DOMAIN-GENERAL AND DOMAIN-SPECIFIC BRAIN ACTIVATIONS

AND NETWORKS IN VISUAL AND AUDITORY WORKING MEMORY

Dawei Li

Dr. Nelson Cowan, Dissertation Supervisor

ABSTRACT

Working memory (WM) is a latent cognitive structure that involves active maintenance and manipulation of information for a short time. How items are stored in WM is an important issue that remains controversial. Whereas some researchers hold that different domains recruit different WM storage systems (*domain-specific* account), some other researchers argue that items of different domains share the same WM storage system (*domain-general* account). In this dissertation, three fMRI studies were conducted to resolve the domain-specific vs domain-general argument. In the first two studies, I used multi-voxel pattern analysis (MVPA) and constrained principal component analysis (CPCA), respectively, to analyze a visual and auditory WM data set. The results showed that a region in the left anterior intraparietal sulcus belongs to a neural network sensitive to both visual and auditory WM loads during WM maintenance, which supports the domain-general account. In the third study, brain activations during a WM task of nonverbal sounds were investigated. The results showed that the left anterior IPS was no longer sensitive to WM load, suggesting that the domain-general neural network might store only categorical information. In sum, this dissertation supports the domain-general account of WM storage, with the constraint that the domain-general system stores only categorical information.