NEUROFEEDBACK TO PROMPT EXPERT BRAIN STATES

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Objectives: We aim to explore whether real-time brain imaging can train individuals to actively modify their neural processes and, in turn, achieve specialized states of consciousness. To date, effective brain self-regulation has been the purview of select few (e.g., expert meditators and hypnotic virtuosos). In this project we seek to leverage brain imaging to guide naïve participants into brain activations similar to those of experts. If non-expert participants could alter their brain patterns to mirror those of accomplished experts, their state of consciousness may also shift towards expert-like brain signatures.

With the variety of available brain imaging techniques, we first identified the most effective means to train neural self-regulation. Because specialized brain states pair with particular postures (e.g., sitting upright in meditation), we conducted an experiment to identify the body-position most advantageous to successful training.

Method: To find the top imaging modality for neurofeedback, we conducted a comprehensive literature search reviewing the most oft-cited and influential papers concerning various feedback methods (Thibault et al., Cortex 2016).

To uncover the most ideal posture for neurofeedback, we leveraged multi-postural magnetoencephalography to measure brain activity in three positions (i.e., lying supine, reclined at 45°, and sitting upright) (Thibault et al., Brain Imaging and Behavior 2015).

Preliminary results: Our survey of the literature suggests that training outcomes associated with electroencephalography neurofeedback are likely attributable to expectations and placebo-like effects. Alternatively, findings from an increasing number of studies indicate that functional magnetic resonance imaging (fMRI) neurofeedback may help guide participants toward neural self-regulation (Thibault et al., Cortex 2016).

Our findings concerning the influence posture wields on neural activity demonstrate that sitting upright, compared to sitting reclined or lying supine, increases left-hemisphere high-frequency neural activity over common speech areas (Thibault et al., Brain Imaging and Behavior 2015).

Conclusion/Discussion: At the moment, fMRI seems to present the most promising imaging modality to train atypical brain states. While our posture findings suggest that the supine position – imposed by fMRI – invokes a less alert state, the benefits of fMRI largely outweigh the minor confines related to supine posture.
Publications: