Nastaran Malmir

- Ph.D. student of Psychology, Islamic Azad University Science and Research Branch, Tehran, Iran.
- Iranian National Center for Addiction Studies (INCAS), Neurocognitive Laboratory (NCL), Tehran, Iran.

Skills:
fMRI analysis (FSL)
Acquisition fMRI data
Biologic background
Behavioral science in combination of cognition

Interests:
Neuroimaging Modalities (fMRI and EEG), Electrical Brain Stimulations (tDCS and tACS), Data Processing, Craving, Neurocognitive Functions

Ongoing Project:

- **Modulation of Psychological and Neural Response for Food Craving among People with Obesity Using Transcranial Direct Current Stimulation (tDCS) on Dorsolateral Prefrontal Cortex (DLPFC): A Randomized Clinical Trial**

Abstract:
Obesity has been considered as global health concern that frequently comorbid with other mental and medical health conditions. Any studies purposed different interventions for treatment of obesity. But, they are often ineffective and weight regain is common. Therefore, new approaches are needed to better understand neural underlying of over eating and obesity. We hope this better understanding can provide new treatment possibilities which are safe, scalable, and with long- lasting effects. Food cue-induced craving (CIC) is considered as one of the core neurocognitive mediators of obesity. Food CIC is defined as “an irresistible urge to consume food” that can be triggered by different internal or external stimuli. Researchers argue that neural substrates of food CIC plays an influential role in the maintenance of obesity and relapse to over eating behavior. On the other hand, Transcranial Direct Current Stimulation (tDCS) is a device-based technology employed to change cortical excitability. This technique applies a weak amplitude direct current (1–2 mA) via two electrodes positioned on the scalp surface. It has been demonstrated in 8 published studies till now (Dec 2017) that tDCS can suppress food craving and food consumption, especially by modulating dorsolateral prefrontal cortex (DLPFC) activity.
However, there is no published study to date that has aimed to delineate neural responders how tDCS reduces craving among people with obesity using functional neuroimaging methods. In this double blind randomized control trial, we purpose the first combined tDCS-fMRI study to examine the acute effects of tDCS on neural substrates underlying food CIC. We hypothesize that tDCS amplifies DLPFC’s top-down modulatory role via its connectivity to other cortical-subcortical

areas. In this study 60 people with obesity divided into parallel arms which delivered active or sham DLPFC tDCS. Each subject will undergo structural, resting state and task based (food cue exposure paradigm) functional MRI pre and post tDCS. The results of this study will provide neuroscience-based evidence for the efficacy of tDCS and will advance the field towards development of new and potentially effective interventions for obesity.

- **Modulation of Food Cue Reactivity Induced by Frontoparietal Transcranial Alternating Current Stimulation (FP-tACS) Among People with Obesity**

Abstract:

Limbic areas including amygdala and ventral striatum play a crucial role in reward circuitry which receive inputs from the prefrontal cortex, major nodes of the executive control network (ECN). The central role of the ECN is to perform top down regulation of subcortical limbic areas during self-control, emotion-regulation, and response inhibition tasks. These processes are well known to be affected in different psychopathologies like addictive behaviors and craving. There is a growing body of evidence that external frontoparietal synchronization (FPS) in the theta band frequency with transcranial alternating current stimulation (tACS) can potentially modulate connectivity within ECN and between ECN and limbic areas. This may improve some aspects of executive function and top down regulation. tACS is a low-cost and scalable non-invasive brain stimulation technology without any serious side effects.

The procedure involves the transcranial delivery of low levels of alternating current (0.1-2 mAmp) in different frequencies through the skull into the brain with both online and long-term offline effects. We propose the first effect of tACS on food cue reactivity to examine the acute offline effects of FPS on neural substrates underlying obesity. We hypothesize that FPS amplifies the ECN top-down modulatory role via its connectivity to other cortical-subcortical areas.

- **The Effect of Neuroscience-Informed Psychoeducation on Self-Efficacy of People with Addiction**
- **Addiction Recovery Path (ARP) project**
- **Development and Evaluation of a Visual Cue-induced-craving Task for Various Populations of Individuals with Opioid Use Disorders and Methamphetamine Use Disorder**