Results

The pre-treatment resting state network (Figure 1) encompassed areas broadly implicated in vision and object recognition such as the 1) Middle Temporal Gyrus; 2) Lateral Occipital Cortex; 3) Intracalcarine Cortex; and 4) Occipital Pole.

Eight clusters (Table X) showed significant increase in connectivity pre- to post-treatment. The clusters primarily resided within the 1) Middle Frontal Gyrus; 2) Frontal Pole; and 3) the Superior Frontal Gyrus.

Table X

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cluster Index** | **Voxels** | **MAX X (vox)** | **MAX Y (vox)** | **MAX Z (vox)** | **COG X (vox)** | **COG Y (vox)** | **COG Z (vox)** | **MAX anatomical location** | **COG anatomical location** |
| 8 | 335 | 25 | 38 | 39 | 27.5 | 33.6 | 39 | Frontal Pole, Middle Frontal Gyrus, Superior Frontal Gyrus | Middle Frontal Gyrus, Frontal Pole, Superior Frontal Gyrus |
| 7 | 315 | 33 | 48 | 52 | 29.3 | 38.5 | 50.3 | NA? | Frontal Pole, Middle Frontal Gyrus, Superior Frontal Gyrus |
| 6 | 111 | 18 | 39 | 38 | 17.8 | 38.8 | 38.4 | Frontal Pole, Superior Frontal Gyrus, Middle Frontal Gyrus | Frontal Pole, Superior Frontal Gyrus, Middle Frontal Gyrus |
| 5 | 65 | 31 | 43 | 41 | 33.6 | 43.1 | 42 | Frontal Pole, Middle Frontal Gyrus, Superior Frontal Gyrus | Frontal Pole, Middle Frontal Gyrus |
| 4 | 56 | 29 | 16 | 32 | 28.2 | 16.8 | 33.6 | Middle Frontal Gyrus | Middle Frontal Gyrus |
| 3 | 16 | 21 | 47 | 27 | 21.7 | 46.9 | 27.4 | Frontal Pole | Frontal Pole |
| 2 | 14 | 23 | 45 | 37 | 22.8 | 45.1 | 37.4 | Frontal Pole, Superior Frontal Gyrus | Frontal Pole, Superior Frontal Gyrus |
| 1 | 6 | 22 | 29 | 47 | 21.7 | 29.2 | 47.3 | Superior Frontal Gyrus, Middle Frontal Gyrus, Frontal Pole | Superior Frontal Gyrus, Middle Frontal Gyrus, Frontal Pole |

Cluster results (pcorrected<0.0125) for resting state connectivity change over time. MAX X/Y/Z = maximum cluster coordinates, vox = voxel coordinates, COG X/Y/Z = center of gravity cluster coordinates.

Linear regression was used to investigate the relationship between changes in resting state connectivity and changes in amygdala pre- to post-treatment while controlling for number of phobias, number of neuro-reinforcement sessions, and time between assessments. Change in resting state network pre- to post-treatment significantly predicted changes in amygdala pre- to post-treatment (beta = -0.24, p = < .05) such that greater increases in network connectivity estimates pre-treatment to post-treatment were significantly related to greater decreases in amygdala activation pre-treatment to post-treatment, aligning with our hypothesis that increases in resting state networks would contribute to decreases in amygdala activity as a direct result of neurofeedback.