A questionnaire to identify the links between athletes’ profiles and cognitive training practice: Heading for personalised neurofeedback procedures

Margaux Izac, Eléa Rossignol, Léa Pillette, Aymeric Guillot, Etienne Guillaud, Franck Di Rienzo, Thomas Michelet, Bernard N’kaoua, Camille Jeunet-Kelway

To cite this version:

Margaux Izac, Eléa Rossignol, Léa Pillette, Aymeric Guillot, Etienne Guillaud, et al.. A questionnaire to identify the links between athletes’ profiles and cognitive training practice: Heading for personalised neurofeedback procedures. CORTICO 2023 - COllectif pour la Recherche Transdisciplinaire sur les Interfaces Cerveau-Ordinateur, May 2023, Paris, France. pp.1, 2023. hal-04130198

HAL Id: hal-04130198
https://hal.science/hal-04130198
Submitted on 20 Jun 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
A questionnaire to identify the links between athletes’ profiles and cognitive training practice: Head ing for personalised neurofeedback procedures

Margaux Izac1, Éléa Rossignol1, Léa Pillette3, Franck Di Rienzo4, Etienne Guillaud1, Aymeric Guillot4, Thomas Michelet2, Bernard N’Kaoua1, Camille Jeunet-Kelway1
1 Université de Bordeaux, INSERM, BPH Research Center, UMR1219, Bordeaux; 2 Université de Bordeaux, CHRS, EPHE, INCA, UMR5287 F-33000 Bordeaux; 3 Université de Rennes, Inria, CNRS, IRSIA-F35000 Rennes; 4 Laboratoire inter-universitaire de Biologie de la Motricité (EA 7424, LIBM), Université Claude Bernard Lyon 1, 69622 Villeurbanne

Introduction

Motor imagery (MI) -
- Mental simulation of an action without movement [1]
- Motor learning (e.g. technique)
- Anxiety management (e.g. self-confidence) [1,2]
- MI practice motivation by lack of feedback resulting in suboptimal gains

Neurofeedback (NF) -
- Method to improve cognitive performance through the regulation of associated EEG patterns
- EEG self-regulation
- Athletes’ performance thanks to a better guidance during MI [3,4,5]
- Efficiency when no personalisation and low attractiveness

Objective
Assess links between MI ability, expertise, personality traits, NF acceptability and preferences to design NF tools, perfectly fitted to athletes’ profile, goals and expectations.

Materials & Methods

Approach - Online questionnaire to assess factors that impact NF’s efficiency in athletes
Participants - 400 responders, being competitors from all sports

(Neuro)feedback preferences in terms of modality (auditive, tactile, visual), redundancy (uni-, bi-, tri-modality) and valence (positive, negative, both) were assessed according to athletes’ individual characteristics:

<table>
<thead>
<tr>
<th>Factor</th>
<th>MI ability &amp; practice</th>
<th>Expertise</th>
<th>Personality</th>
<th>NF acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>What ?</td>
<td>MI ability (vividness, control) MI practice (frequency, context)</td>
<td>Mastery level (titles, training hours…)</td>
<td>Traits (5 dimensions)</td>
<td>NF’s perception &amp; needs (personal likings, knowledge, interest…)</td>
</tr>
</tbody>
</table>

Preliminary Results

A pre-test questionnaire version was broadcasted. Data of 41 athletes (19F, 22M) aged 24 ± 9 and all being competitors in their discipline (4 internationals, 20 nationals, 13 inter-regional or under, 4 unknown) are presented.

We provide below a few descriptive analyses concerning MI ability & practice.

A correlation matrix highlighted links between MI frequency of practice, MI ability and MI total (practice and ability summed up).

However, no significant differences were found between mean factor scores and modality, redundancy or valence choices when using one way ANOVAs.

Next step
- Final version broadcasted to 400 competitor athletes
- Longitudinal study on athletes where
  G1 : classic NF
  G2 : personalised NF, according to the presented factors

References:
[5] Gong et al. (2021) - IEEE Transactions on Biomedical Engineering
[7] Hall et al. (1990) - International Review of Sport and Exercise Psychology
[8] Li and Smith (2021) - Frontiers in Neuroscience

Spill the tea
Is NF sufficiently personalised?
To what extent?
How should we in current and future projects?

margaux.izac@u-bordeaux.fr