ABSTRACT

Cebecioglu, S. (2026). An electroencephalographic investigation of implicit contextual learning differences between orienteering and running sports. İstanbul University, Institute of Health Science, Neuroscience. Master's Thesis. Istanbul.

Implicit contextual learning refers to the acquisition of spatial regularities in the environment without conscious awareness. While interactions among attentional systems contribute to individual differences in this form of learning, orienteering is a cognitively demanding sport that requires advanced visuospatial abilities, planning, and rapid decision-making. The present thesis aimed to investigate the selective effects of professional-level orienteering training on behavioral and electrophysiological mechanisms. To control for the long-term neurophysiological and vascular changes associated with physical exercise, the control group consisted of elite runners with comparable levels of physical activity.

The study was conducted with orienteering athletes (N = 13) and runners (N = 9). Results indicated that the orienteering group demonstrated significantly superior spatial orientation performance compared to the running group. Analysis of reaction times during the contextual cueing task revealed that the orienteering group exhibited a significantly stronger contextual cueing effect in repeated trials, whereas no such effect was observed in the running group. Event-related potential analyses showed that the orienteering group produced a significantly greater late positive wave amplitude during repeated trials compared to novel trials, while no such differentiation between conditions was observed in the running group. Furthermore, between-group comparisons demonstrated that repeated trials elicited significantly larger late positive wave amplitudes in the orienteering group, providing electrophysiological support for the behavioral findings.

In conclusion, the findings suggest that beyond the general benefits of physical exercise, the cognitive demands and practices inherent to orienteering confer a specific advantage in the neural processing of spatial-contextual cues.

Keywords: Implicit contextual learning, contextual cueing, electroencephalography, orienteering, running