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Plenary Lecture-PhD

PL04

fMRI for Cognitive Intervention

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Real-time fMRI allows us to detect spatial patterns of activity in the human brain. These patterns only indirectly reflect neural activity, but they can statistically track specific cognitive processes or sensory signals. By pairing their occurrences with reward signals presented to human subjects, we can associate positive valence with certain representations, and thereby make the relevant concepts or visual stimuli, such as images of a spider, or a snake, less threatening. We used this method to successfully reduce the excessive physiological arousal in patients with phobia, when they encountered pictures of these animals. Because the procedure took place without the patients' awareness of the purpose of the intervention, this was conducted in a double-blinded (i.e. placebo controlled) manner. I discuss the challenges and importance in conducting this kind of work for targeting signals in the prefrontal cortex, and outline future work that can further enhance the efficacy and our understanding of this method. This non-invasive tool of causal intervention may be employed also for understanding basic brain functions.

Keywords: Neurofeedback, Phobia, Consciousness