

Unveiling the role of beta activity in motor motivation: an EEG study of effort using neurofeedback and pupillometry

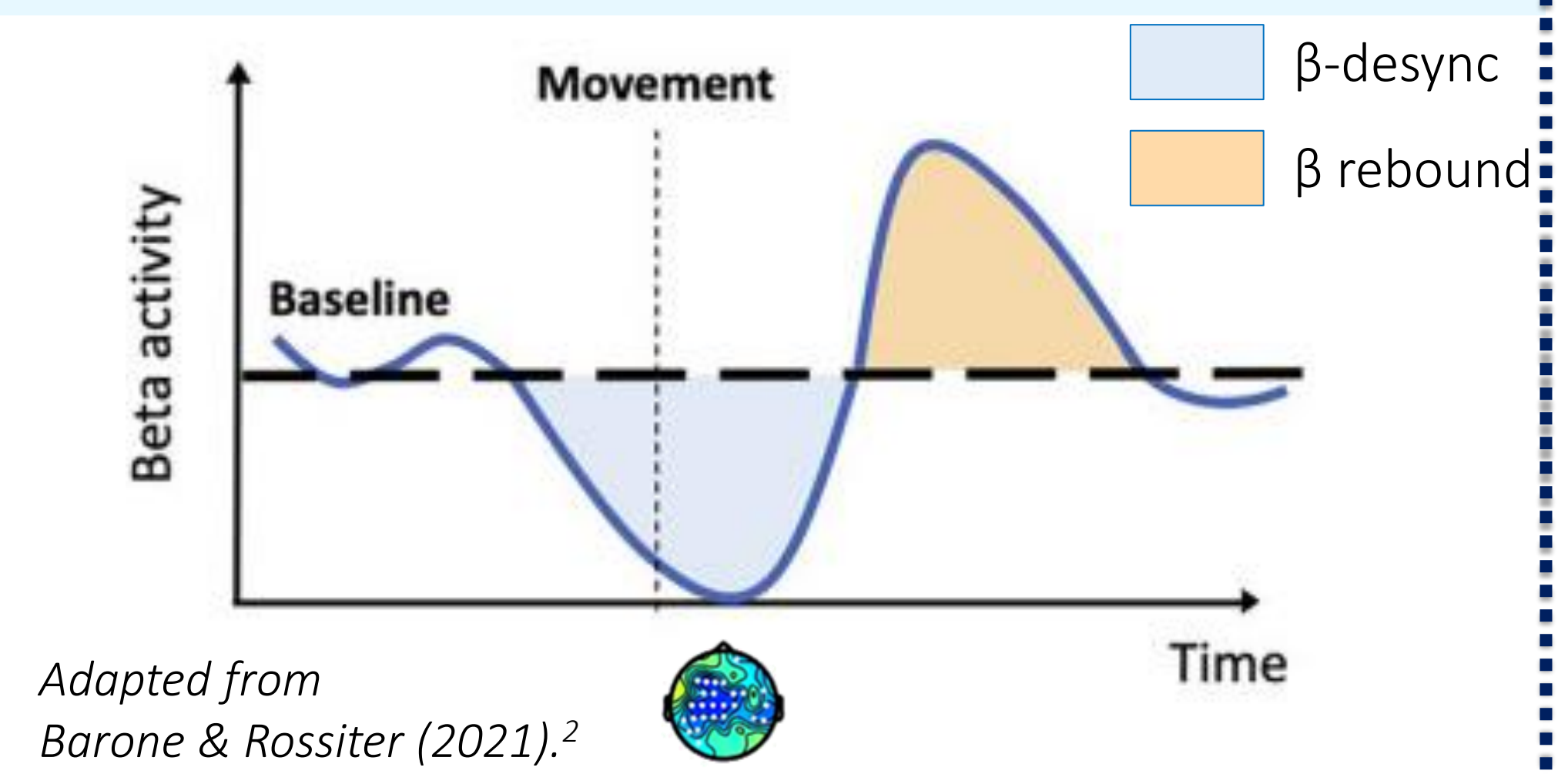
Emeline Pierrieau,¹ Léa Pillette,² Claire Dussard,³ Nathalie George³ & Camille Jeunet²

¹ Département de Physiologie, FMSS, Univ. de Sherbrooke, Canada ² Univ. de Bordeaux, CNRS, INCIA (UMR5287), Bordeaux ³ Institut du cerveau et de la moelle épinière (ICM), CNRS/Inserm, Sorbonne Univ., Paris

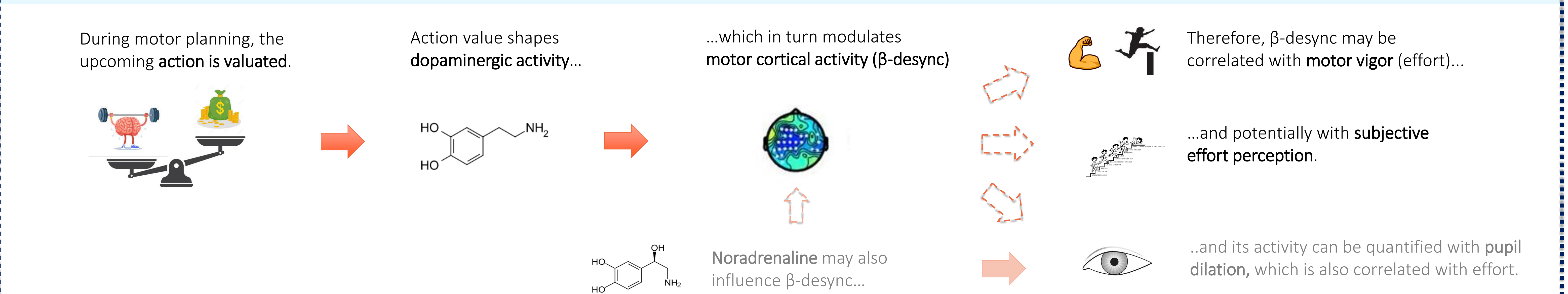
Introduction - Understanding the role and origin of motor beta-band activity.

- > Movement initiation is associated with a **decrease in the amplitude of beta-band oscillations (β ; 15-25 Hz) over sensorimotor regions**, commonly referred to as β desynchronization (**β -desync**).^[1,2]
- > The magnitude of β -desync has been positively **correlated with movement speed** ^[3,4] and **force**.^[5]
- > β -desync is **attenuated in Parkinson's disease**, and this abnormal activity pattern has been associated with **dopamine depletion** and related motor symptoms such as **bradykinesia**.^[6]

However, the functional role of β -desync and its neurophysiological foundation are still unclear.^[7]



Research question - Is β -desync a reflect of motor motivation?

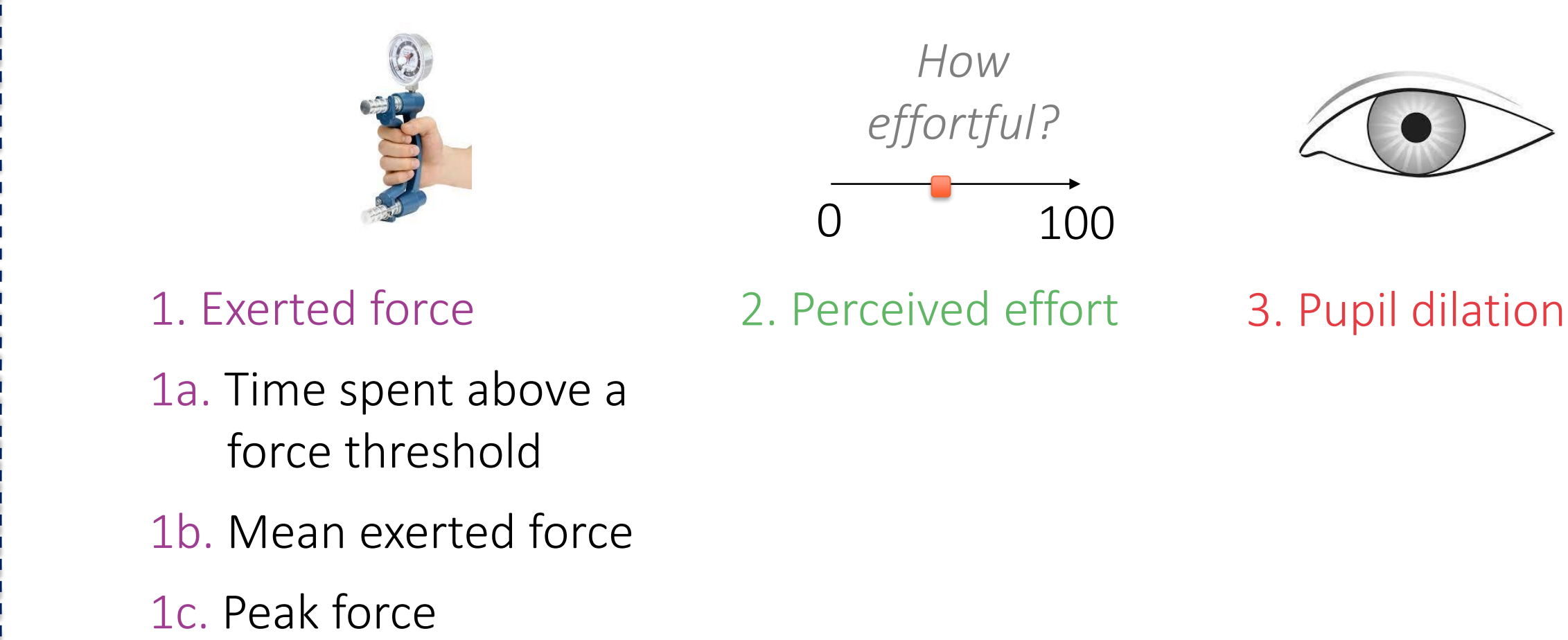


Methods - Using neurofeedback to modulate pre-movement β -power and assessing the effects on subsequent movements.

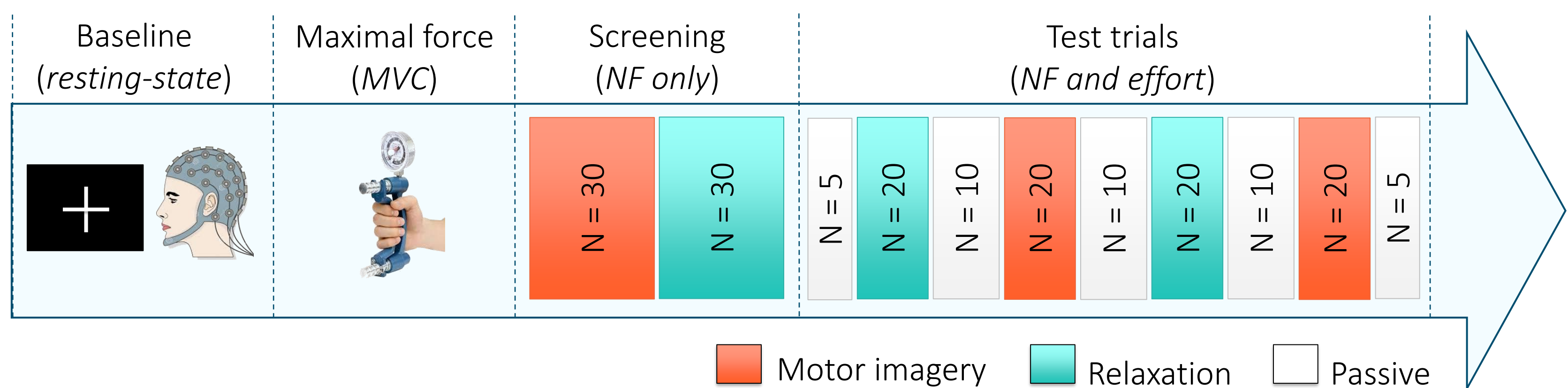
A. 3 experimental conditions with 3 types of neurofeedback (NF)



B. Assessment of motor motivation with different variables



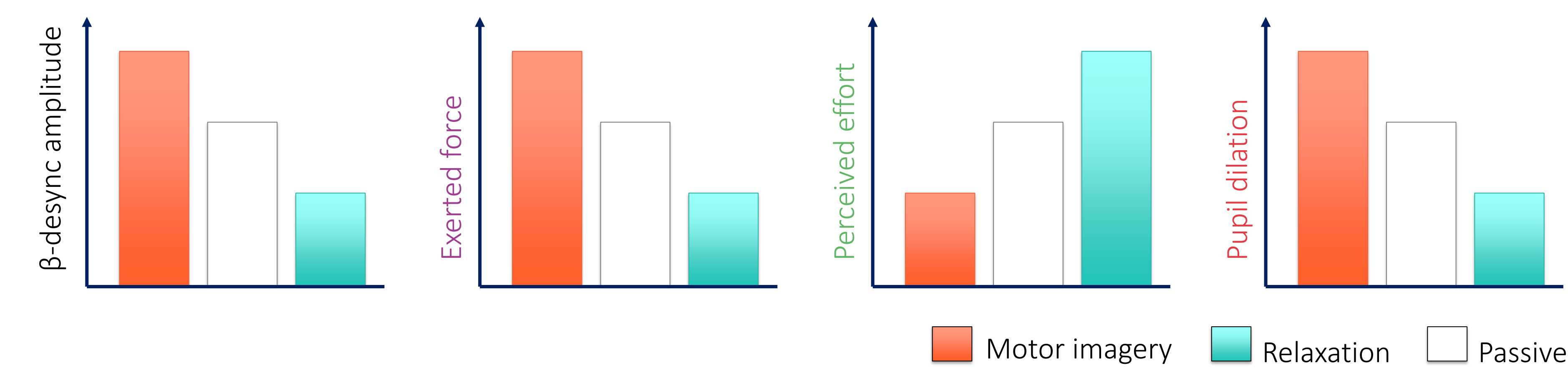
C. Session timeline (motor imagery and relaxation blocks will be counterbalanced)



D. Trial timeline



Expected results



Perspectives

- Clinical applications in motivational disorders (Parkinson's disease, major depression syndrome).
- β -desync as a proxy for motor motivation.
- Pharmacological studies (dopamine, noradrenaline).
- Association with inter-individual variability in motor motivation.

En savoir +

Contact : emeline.pierrieau@usherbrooke.ca

References

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3. Little et al, PLoS Biol. 17(10):e3000479, 2019.
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