<table>
<thead>
<tr>
<th>Title</th>
<th>Stimulus Context Effect on Deviant Target and Non-target: P3 ERP Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>SAWAKI, Risa; KATAYAMA, Jun'ichi</td>
</tr>
<tr>
<td>Citation</td>
<td>The 46th Annual Meeting of the Society for Psychophysiological Research</td>
</tr>
<tr>
<td>Issue Date</td>
<td>2006-10</td>
</tr>
<tr>
<td>Doc URL</td>
<td><a href="http://hdl.handle.net/2115/15867">http://hdl.handle.net/2115/15867</a></td>
</tr>
<tr>
<td>Type</td>
<td>conference presentation</td>
</tr>
<tr>
<td>Note</td>
<td>10/25-29, 2006. the Hyatt Regency Hotel, Vancouver, BC, CANADA.</td>
</tr>
<tr>
<td>File Information</td>
<td>06SPR_Risa.pdf</td>
</tr>
</tbody>
</table>

Hokkaido University Collection of Scholarly and Academic Papers: HUSCAP
Stimulus Context Effect on Deviant Target and Non-target: P3 ERP Study

Risa SAWAKI1, 2 & Jun’ichi KATAYAMA1
1Graduate School of Education, Hokkaido University, JAPAN; 2Japan Society for the Promotion of Science
sawaki@edu.hokudai.ac.jp

Introduction

Stimulus Context Effect on Non-target P300:
Difficulty of standard/target discrimination in three-stimulus oddball task

<table>
<thead>
<tr>
<th>Stimulus Context</th>
<th>Easy</th>
<th>Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-target P300</td>
<td>Small amplitude</td>
<td>Long latency</td>
</tr>
<tr>
<td></td>
<td>Central/parietal distribution</td>
<td></td>
</tr>
</tbody>
</table>

Difficult discrimination induces an anterior enhancement of non-target P300.
Does it reflect the enhancement of attentional capture process or inhibition process?

Purpose:
To elucidate whether the discrimination difficulty modulates an attentional capture process or inhibition process.

Attentional capture can occur for target as well as non-target
Inhibition can occur only for non-target

Methods

Participants:
12 students (6m, 6f; 20-28 (M = 24.3, SD = 2.9) yrs.)

Task:
Three-stimulus oddball task
To make a quick button press by the right thumb to the target stimuli

Stimuli:
Table 1. Stimulus characteristics for each task condition

<table>
<thead>
<tr>
<th>Discrimination difficulty</th>
<th>Three-category</th>
<th>Two-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent circle (p = .70)</td>
<td>Easy Standard</td>
<td>Difficult Standard</td>
</tr>
<tr>
<td>Rare circle (p = .15)</td>
<td>Target</td>
<td>Target</td>
</tr>
<tr>
<td>Rare square (p = .15)</td>
<td>Non-target Target</td>
<td></td>
</tr>
</tbody>
</table>

SOA: 1.2 s; Duration: 120 ms; Viewing distance: 1 m
Visual angle: frequent circle 1.15 x 1.15°, large rare circle 2.3 x 2.3°, small rare circle 1.3 x 1.3°, rare square 2 x 2°

ERP recording:
EEG: 30 electrode sites, referred to the nose tip
Bandpass: 0.5 - 100 Hz, A/D: 500 Hz (30 Hz off-line low-pass filter)
P300 peak: max. pos. pts. 300 - 700 ms at Pz (target), Cz (nontarget)

Results & Discussion

Behavior

Figure 3. Hit rate for target stimuli.

Figure 4. Grand averaged ERPs (N = 12).

Three-category task (rare square; non-target)
>> P300 for target rare circle was smaller in amplitude and longer in latency in the difficult condition
>> P300 for non-target rare square was larger in the difficult condition

The effect of discrimination difficulty on non-target P300 was further supported.

Two-category task (rare square; target)
>> P300 for target rare circle was smaller in amplitude and longer in latency in the difficult condition
>> P300 for target rare square was larger in the difficult condition at anterior electrode sites (Fz and Cz)

Figure 5. Topographic maps taken at P300 peak latency.

Figure 6. Mean P300 peak amplitude.

Figure 7. Grand averaged ERPs from target and non-target rare squares, and difference waveforms.

The discrimination difficulty modulates attentional capture for deviant information.

Conclusion

The discrimination difficulty modulates attentional capture for deviant information.