Introduction

Obsessive-compulsive disorder (OCD) is a chronic and debilitating psychiatric disorder in which recurrent, intrusive and unwanted images, thoughts, or compulsions cause distress and significantly impair the quality of life. Deep brain stimulation (DBS) of the subthalamic nucleus (STN) has been shown to alleviate OCD symptoms by altering the activity of the STN.

Methods

The action selection mechanism utilized in the model, based on a cornering model of the CBG, operates under the principles of connection analysis, an abstract model for modeling dynamic activity in non-linear systems. Locally projected dynamical systems (LPDS) were used to achieve continuous selection of discrete actions. The model was validated through computer simulations.

Results

ORDER: CONTROL, DBS 1, DBS 2, OCD in Four Quarters

Discussion & Conclusions

We found that the OCD channel tended to have a higher selection contrast, STN activity is reduced, and disinhibits the STN, and the DBS stimulation increased STN activity. Essentially, the OCD channel, on average, was clearly disinhibited in the gPi model, while the gPi model showed an overall increase in STN activity. The STN model, on the other hand, showed a decrease in STN activity. The higher selection contrast in the OCD channel indicates that the DBS stimulation is more effective in reducing OCD symptoms compared to the control condition.

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