早稲田大学スポーツ科学学術院スポーツ科学研究センター　主催
早稲田大学スーパーグローバル大学創成支援事業 スポーツ健康科学拠点共催

第234回スポーツサイエンス研究会

日時　2024年1月29日（月）　13:00 より

場所　早稲田大学所沢キャンパス 100号館 403教室

演題

Applying neurofeedback training to optimize athletes' performance: Evidence and challenges

演者

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抄録

Content

That athletic performance is influenced by brain oscillatory activity, and distinct patterns of brain activity can indicate optimal and suboptimal performance, is well established. A notable example is the relationship between brain oscillatory activity in the range of alpha (7 – 13 Hz) and targeting accuracy (e.g., in archery). Empirical evidence suggests that brain stimulation techniques (such as neurofeedback training [NFT]) can be utilized to change brain oscillations. NFT is the process by which an individual is presented with (approximately) real-time feedback of his own brain activity (or other parameters such as blood flow). A participant is supposed to learn (consciously or not) strategies to alter these parameters to reach a level where he can more efficiently regulate them, to treat some mental disorders (such as ADHD) or optimize behaviors (such as athletic performance). Thus far, the effectiveness of NFT has been assessed with regard to its applications in clinical populations, as well as the enhancement of performance in a variety of contexts. However, evaluations of the effectiveness of NFT in the sports domain is lacking, although the use of NFT to optimize athletes' performance dates back to 1991, when it was first applied to improve targeting accuracy in archery. In my talk, I first investigate the effectiveness of NFT in sports. Then, I evaluate the quality of empirical studies that address athletic performance by defining some methodological and theoretical criteria with which these studies can be scrutinized (1). In the second step, I present some of my empirical data (2), and in the third step I focus on the psychophysiological framework and neural mechanisms underlying NFT (3).

References:

1- Mirifar, A., Beckmann, J., & Ehrlenspiel, F. (2017). Neurofeedback as supplementary training for optimizing athletes' performance: A systematic review with implications for future research. Neuroscience & Biobehavioral Reviews, 75, 419-432.

2- Mirifar, A., Keil, A., Beckmann, J., & Ehrlenspiel, F. (2019). No effects of neurofeedback of beta band components on reaction time performance. Journal of Cognitive Enhancement, 3, 251-260.

3- Mirifar, A., Keil, A., & Ehrlenspiel, F. (2022). Neurofeedback and neural self-regulation: a new perspective based on allostasis. Reviews in the Neurosciences, 33(6), 607-629.

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