



Understanding the effect of beta blockers on motor performance under uncertainty: An experimental pharmacological study

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INTRODUCTION

Many musicians face Music Performance Anxiety and tend to rely on beta blockers to alleviate anxiety symptoms. This study investigates how Noradrenaline blockade by beta blockers impacts motor execution in pianists. Further exploration under the influence of beta blockers reveals altered effort modulations, indicating potential energy mobilization reduction during action, offering insights for musicians' performance optimization and broader research implications

HYPOTHESES

- Without propranolol, participants would subconsciously engage less effort when the reward is low
- Beta blockers should reduce the mobilization of energy necessary for the action.

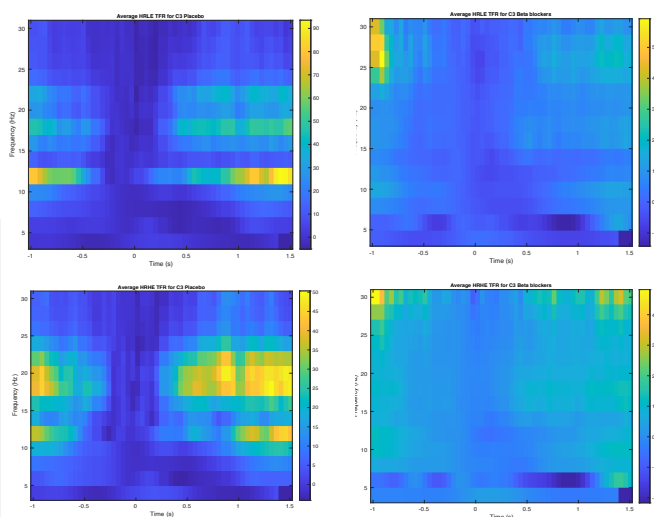
METHODS

- EEG (64 electrodes, extended international 10-20)
- 20 participants : within subject design
- 2 conditions: Placebo or Propranolol
- Musical Instrument Digital Interface (MIDI) protocol



TIME FREQUENCIES ANALYSIS

- Artifacts removal : Independent Component Analysis



TASK

	HIGH EFFORT	LOW EFFORT
HIGH REWARD		
LOW REWARD		

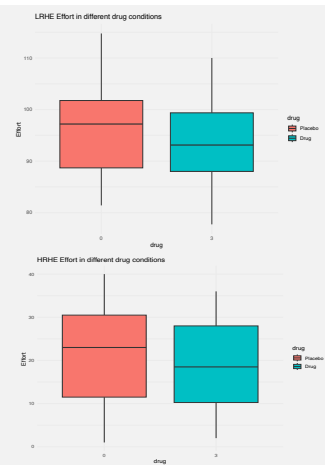
STATISTICAL ANALYSIS

Behavioral results :

- Repeated measures Bayes analysis ANOVA 2X2 : Success rate and effort.
- Effort :strong evidence in favor of the alternative hypothesis (H1) (BF = 9.0080)

Cognitive results :

- Within trials, non-parametric permutation test (Fieldtrip toolbox).



CONCLUSION

- The behavioural results suggests that the use of beta blockers or placebos has a significant impact on performance effort.
- Anecdotal evidence of effort modulated by the type of trial.
- In line with prior research (Chiara Varazzani et al., 2015), this study provide further confirmation of the distinctive role of noradrenergic (NA) neurons in orchestrating the allocation of resources to fuel behavior and confront task-related demands. By elucidating the specific involvement of NA neurons in resource mobilization, this study contributes to a deeper understanding of the neural mechanisms underlying music performance under beta blockers.