



INTRODUCTION

The ability to remember, make, and execute one's future intentions in a way that activates them at the appropriate time is called prospective memory (PM) (Einstein & McDaniel, 1990).

PM is basically divided into two time-based and event-based, depending on which variable the recall takes place. Event-based PM is when a person remembers to perform a delayed intention when triggered by an environmental stimulus. Event-based PM cues are divided into two subcategories depending on the use of controlled attention processes as focus or out-of-focus event-based PM (Kliegel et al., 2008). It is assumed that out-of-focus ON tasks require more cognition of attention processes (McDaniel et al., 2015).

MATERIAL & METHODS

- This study, it was aimed to examine the relationship between PM and attention in healthy adults while solving PM out-of-focus cue stimuli tasks.
- People with any neurologic and psychiatric disease and under 21 points on SMMT were excluded.
- A total of 19 young adult participants' behavioral and electro-neurophysiological data were collected.
- Firstly each subject was evaluated with Montreal Cognitive Assessment for cognitive function and WMS-R: Digit Span Forward and Backward for attention. Later Stroop Paradigm task -without PM cues- and Stroop with PM Paradigm task were solved.

EXPERIMENT DESIGN

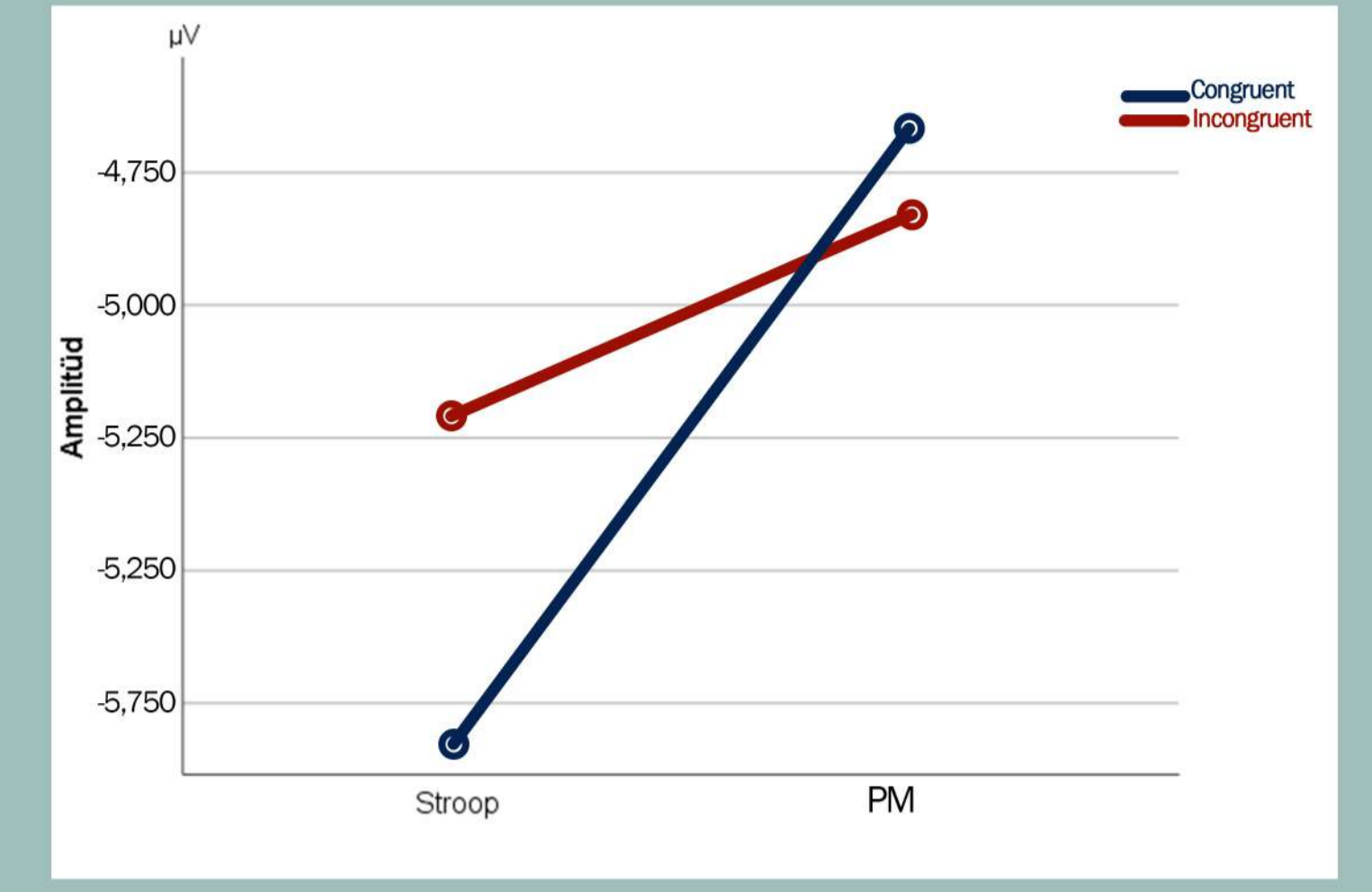
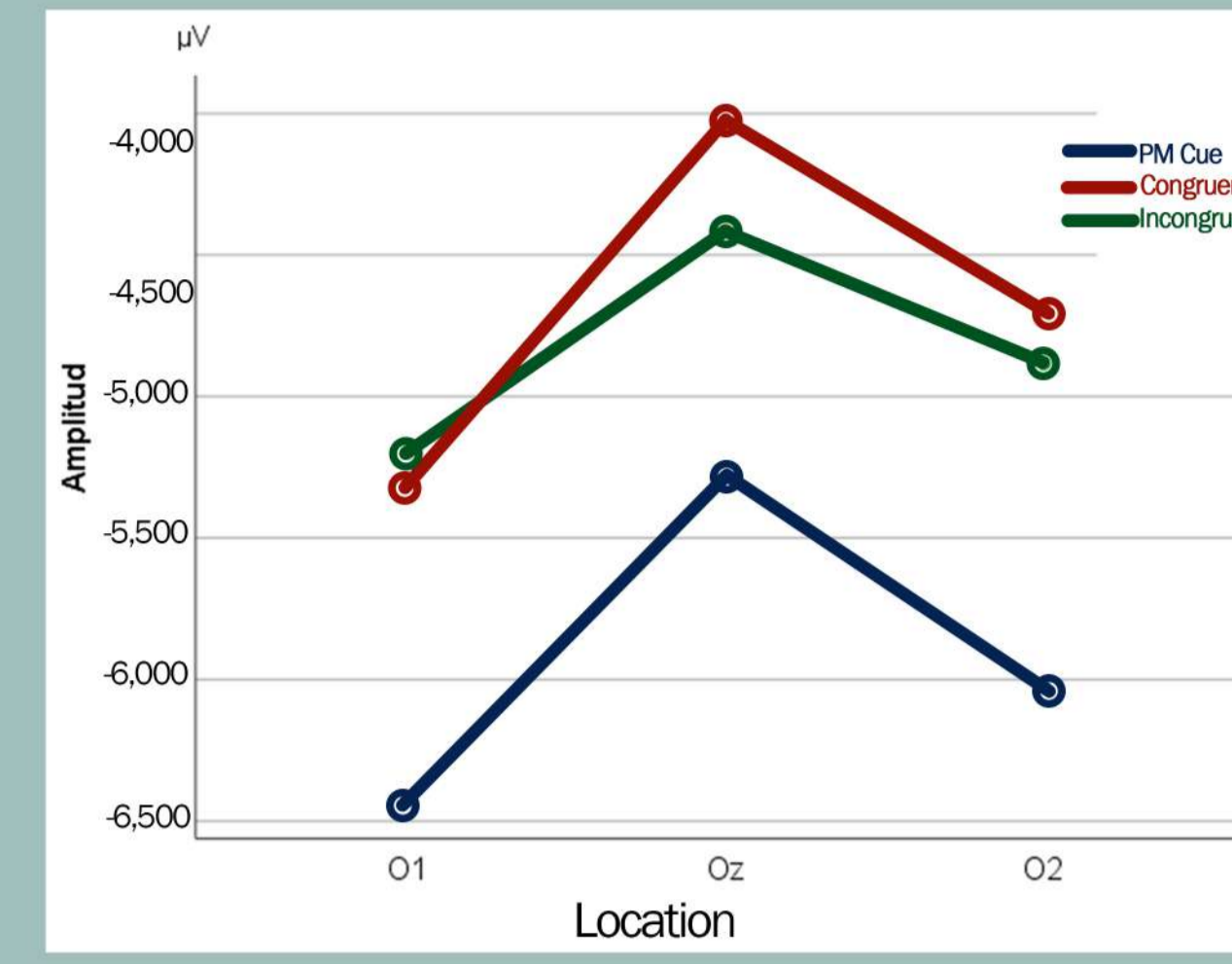
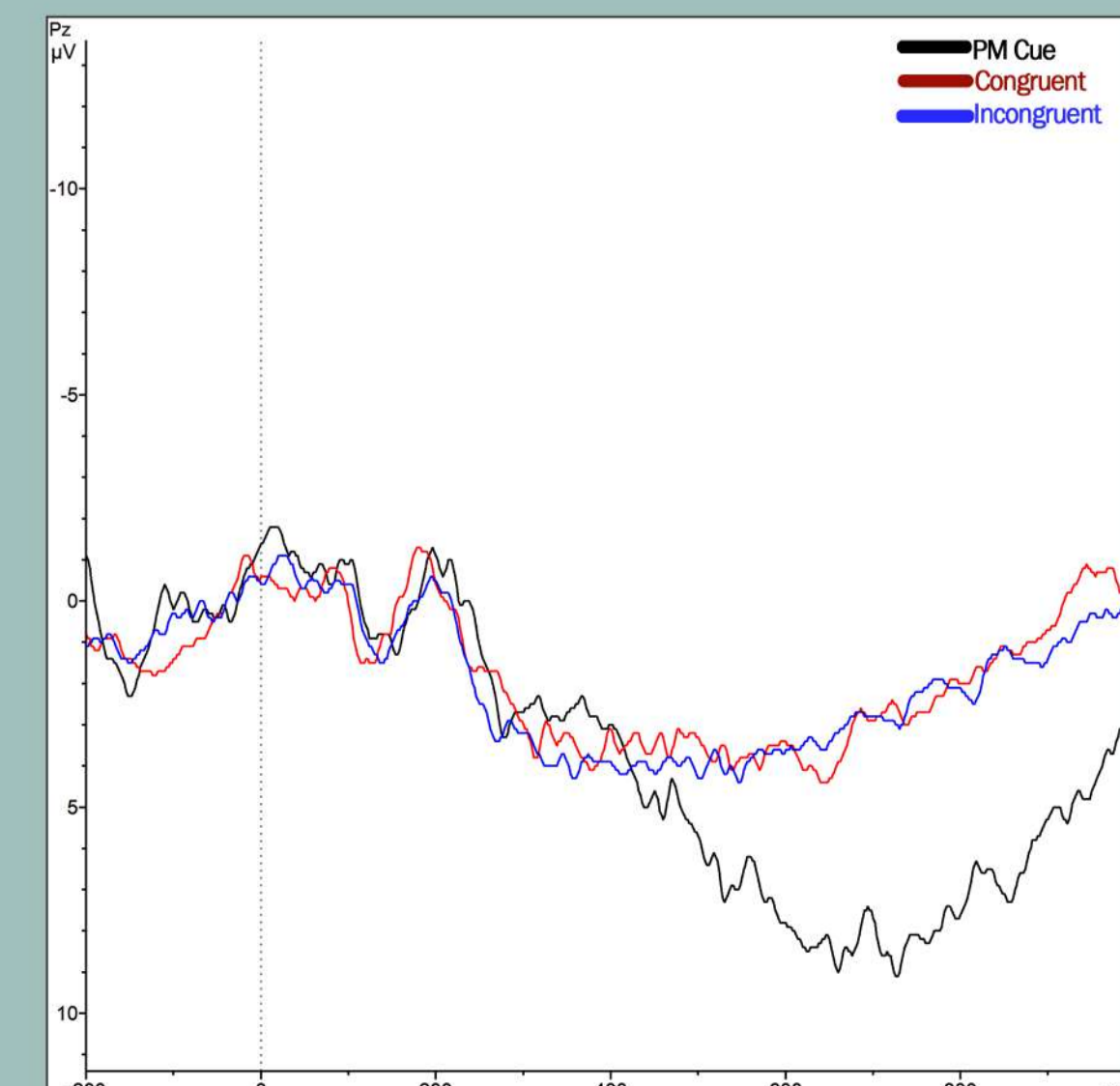
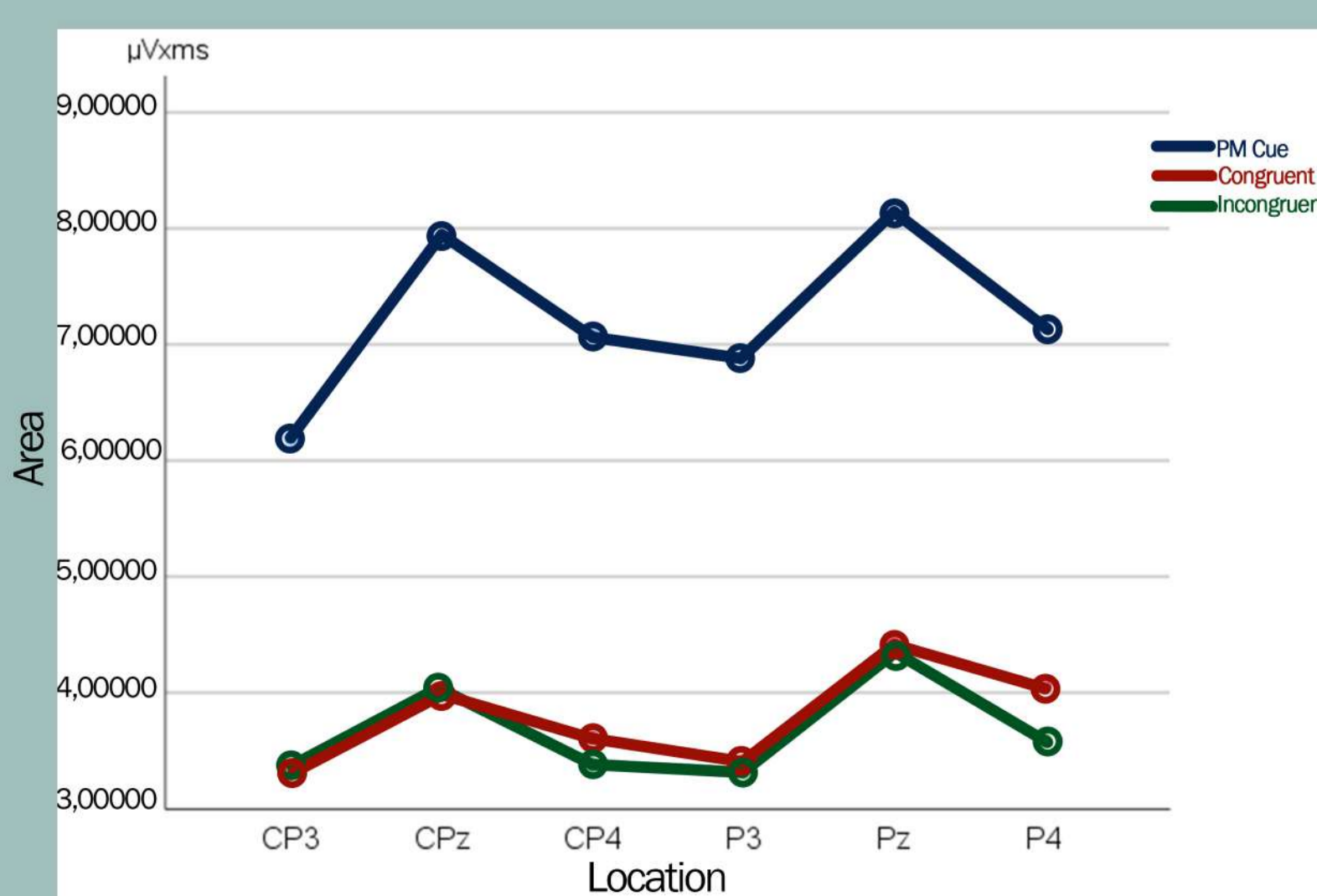
- The Stroop Color-Word test is a widely accepted criterion in examining selective attention.
- While the subject decoded the Stroop paradigm with/without PM clue electrophysiological responses were recorded with EEG by 22 active electrodes.
- The colors for the stroop paradigm were red, yellow, and blue.
- The capital letter was designated as an out-of-focus PM task implemented on the stroop paradigm.
- In the PM task, in addition to the Stroop test, the participant was given another task to keep in mind in the background. If the word written in white on the second line was written in capital letters, they were asked to press a different key than stroop task responses on the keyboard.



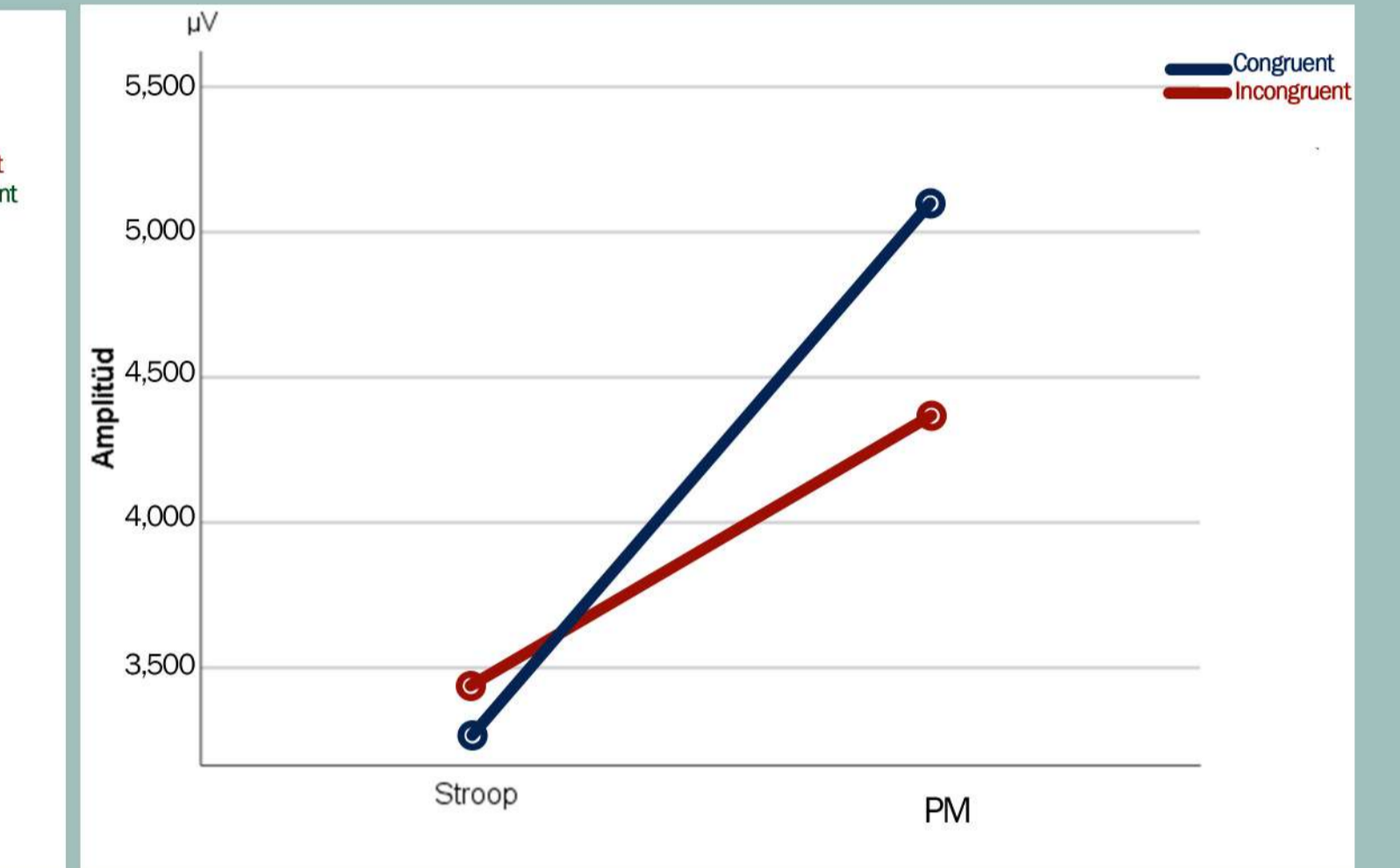
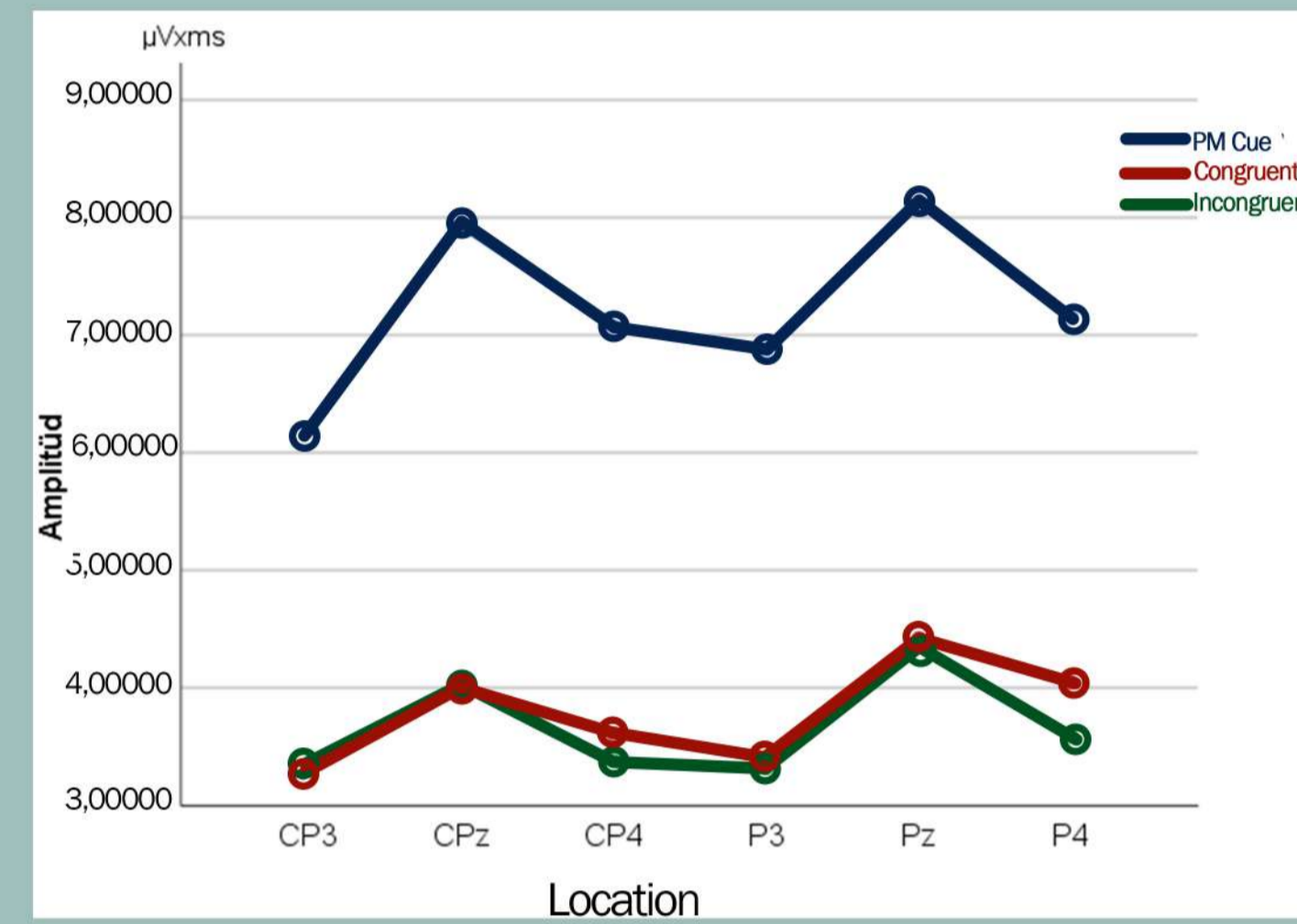
- EEG analysis was made on Brain Vision Analyzer.
- Event-related potential (ERP) analyses were performed for 3 locations centro-parietal, parietal, and occipital regions.
- ERP was applied for 3 locations centro-parietal, parietal, and occipital.
- Peak detection for N100 and P100, and area detection for Parietal Positivity were analyzed.

RESULTS

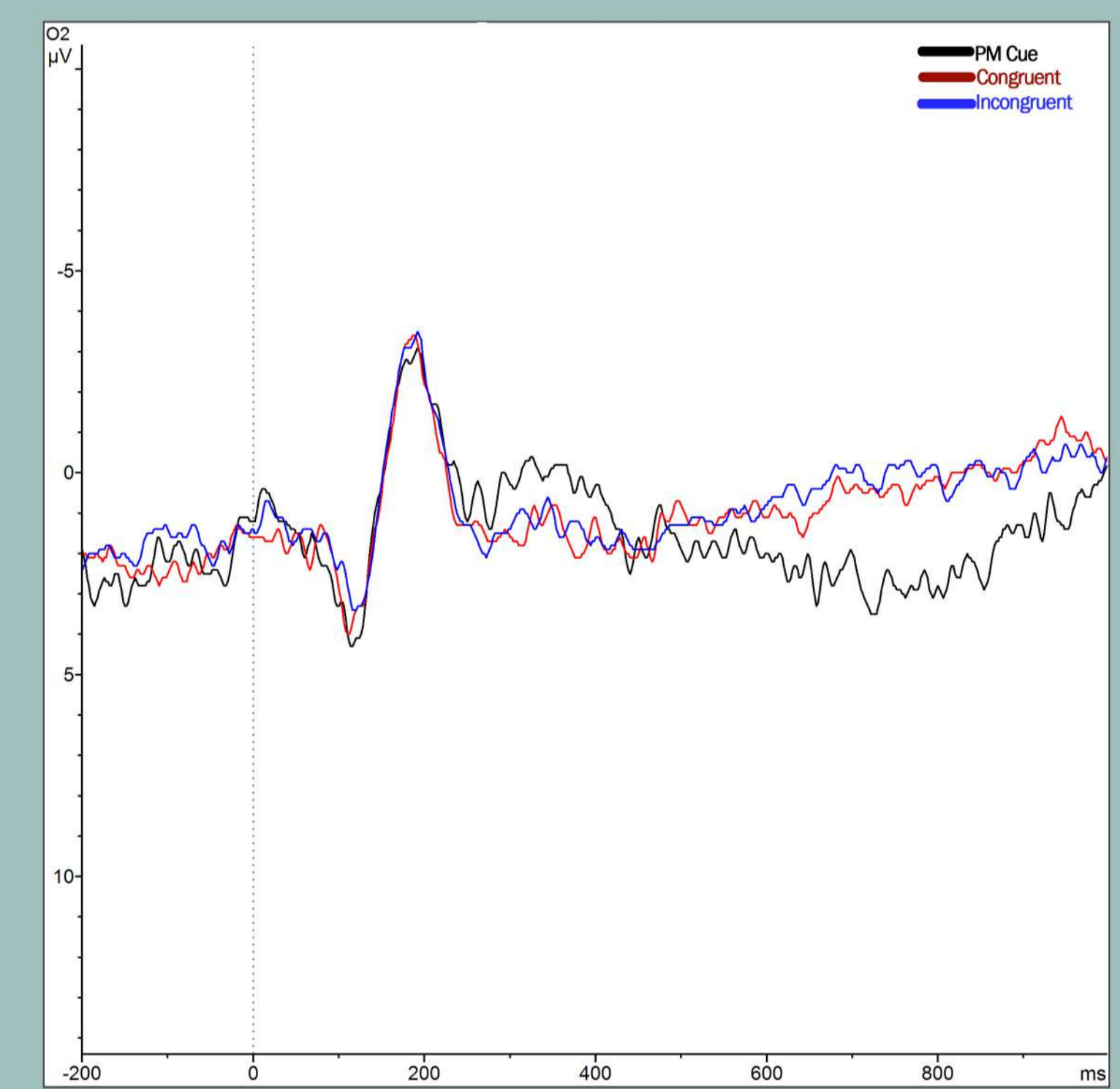
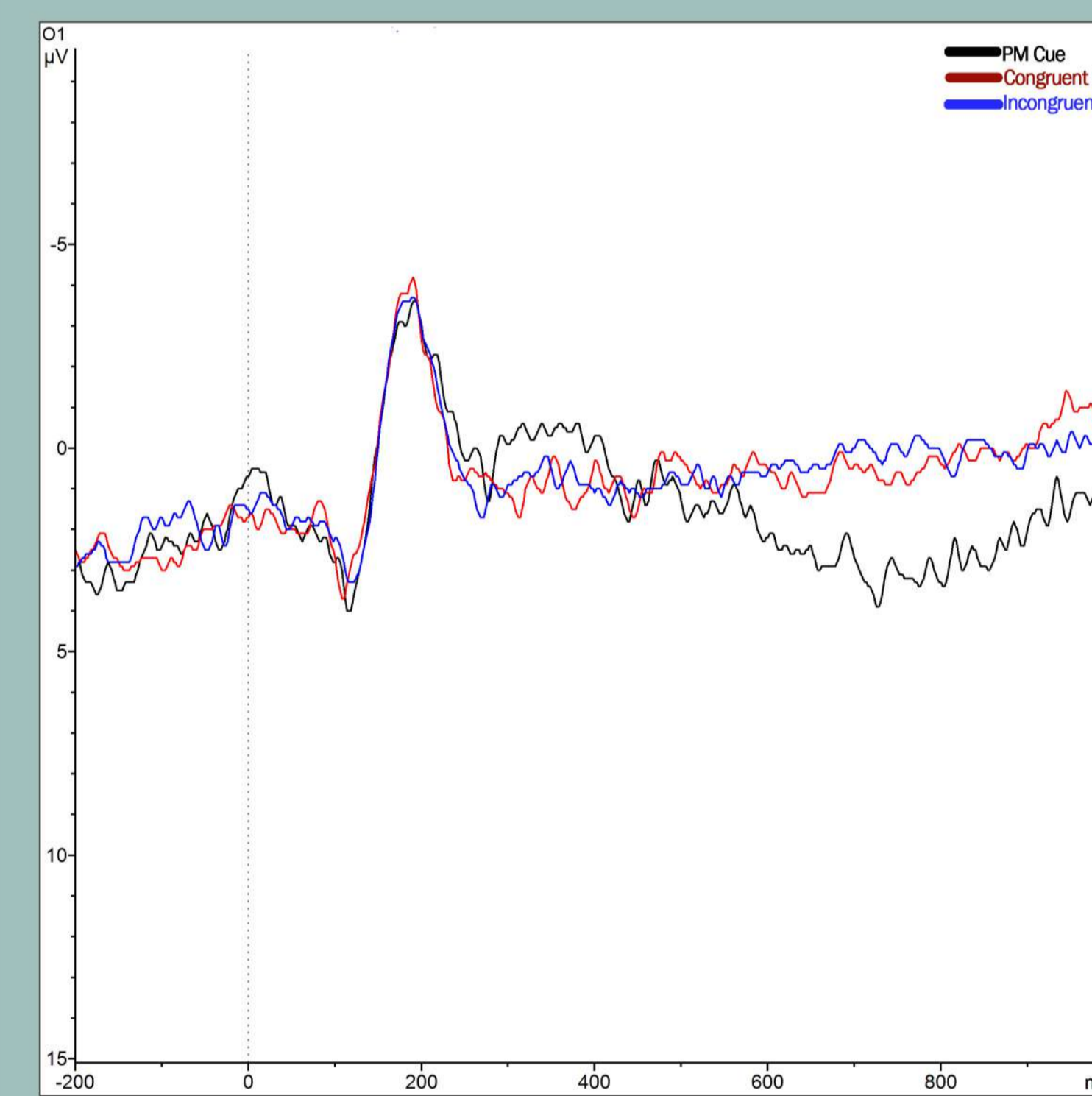
- A significant difference was found in the area-detection analysis between stimuli and localizations in the PM task ($F=2.378$; $p=0.036$). For parietal positivity, the mean activation of PM cue stimuli was quite high compared to other stimuli.



- Considering the N100 amplitudes of stimuli, it was seen that the potential revealed for the PM cue stimulus was significantly higher than the other stimuli.
- The mean amplitude values of congruent and incongruent stimuli in the PM task decreased significantly compared to the Stroop task.



- For P100, the potential of the PM cue stimulus was higher than both stimuli, while the amplitude of the congruent stimulus was higher than the incongruent stimulus. At the same time, a significant difference was found between tasks and stimuli ($F=6.149$; $p=0.023$).
- It was observed that the potential of both stimuli increased in the PM task compared to the Stroop task.



DISCUSSION

- In the results of behavioral responses analysis; there was a correlation between the forward digit span, which is associated with simple-selective attention, and the correct score of PM cues. These results suggested that the sources of attention evaluate the incongruent stimulus in the foreground task similar to the PM cue and directed to them. Therefore selective attention is split from the congruent stimulus and is directed to the PM cue.
- It was showed that the amplitudes of the N100 and P100 potentials associated with early attention were affected by the PM out-of-focus cue in the occipital regions, and PM was directly related to attention (Sass et al., 2017).
- The PM cue was associated with simple-selective attention instead of complex-divided attention.
- It was observed that parietal positivity revealed significant activation of the cue stimulus in the centro-parietal and parietal regions than other stimuli. Parietal positivity results were found to be consistent with the previous studies (Czernochowski et al., 2012).

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