

Dissociable systems for recognizing places and navigating through them: neuropsychological and developmental evidence

Frederik Kamps

MIT, Cambridge, Massachusetts, United States

Samaher Radwan

Stanford University, Stanford, California, United States

Stephanie Wahab

Augusta University, Augusta, Georgia, United States

Jordan Pincus

Marcus Autism Center, Atlanta, Georgia, United States

Daniel Dilks

Emory University, Atlanta, Georgia, United States

Abstract

Recent neuroimaging evidence suggests that scene processing depends on dissociable systems for visually-guided navigation (including the occipital place area, OPA) and scene categorization (including the parahippocampal place area). If these systems are truly dissociable, then it should be possible to find cases in which one system is impaired, while the other is spared. Further, if dissociable, then these systems may develop independently. Here we tested visually-guided navigation and scene categorization abilities in 36 adults with Williams syndrome (WS) a developmental disorder involving cortical thinning in and around the OPA as well as 82 typically developing 4-8 year old children. We found that i) WS adults are impaired in visually-guided navigation, but not scene categorization, relative to mental-age matched children; and ii) visually-guided navigation matures later in typical development than scene categorization. These findings provide neuropsychological and developmental evidence for dissociable scene processing systems for recognizing places and navigating through them.