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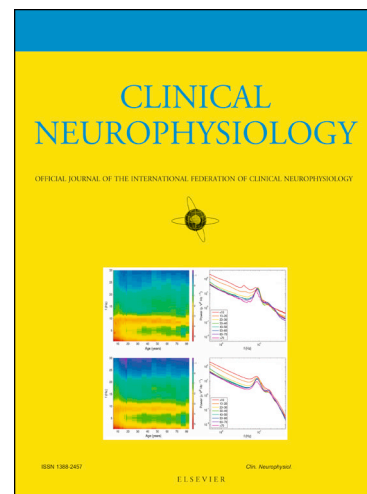
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Investigating the Effects of Visual Distractors on the Performance of a Motor Imagery Brain-Computer Interface

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Highlights

- Transient, visual distractors have a significant effect on motor imagery-related neural activity.
- For most participants, the BCI performance was robust to these small distractors effects.
- A mean online classification accuracy of 78% was attained for distractor trials across participants.

Abstract

Objectives: Brain-computer interfaces (BCIs) allow users to operate a device or application by means of cognitive activity. This technology will ultimately be used in real-world environments which include the presence of distractors. The purpose of the study was to determine the effect of visual distractors on BCI performance.

Methods: Sixteen able-bodied participants underwent neurofeedback training to achieve motor imagery-guided BCI control in an online paradigm using electroencephalography (EEG) to measure neural signals. Participants then completed two sessions of the motor imagery EEG-BCI protocol in the presence of infrequent, small visual distractors. BCI performance was determined based on classification accuracy.

Results: The presence of distractors was found to affect motor imagery-specific patterns in mu and beta power. However, the distractors did not significantly affect the BCI classification accuracy; across participants, the mean classification accuracy was $81.5 \pm 14\%$ for non-distractor trials, and $78.3 \pm 17\%$ for distractor trials.

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