# The effect of loss of a sense of agency on apathy

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## Introduction

In an EEG and MRI study, sense of agency is **modulated** in an **effort-based decision-making tapping task via a visuomotor conflict** to determine whether **losing sense of agency increases the state of apathy**. First conducted on healthy participants, with future studies on Parkinson's Disease patients — up to 40% of which experience apathy.[1]

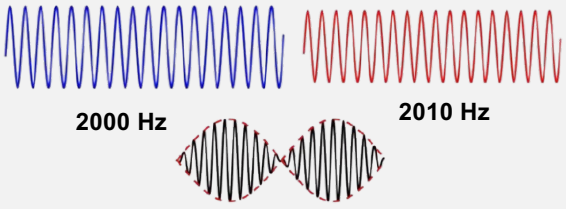
## EEG Methodology

- Brain activity recorded from 64-channel EEG cap
- n = 15/30 participants
- ECG (cardiac) and EOG (eye) artefacts to be removed during Independent Component Analysis (ICA)

**Reward: 40 points**
**Accept** →
or
← **Decline**

## MRI Methodology

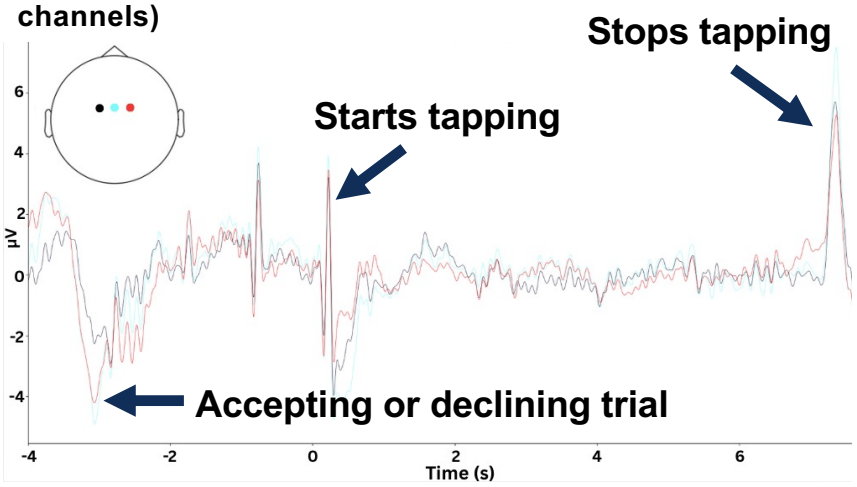
- Transcranial Temporal Interference Study (tTis) with stimulation of the ventral striatum.
- Two sessions: ITBS (stimulation) and HF (control)



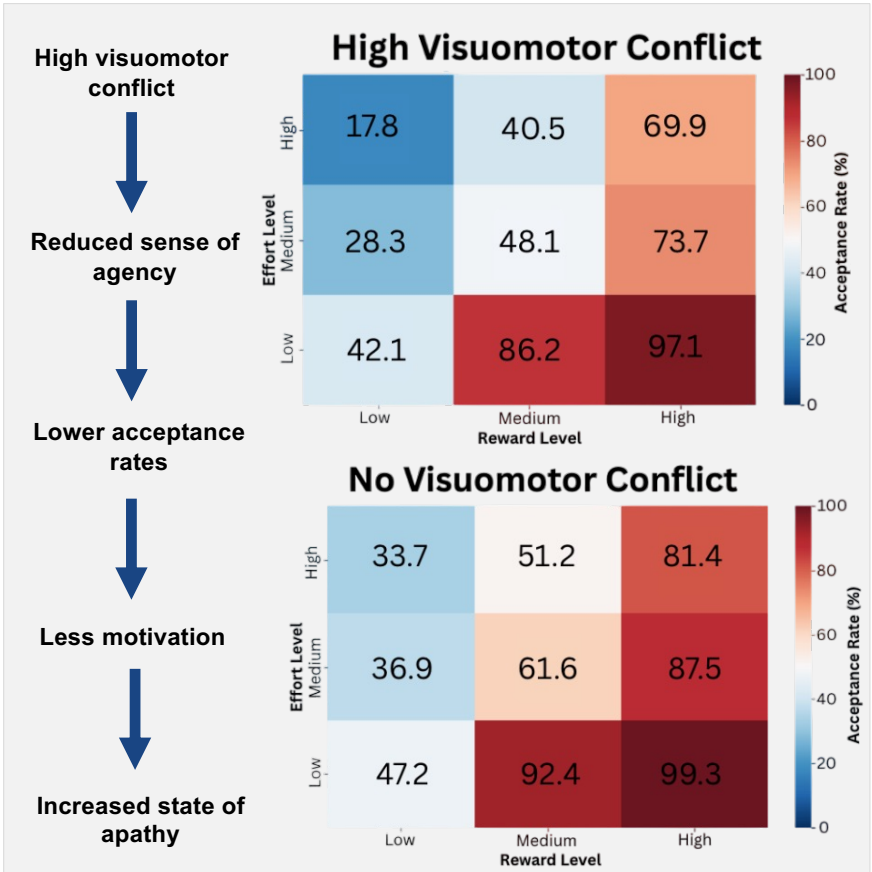

- Structural (T1), Resting State, and taskMRI recorded
- n = 10/25 participants

## EEG Preliminary Results

**Readiness Potential (Low-pass 10 Hz) (3 motor cortex channels)**




## MRI Behavioural Data Analysis




## References:

[1]Maher, S., Donlon, E., Mullane, G., Walsh, R., Lynch, T., & Fearon, C. (2024). Treatment of Apathy in Parkinson's Disease and Implications for Underlying Pathophysiology. *Journal of Clinical Medicine*, *13*(8), 2216–2216. https://doi.org/10.3390/jcm13082216

[2]Guo, W., He, Y., Zhang, W., Sun, Y., Wang, J., Liu, S. and Ming, D. (2023). A novel non-invasive brain stimulation technique: 'Temporally interfering electrical stimulation'. *Frontiers in Neuroscience*, 17. doi:https://doi.org/10.3389/fnins.2023.1092539.