**Introduction**

Depressed individuals are biased to attend to negative stimuli [1,2], which has inspired attention training research aimed at improving depressive symptoms. However, meta-analyses of behavioral training paradigms reveal mixed efficacies [3-5]. More recently, research has suggested that the negative bias in depression is caused by a problem with disengaging negative information [6].

To address this issue, we use a closed-loop real-time fMRI task [7] to train sustained attention by forcing subjects to pull themselves out of negative states. Additional tasks were administered before and after neurofeedback to understand how changes in neurofeedback related to other clinical, neural, and behavioral measures.

**What differences do we see between depressed and control subjects before neurofeedback?**

**Can we improve depression severity by training depressed subjects to get themselves out of negative states?**

**Do the improvements in neurofeedback relate to improvements in other domains?**

**Study design**

**GROUP 1: healthy control (HC) n=11**
**GROUP 2: depressed (MDD) n=14**

<table>
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<tr>
<th>Task</th>
<th>Clinical assessments</th>
<th>Gaze task</th>
<th>Go/no go attention task</th>
<th>POMS - resting state</th>
<th>OMT - face-matching</th>
<th>OMT - real-time neurofeedback</th>
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<tbody>
<tr>
<td>Symbol</td>
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**Visit 1: Pre NF**
- Gaze task
  - Look anywhere on the screen

**Visit 2: NF 1**
- Go/no go task
  - Stimulus conditions
    - Neutral SF: Model training
  - Neutral SF: Go/No go task before and after face block
  - Face-matching task

**Visit 3: NF 2**

**Visit 4: NF 3**

**Visit 5: Post NF**

**Visit 6: 1M FU**

**Visit 7: 3M FU**

**Closed-loop neurofeedback**

**Quantifying neurofeedback performance**

**Preliminary results: NF transfer to other measures**

**Conclusions and future directions**

Over the course of training, depressed subjects improved in terms of depression severity, amygdala reactivity to negative faces, and negative stickiness during neurofeedback. Additionally, the improvement during neurofeedback was related to the improvement in depression and amygdala reactivity.

Future analyses will focus on other behavioral and neural estimates (e.g., resting state, eye-tracking etc.), and analyzing potential links to NF and severity improvement.

Data collection is still ongoing, as we aim to collect 16 subjects per group.