

A Model of Working Memory in Schizophrenia

Brandon Abbs

Harvard Medical School, Department of Psychiatry Brigham and Women's Hospital, Department of Medicine and Connors Center for Women's Health and Gender Biology

Abstract: Working memory deficits in schizophrenia are key cognitive features of the disorder and have been demonstrated to involve a circuit of brain regions. Here we model this circuitry with a connectionist model representing 3 key processing areas of the circuitry: anterior cingulate gyrus (ACG), dorsal lateral prefrontal cortex (DLPFC), and parietal cortex. The model adapts to a stream of unique inputs and responds when it detects novel matches to either a set target or previously-viewed items held in memory, depending on the working memory load. We show how ACG and DLPFC are involved in maintenance and novelty detection using working memory, and relate the dysfunction of these areas in schizophrenia to the operation of the model. The model demonstrates how the impairment of both response selection and working memory maintenance can affect performance and how brain imaging may help to identify the dissociable impairment predicted by the model.