

INVESTIGATING BRAIN ACTIVITY DURING FREE WILL & ATTENTION

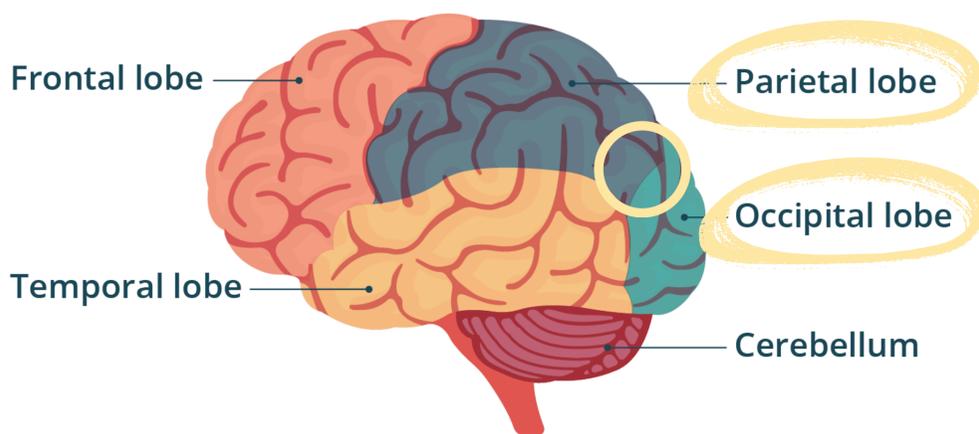
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Free Will and Attention to Time

Everyday we focus our attention at will. This enables us to navigate the world and avoid becoming overwhelmed by the mass amounts of information that surrounds us (Nadra & Mangun, 2023).

Recently, research has found differences in brain activity and visual processing between tasks where participants are **instructed** to and **freely choose** to focus on a location in space (Bengson et al., 2014; Rajan et al., 2019).

The present study investigated differences in brain activity and visual processing between instructed and willed tasks, but when focusing on a moment in time.



Using EEG to Investigate the Brain

Electro-encephalo-graphy (EEG) measures electrical activity in the brain, that is time-locked to specific events.

This study was interested in brain activity concerning visual processing (**occipital lobe**) when focussing on a moment in time (**parietal lobe**). So, we analysed data from electrodes that were placed over these areas.

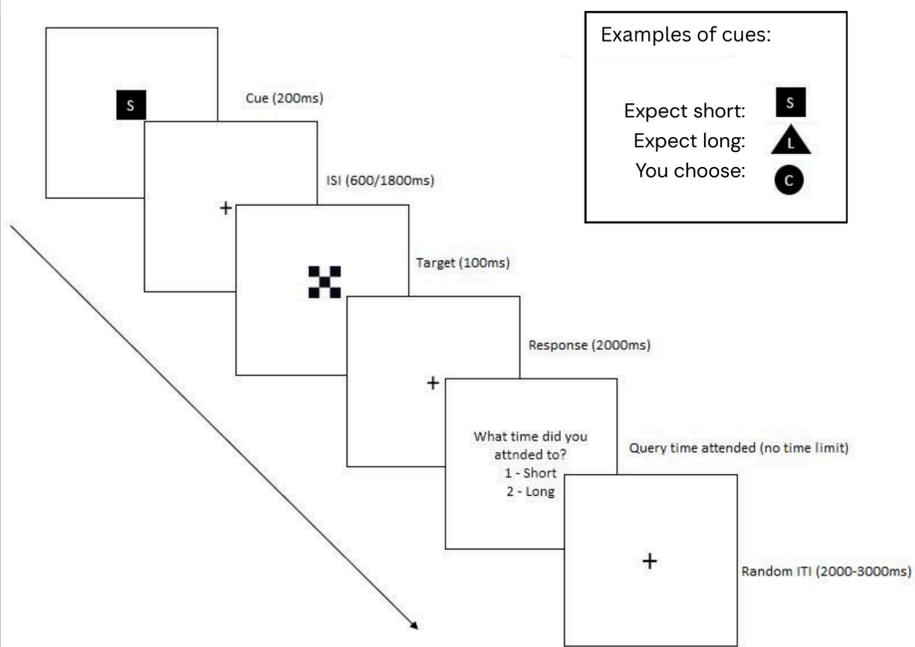
What did we do?

Participants: 46 (29 female), aged 18 – 33.

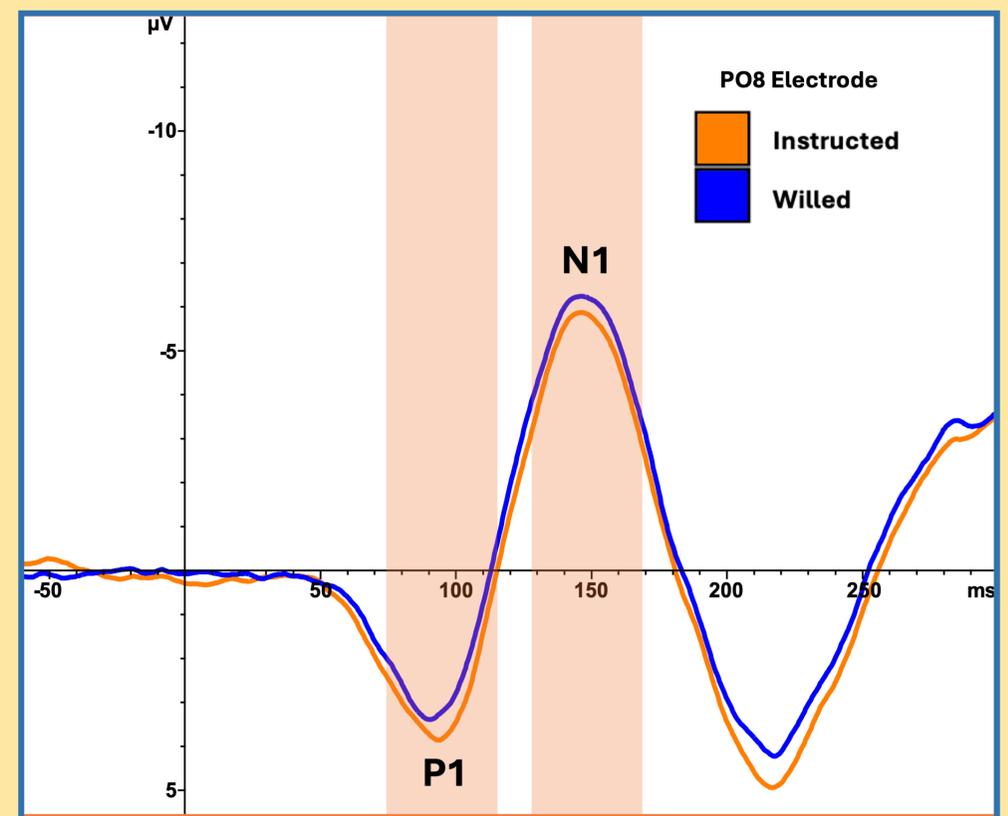
The Task (an adapted cue-target paradigm):

- Participants reacted to targets by saying 'pah!', but only if it appeared when they expected it.
- Targets could appear after Short (800 ms) or Long (2000 ms) intervals.
- Instructed attention – participants were told to expect targets after a short (S) or long (L) intervals.
- Willed attention – participants chose (C) when to expect the targets.
- After the fact, participants entered '1' or '2' to confirm which interval they expected the target to appear after.

An Example Task



What did we find?



Differences in brain activity (labelled P1 & N1) were found between the instructed and willed tasks at the moment the target appeared, suggesting that visual processing is modulated as a function of whether attention is instructed or freely willed.

Next steps...

Future research should use fMRI to investigate the brain areas recruited during these tasks, as the differences could reflect the additional task of making a decision.

Further, participants should be questioned about task preference, as differences in fatigue and engagement can modulate brain activity.