BRAIN CONNECTIVITY CHANGES ASSOCIATED WITH A COGNITIVE-EMOTIONAL TRAINING INTERVENTION FOR DEPRESSION

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BACKGROUND

- Recent clinical trial data suggest monotherapy with cognitive-emotional training using the Emotional Faces Memory Task (EFMT) is beneficial in reducing symptoms in patients with Major Depressive Disorder (MDD). (Iacoviello et al., in press)
- The intervention was designed to target abnormal activation patterns between the dorsolateral prefrontal cortex (DLPFC) and amygdala, which underlies impairments in cognitive control and emotion regulation observed in MDD [Figure 1].
- The present study aimed to investigate whether EFMT treatment for MDD is associated with changes in brain activation patterns. Effective connectivity was assessed using task-based Dynamic Causal Modeling and functional connectivity within and between key neural networks was assessed during resting state. The study also assessed whether changes in connectivity parameters are related to symptomatic improvement.

METHODS

- **Participants**
  
<table>
<thead>
<tr>
<th>IDLPFC</th>
<th>IVLPFC</th>
<th>rVLPFC</th>
<th>IDACC</th>
<th>dACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.43 (5.12)</td>
<td>21.07 (24.10)</td>
<td>19.14 (2.60)</td>
<td>25.36 (13.12)</td>
<td>36.64 YEARS (8.37)</td>
</tr>
</tbody>
</table>

  **Note:** values indicate n’s or mean (SD)

- **Brain Imaging Methods**

  - Image acquisition occurred at rest and during an abbreviated EFMT task
  - Task-based data were analyzed using Dynamic Causal Modeling [Figure 3] to estimate effective connectivity between key brain regions targeted in EFMT
  - Resting-state data were analyzed to estimate functional connectivity within and between key neural networks.

- **Table 1. Demographic and Clinical Characteristics of the Sample**

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- **Results**

  - Post-treatment reductions in within-network connectivity were observed in the dorsal Default Mode Network (dDMN; d=−0.38) and Salience network (SAL; d=−0.36)

- **Effective Connectivity Results**

  - Connectivity increased between left Central Executive Network (LCEN) and RCEN (d=0.31), between vDMN and dDMN (d=0.31), and between LCEN and both vDMN (d=0.45) and SAL (d=0.53)

- **Conclusion**

  - The main findings provide initial evidence that cognitive-emotional training may be associated with changes in short-term plasticity of neural networks implicated in effective information processing and MDD.
  - Post-treatment reductions in functional connectivity of dDMN and SAL and increased integration between cognitive control, self-referential and salience processing networks suggest increasingly coordinated responses to emotional stimuli in MDD patients.

  **References**


  **Grant Information**

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