low-arousing) words, e.g. spot
- 180 pseudowords: e.g. drant, thack. ARC non-word database [8]
- Words matched for: Valence and arousal ratings (between young & older adults), word length, frequency, concreteness, imageability, and familiarity

Word Stimuli

<table>
<thead>
<tr>
<th>High-arousing</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>winner</td>
<td>500ms</td>
<td>200ms</td>
</tr>
<tr>
<td>pain</td>
<td>260-420ms</td>
<td>500ms</td>
</tr>
<tr>
<td>Low-arousing</td>
<td>grandpa</td>
<td>trash</td>
</tr>
<tr>
<td>Self-paced</td>
<td>300ms</td>
<td></td>
</tr>
</tbody>
</table>

Results

Younger Adults

Older Adults

LPC effect: 500-650 ms

Negative - Positive

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, η² = .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, η² = .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

Reference


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