INTRODUCTION

- N400 is a critical ERP component in the semantic priming literature. The magnitude of the N400 reflects the amount of cognitive effort needed to bring a test stimulus to activation following the presentation of a related or unrelated context
- Typically, N400 is greater when the context and test are unrelated vs. related (Kutas & Federmeier, 2011), suggesting a semantic priming effect (i.e., more effort to activate unrelated vs. related test stimulus)
- This effect, however, is diminished in older relative to younger adults. Older adults show differentially smaller N400 reductions to semantically related relative to unrelated test (Federmeier & Kutas, 2005)
- Semantic priming occurs at both short (automatic processing) and long ISIs (resource demanding controlled attention; Neely, 1977)
- Expectancy-based semantic priming requires attentional resources. For example, using information provided during context to predict test word (Balota et al., 1992)

Study Goals:
1. Clarify the functional significance of differences in N400 modulation in younger and older adults (using both behavioural and electrophysiological measures)
2. Assess the timeline of automaticity of semantic priming in younger and older adults by manipulating ISI
3. Examine the interfering and/or facilitatory impact of irrelevant information for younger and older adults
4. Explore age differences in attentionally demanding strategy use

STIMULI AND PROCEDURE

- Each participant completed four blocks of trials
- * Each block includes 2 filler trials in which a semantically related context display was followed by a “no” response probe

RESULTS

- ERP Recording
  - EEG continuously digitized using ActiView (Bio-Semi), Band-pass filter of 208 Hz and 1024 Hz sampling rate. 0.05 (12 dB/oct; zero phase) high-pass and 30 (24 dB/oct; zero phase) Hz low-pass filter were used.

PARTICIPANTS

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Younger (n = 18)</th>
<th>Older (n = 18)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>21.39 (4.65)</td>
<td>75.11 (6.64)</td>
<td>.000</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>12/6</td>
<td>12/6</td>
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<td>Education (years)</td>
<td>13.89 (2.61)</td>
<td>16.11 (2.17)</td>
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<tr>
<td>Display (R correct)</td>
<td>29.30 (4.74)</td>
<td>36.72 (7.14)</td>
<td>.000</td>
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<td>Digit Symbol (R correct)</td>
<td>83.00 (14.04)</td>
<td>68.83 (14.45)</td>
<td>.005</td>
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<tr>
<td>MMSE</td>
<td>n/a</td>
<td>27.63 (1.58)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: MMSE = Mini Mental State Exam

RESULTS cont.

- **BEHAVIOURAL DATA**
  - 2 (age: Younger vs. Older) x 2 (ISI: 50 ms vs. 1000 ms) x 4 (display type: No-Interference, No-Control, Yes-Facilitation, Yes-Control)
  - Reaction time (RT):...
  - Accuracy:...

- **ERPV DATA**
  - 2 (age: Younger vs. Older) x 2 (ISI: 50 ms vs. 1000 ms) x 4 (display type: No-Interference, No-Control, Yes-Facilitation, Yes-Control)
  - Context Display:...
  - Test Display:...

CONCLUSIONS

1. Faster and more accurate Yes-Fac vs. Yes-Con as well as slower and less accurate No-Int vs. No-Con is seen in both younger and older adults. However, younger adults show significant, while older adults show smaller and non-significant, N400 reduction for Yes-Fac vs. Yes-Con
2. Additional cognitive effort is required for semantic priming during more automatic stages of processing
3. Younger adults show greater facilitation than older adults, although both age groups show equivalent interference effects
4. Resource demanding expectancy-based priming is evident in younger adults only during more controlled stages of processing

KEY REFERENCES

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Modulating Younger and Older Adults’ Performance in Ignoring Pictorial Information during a Word Matching Task
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