Alexithymia is associated with increased age-related neurodegeneration as measured by elevated frontal theta power during response inhibition

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BACKGROUND

• Alexithymia: disrupted emotional awareness
  - Characterized by three facets: difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT)
  - DIF is associated with cognitive control deficits
  - Old age is associated with both increased alexithymia and decreased cognitive control
  - Neural measure of cognitive control: EEG theta band (4-8 Hz)
  - In healthy younger adults, elevated frontal theta is associated with appropriate cognitive control
  - Theta power decreases with age in healthy aging, but increased theta power is associated with early-stage dementia (likely neural compensation for degeneration)

METHODS

Participants:

<table>
<thead>
<tr>
<th>Participant characteristic</th>
<th>Older adults (n = 45)</th>
<th>Younger adults (n = 42)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
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<tr>
<td>Age</td>
<td>79.7 (4.7)</td>
<td>19.9 (2.7)</td>
</tr>
<tr>
<td>Gender (% female)</td>
<td>76</td>
<td>74</td>
</tr>
<tr>
<td>Education</td>
<td>14.7 (2.3)</td>
<td>13.7 (1.1)</td>
</tr>
<tr>
<td>Stop-signal reaction time</td>
<td>541.1 (37.4)</td>
<td>541.4 (44.5)</td>
</tr>
</tbody>
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Measures:

• Toronto Alexithymia Scale (TAS-20)
  - DIF subscale
• Stop-signal task
  - Go task: respond to specific stimuli in serial presentation
  - Stop task: withhold response to the same stimuli if a flashing light is presented immediately after a stimulus
• Relative EEG band power at frontal and front-central electrodes during successful response inhibition
  - Fz (frontal midline) - frontal task-related theta power

REFERENCES


RESULTS

• DIF alone does not predict theta power, but DIF interacts with age to predict theta power at relevant midline and left-hemisphere electrodes

In elders (navy), DIF predicts task-related theta power at:

Frontal midline (Fz)
- Inhibitory control

Left front-central (FC3)
- Potentially task-relevant motor planning activity

DISCUSSION

• In older adults, high DIF predicted high theta during successful inhibition
  - Increased theta power indicates neural compensation for age-related degeneration
  - High DIF as a trait may exacerbate degeneration
• DIF may indicate cognitive control deficits that disrupt appropriate inhibition of responses to competing stimuli
• Future directions:
  - Role of Alzheimer’s biomarker (APOE epsilon 4) in DIF-theta power relationship
  - Comparison of task-state to resting-state theta power