

Abstract

FRONTAL NEURAL CORRELATES OF WORKING MEMORY DECLINE IN HAZARDOUS DRINKERS LIVING WITH HIV

V. E. Bryant, A. J. Woods, E. W. Porges, R. L. Cook, C. W. Kahler, A. O'Shea, Peter Monti, K. Tashima, R. A. Cohen,

Department of Aging and Geriatric Research, Gainesville, Florida, USA 32607; Department of Epidemiology, Gainesville, Florida, USA 3260; Department of Behavioral and Social Sciences, Providence, RI, USA 02912; The Miriam Hospital, Department of Medicine, Providence, RI USA 02912

Background: The basic role of working memory (WM) has been defined as a form of memory that supports the temporary storage, maintenance, and manipulations of internal representations. WM abilities may be critical measures of frontal brain function, which are critically affected by drinking behavior in this population.

Purpose: To examine volumetric differences among four specific brain regions in each hemisphere, specifically: 1) Which frontal gray matter region(s) were associated with working memory and 2) Among significant region(s) whether working memory remained a significant predictor of frontal structure(s), when controlling for covariates 3) whether hazardous drinking interacts with working memory as a predictor of frontal structure(s).

Methods: The sample included 66 people living with HIV from the Providence, RI area. Gray matter volume data was extracted from 3T high-resolution structural MRIs and analyzed using FreeSurfer standard regions of interest. Working memory was measured by the Letter Number Sequencing task. Alcohol Use Disorder (AUD) classification was determined using the AUDIT. Analyses were conducted using Multiple Linear Regression and Analysis of Covariance.

Results: Among the frontal regions examined, the left superior frontal gyrus (LSFG) was the only region that significantly predicted working memory function [Beta = .204, B = .190, SE = .091, $p = .039$, $r^2 = .191$]. Working memory became non-significant, while controlling for covariates. Though, when dichotomized into high vs. low WM, examination using ANCOVA revealed a significant main effect of WM on LSFG volume [$F(6,50) = 5.6$, $p = .022$, partial $\eta^2 = .101$, $r^2 = .756$]. The interaction between never having a history of AUD versus ever having a history of an AUD by high vs. low working memory function, significantly predicted LSFG volume [$F(6,50) = 4.907$, partial $\eta^2 = .089$, $p = .031$].

Conclusions: LSFG volume was a significant predictor of working memory function. The results of the interaction suggest that never having a history of an AUD, along with high working memory function was related to significantly larger LSFG volume relative to having a history of AUD and any level of working memory function. Individuals with impaired working memory should be targeted for risk reduction interventions.