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 (mm)** | **MAX Y (mm)** | **MAX Z (mm)** | **COG X (mm)** | **COG Y (mm)** | **COG Z (mm)** | **MAX anatomical location** | **COG anatomical location** |
| 8 | 335 | 40 | -50 | 6 | 34.9 | -58.7 | 6.08 | Supramarginal Gyrus, posterior division | Lingual Gyrus, Precuneous Cortex, Intracalcarine Cortex |
| 7 | 315 | 24 | -30 | 32 | 31.3 | -49 | 28.5 | Cingulate Gyrus, posterior division | Angular Gyrus, Precuneous Cortex, Lateral Occipital Cortex, superior division |
| 6 | 111 | 54 | -48 | 4 | 54.4 | -48.3 | 4.72 | Middle Temporal Gyrus, temporooccipital part, Angular Gyrus, Supramarginal Gyrus, posterior divison | Middle Temporal Gyrus, temporooccipital part, Angular Gyrus, Supramarginal Gyrus, posterior division |
| 5 | 65 | 28 | -40 | 10 | 22.7 | -39.9 | 12 | Cingulate Gyrus, posterior divison, Precuneous Cortex | Cingulate Gyrus, posterior division, Supracalcarine Cortex |
| 4 | 56 | 32 | -94 | 8 | 33.5 | -92.4 | -4.86 | Occipital Pole, Lateral Occipital Cortex, superior division, Lateral Occipital Cortex, inferior division | Lateral Occipital Cortex, inferior division |
| 3 | 16 | 48 | -32 | -18 | 46.6 | -32.3 | -17.2 | Inferior Temporal Gyrus, posterior division, Temporal Fusiform Cortex, posterior division, Inferior Temporal Gyrus, temporooccipital part | Inferior Temporal Gyrus, posterior division, Temporal Fusiform Cortex, posterior division, Inferior Temporal Gyrus, temporooccipital part, Temporal Occipital Fusiform Cortex |
| 2 | 14 | 44 | -36 | 2 | 44.4 | -35.9 | 2.86 | Superior Temporal Gyrus, posterior division, Middle temporal Gyrus, posterior division, Miiddle Temporal gyrus, temporooccipital part, Supramarginal Gyrus, posterior division, Angular gyrus | Superior Temporal Gyrus, posterior division, Middle Temporal Gyrus, posterior division, Middle Temporal Gyrus, temporooccipital part, Supramarginal Gyrus, posterior division, Angular Gyrus |
| 1 | 6 | 16 | -68 | 22 | 46.7 | -67.7 | 22.7 | Cuneal Cortex, Precueous Cortex, Supracalcarine Cortex, Intracalarine Cortex | Lateral Occipital Cortex, superior division, Lateral Occipital Cortex, inferior division, Angular Gyrus |

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.