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Golf performance enhancement by means of real-life neurofeedback training based on personalized event-locked EEG profile

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Summary: The presentation will introduce a new method for improving golf performance. Some sports psychology/brain physiology backgrounds will be discussed as well as the assessment method and the promising results from the initial experiment.
Abstract: This study reports on a very promising, new method for golf performance enhancement employing real-life neurofeedback during golf putting. Participants (n=12) received an assessment and three real-life neurofeedback train- ing sessions. In the assessment, a personal event-locked EEG profile was determined for successful vs. unsuccessful puts. Target frequency bands and amplitudes marking optimal mindset were derived from the profile by two raters. The training sessions consisted of four series of 80 puts in an ABAB design. The feedback in the second and fourth series was administered in the form of a continuous NoGo tone, whereas in the first and third series no feedback was provided. This tone was terminated only when the participants EEG met the assessment-defined criteria. In these series, participants were instructed to perform the put only after the NoGo tone had ceased. From the personalized event-locked EEG profiles individual training profiles were established. The inter-rater reliability was 90%. Individual training results show that 92% of participants improved their putting performance in the feedback condition as compared to the no-feedback condition. The overall percentage of successful puts was significantly larger in the second and fourth series of training compared to the first series ($p=0.0005$ and $p=0.0095$, respectively; two-sided paired t-tests). This study demonstrates that the 'zone' or the optimal mental state for golf putting shows clear recognizable individual patterns. Furthermore, most subjects improved their performance with feedback on their personal EEG profile with 10%, on average. The learning effects suggest that this real-life approach to neurofeedback improves learning. In a follow-up study we will study the long term learning effects and the effects on these golf players handicaps.

Keywords. golf; peak performance; real-life neurofeedback