

# Effects of self-efficacy on frontal midline theta power and golf putting performance

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## Abstract

Self-efficacy (SE) is recognized as a main determinant of successful performance and may mediate the relationship between psychological performance enhancement techniques and sports performance. Identifying the cognitive–motor processes of superior performance can provide crucial information not only for accelerating the motor learning process but also for enhancing motor performance. The frontal midline theta power (Fm $\theta$ ) reflects the level of top–down attention allocated to achieve a desired cognitive–motor behavior. Thus, this study investigated the effect of SE on the performance and Fm $\theta$  of golf players and explored the association between the objective measures of cortical dynamics and SE. Thirty-four skilled golfers were recruited (within-subject design) to perform 60 putts, and their electroencephalographic activity was recorded during the task. The SE score was measured using a visual analog scale ranging from 0 to 10 before each putt. Paired t test results revealed that trials with higher SE scores were associated with a higher putting success rate than trials with lower SE scores (53.3% vs 46.7%). Moreover, trials with higher SE scores were preceded by lower Fm $\theta$  than trials with lower SE scores (4.49 vs. 5.18). These findings suggested that higher SE was followed by less top–down attentional control, a characteristic of automatic processing, leading to better putting performance. Our findings support Bandura’s SE theory and elucidate the intermediate processes of SE by investigating the effect of the anticipation of outcomes on sports performance and attentional control before putting.

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