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Effect of NeuroBike cycling on EEG brain activity and mathematical performance: An intervention study

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The NeuroBike is an instable system applied in sports therapy and sports training. The balance movement is similar to the cross-coat of the human, due to the joint in the center of the bicycle frame. In the present study, we investigated effects of training on the NeuroBike on spontaneous EEG activity and on mathematical performance. Participants performed different trainings (NeuroBike, ordinary bicycle and daily activity) for 20 minutes three times per week in a two-week intervention. Mathematical performance (algebra, geometry and numerics) was assessed before and after the intervention. Spontaneous EEG was recorded before, and after each training session at rest, and during the mathematical tests before and after the two-week intervention. Behavioural data showed reduced mathematical performance in algebra and geometry after the NeuroBike intervention. EEG data revealed increased parietal theta power at Pz after the NeuroBike intervention, and during algebra performance. Further, increased resting-state frontal alpha power, and decreased parieto-occipital gamma power was obtained after the intervention. Our results demonstrate that training on the NeuroBike fosters a beneficial brain state for learning at resting state, but does not lead to an optimum brain state for active spatial processing in mathematical problem solving.

Biography

John A (Cand. Master of Education degree "Sports and Mathematics") is an Assistant of the Department of Training and Movement Science at the University of Mainz, Germany.

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