The role of neuromodulation, cognitive processing and behavioral inhibition in problem gambling

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INTRODUCTION

- Previous research identified deficits in risky decision-making in problem gamblers (PGs) (Lawrence et. al., 2009).
- Irrational thinking plays an important role in the development of problem gambling (Benhsain, Taillefer & Ladouceur, 2004).
- Research found a link between gambling-related cognitive distortions and gambling problem severity (Xian et. al., 2008).
- Pathological gambling has been associated with elevated impulsivity (Michalczuk et al., 2011).

METHODS

- Transcranial direct current stimulation (tDCS): a non-invasive brain stimulation technique that applies a very weak electrical current (1.5 mA) to the scalp to modulate neuronal activity.

- Electroencephalography (EEG): Measures the changes in brain electrical activity.

OBJECTIVES

- To investigate the role of prefrontal cortex (PFC) in problem gambling decision-making.
- To study whether neuromodulation can help to moderate cognitive distortions, impulsivity and risk taking behaviour.
- To offer improved treatment interventions for problem gamblers.

EXPERIMENTAL DESIGN

- n = 24
- Phase 1: neuromodulation of DLPFC and vmPFC to decide the brain area to target in phase 2.
- Phase 2: Longitudinal neuromodulation of PGs not treated with CBT and PGs treated with CBT.

PREDICTIONS

- PGs will show higher scores in tasks that measure impulsivity, risk taking behaviour, biases and cognitive distortions than healthy controls. EEG resting activity will differ for both groups.
- The tasks performance will change after neuromodulation treatment to a larger extent in stimulation than in sham. In particular, a decrease of the above mentioned measures will be linked to improved executive function and control inhibition performance.
- Combined neuromodulation with CBT will show enhanced cognitive performance than neuromodulation treatment.

REFERENCES


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