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Examining polygenic risk score by environment interaction on the relationship between interpersonal violence exposure and alcohol use in an ancestrally diverse college cohort

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Large-scale genetic studies have identified variants associated with alcohol phenotypes, with recent research detecting ancestry-specific variants in addition to those shared across ancestries. Growing evidence suggests the importance of the interaction between genetic and environmental factors on alcohol outcomes. This project aimed to detail relationships between polygenic risk for alcohol consumption, interpersonal violence (IPV), and alcohol consumption in Spit for Science (n = 12,358) an ancestrally diverse, college-aged cohort with longitudinal assessments. Three measures of IPV (physical assault, sexual assault, and unwanted sexual experiences) were combined into a single dichotomous variable indexing whether a participant had ever experienced IPV prior to college. Alcohol consumption (ethanol per grams typically consumed) was measured at multiple points throughout college and the maximum value was selected. A cross-ancestry polygenic risk score (PRS) for alcohol consumption was constructed using PRS-CSx and included African and European ancestry summary statistics from the Million Veterans Program (MVP). Of the participants who drank (n = 6,946), 27% of males and 38% of females had experienced IPV. Pre-college IPV was associated with higher alcohol consumption ($p = 1.46 \times 10^{-9}$), with stronger effects found in women (r-squared = 0.001 [males] and 0.008 [females]). Ancestry-stratified analyses found that the addition of the PRS improved model prediction in participants of European ancestry only ($p = 0.004$; r-squared = 0.050). No PRS by IPV exposure interaction was identified ($p = 0.225$). Future analyses will focus on developing a more ancestrally inclusive PRS and expand into other alcohol-related outcomes, including alcohol use disorder.