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

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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

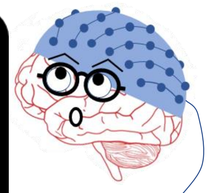
Neurofeedback (NF) -

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

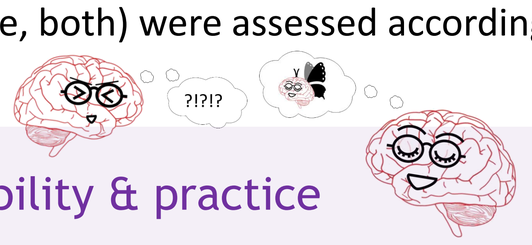
Assess links between MI ability, expertise, personality traits, NF acceptability and preferences to design NF tools, perfectly fitted to athletes' profile, goals and expectations.

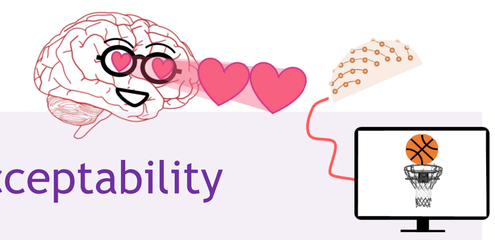


Materials & Methods

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:



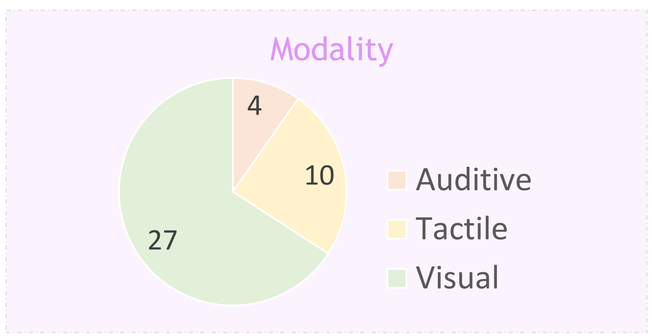


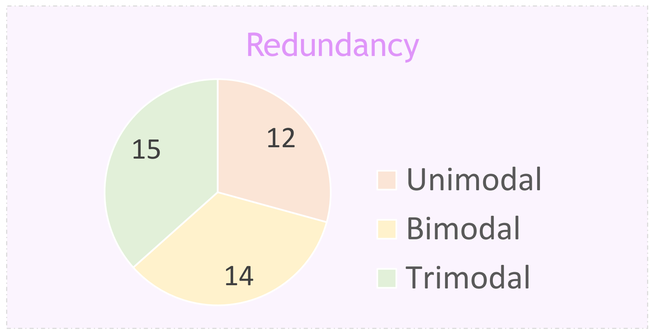
Factor	MI ability & practice	Expertise	Personality	NF acceptability
What ?	MI ability (vividness, control) MI practice (frequency, context)	Mastery level (titles, training hours…)	Traits (5 dimensions)	NF's perception & needs (personal likings, knowledge, interest…)
Why ?	MI ability and NF performance are correlated [6]	≠ cerebral recruitment efficiency [8]	Anxiety and self-reliance impact MI and NF [9,10]	Motivation results in NF gain rates
How ?	Imagery Use Questionnaire [7]	Demographic data	Big Five Inventory [11]	BCI-Accept [12]

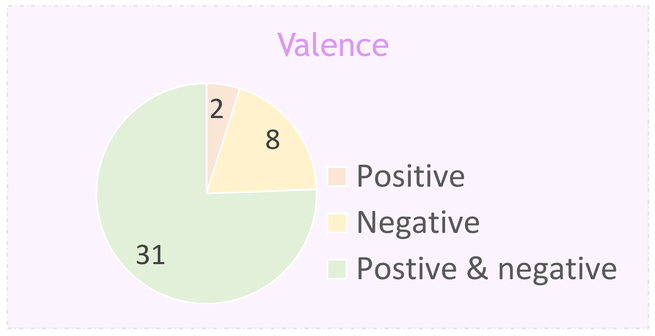
Preliminary Results

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.

Correlation matrix

	MI frequency	MI ability	MI total
MI frequency			
MI ability	*3.9^{e}-05		
MI total	*2.4^{e}-15	*2.9^{e}-13	

*p<0.05

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

Spill the tea

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

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