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Additive Genetic and Interactive Effects on Alcohol Problems and Traumatic Experiences Among African Americans

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Alcohol use disorder (AUD) is a complex disease that is associated with stress and trauma. Alcohol use is genetically influenced as shown by both twin and genome-wide association studies for alcohol consumption and AUD. Moreover, post-traumatic stress disorder (PTSD) and its symptom cluster like re-experiencing, avoidance, and hyperarousal, have been linked to problematic alcohol use.

Evidence suggests that PTSD, alcohol consumption, and AUD are genetically correlated, but no study has yet examined the robust predictive utility of PTSD and AUD genetic scores. We examined the genetic effects of AUDIT-C, AUD, PTSD, PTSD hyperarousal, and PTSD re-experiencing polygenic scores (PGSs) and their interaction with lifetime trauma on AUD and alcohol consumption in African Americans. Data (n=2,039) are from the Grady Trauma Project. PGSs were derived from African ancestry Million Veteran Program summary statistics using PRS-CS methods. AUDIT symptoms were separated into alcohol problems and consumption sub-scores. Lifetime trauma was assessed using the Traumatic Events Inventory. Multiple regression models were run to assess PGS and interaction effects while controlling age, sex, education, employment, income, and genetic principal components. We found that higher PGS scores were associated with higher alcohol problems (standardized betas ranged from 0.046 to 0.099), but not alcohol consumption. However, there was an interaction between PGS-AUD x TEI (B=0.12, p=0.019) for alcohol consumption.

Additionally, polygenic effects for hyperarousal and AUD were moderated by experiences of adult trauma (PGS-AUD x TE (B=0.17, p=0.002) and PGS-Hyper x TEI (B=0.11, p=0.049)) in relation to alcohol problems.