

Sex-Specific Associations of Alcohol and Cannabis Co-use with Cognitive Function

Introduction

Alcohol and cannabis co-use – whether concurrent (on separate occasions) or simultaneous (at the same time) – is a common pattern of polysubstance misuse.

While previous studies from our group and others have linked alcohol and cannabis use to impairments in various domains of cognitive functioning, the effects of their co-use on cognition remain poorly understood.

The purpose of this study was to examine the impact of combined alcohol and cannabis use and hazardous use on cognitive function.

Hypothesis: alcohol and cannabis co-users exhibit a worse cognitive function compared to non-users, alcohol-only users, and cannabis-only users.

Methods

Participants (n=55) were HIV-negative individuals enrolled in the observational, longitudinal New Orleans Alcohol Use in HIV (NOAH) Study.

Substance use measures

- Phosphatidylethanol (PEth) ≥ 8 ng/mL in the blood samples indicated positive alcohol consumption in the past 2 – 4 weeks.
- The Addiction Severity Index (ASI) evaluated cannabis use by measuring the frequency of use in the past 30 days and the duration of lifetime use in years.

Hazardous drinking patterns in the past 12 months

- ≥ 8 points on Alcohol Use Disorder Identification Test (AUDIT) suggested potentially risky alcohol consumption and an increasing risk of Alcohol Use Disorder (AUD) development.
- Cannabis Use Disorder Identification Test – Revised (CUDIT-R) was used to identify hazardous use (≥ 8 points) or high risk of Cannabis Use Disorder (CUB) (≥ 12 points).

Cognitive function

- The Montreal Cognitive Assessment (MoCA) evaluated 6 domains of cognition: attention, memory, executive function, language, visuospatial skills, and orientation.

Substance Use Prevalence

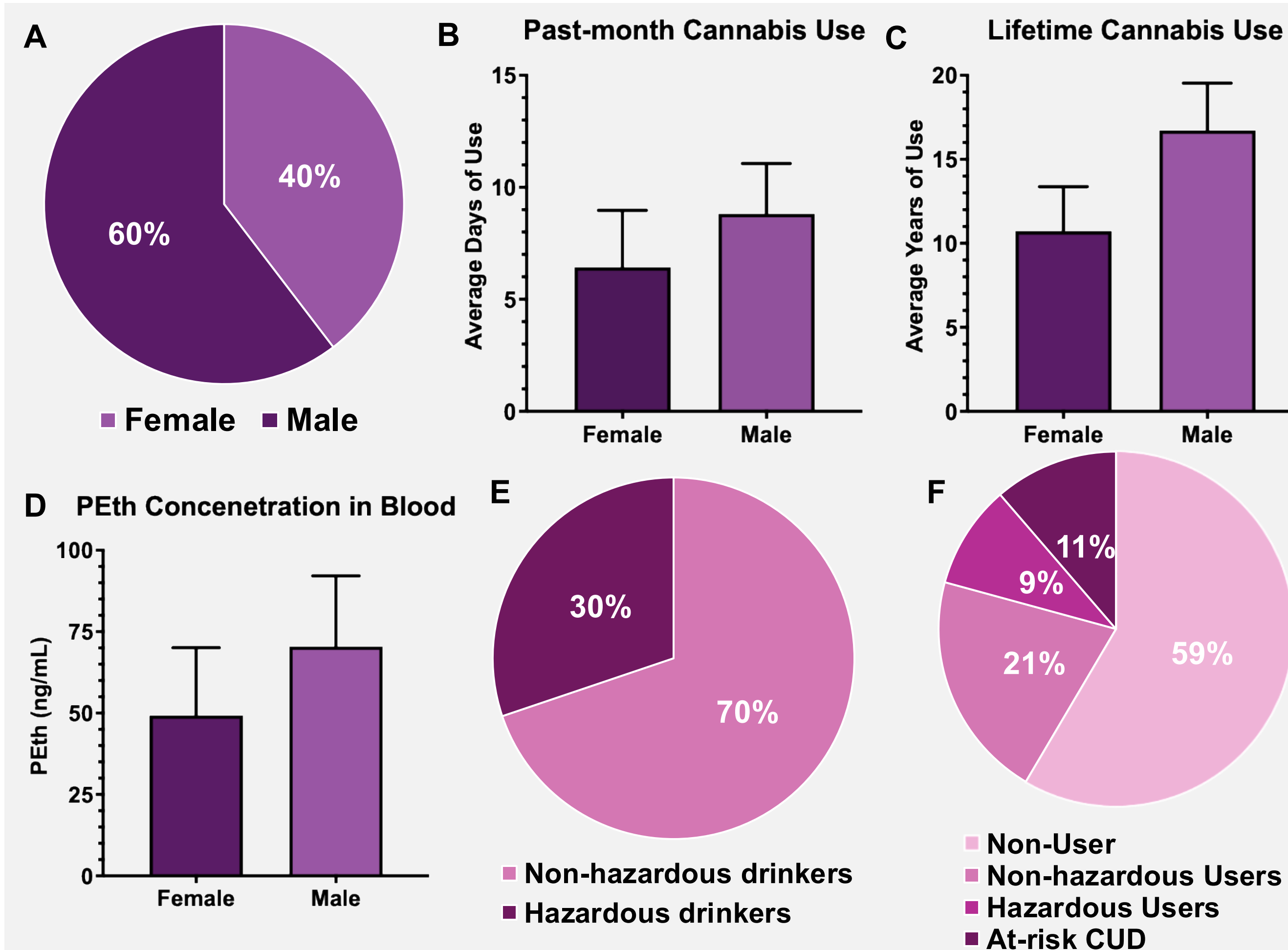


Figure 1. Substance use prevalence in research participants. (A) Participant (n=53) included 21 females and 32 males. (B-C) ASI accessed (B) average days of cannabis use in the past 30 days and (C) average years of cannabis use in lifetime. (D) The average of PEth in females was 49.24ng/mL & in males was 70.41ng/mL. (E) AUDIT-T identified 37 non-hazardous drinkers and 16 hazardous drinkers. (F) CUDIT-R identified 31 non-users, 11 non-hazardous users, 5 hazardous users, and 6 individuals were at risk of CUD. Error bars represent SEM. Data analyzed using unpaired t-test.

Substance Use and Cognition

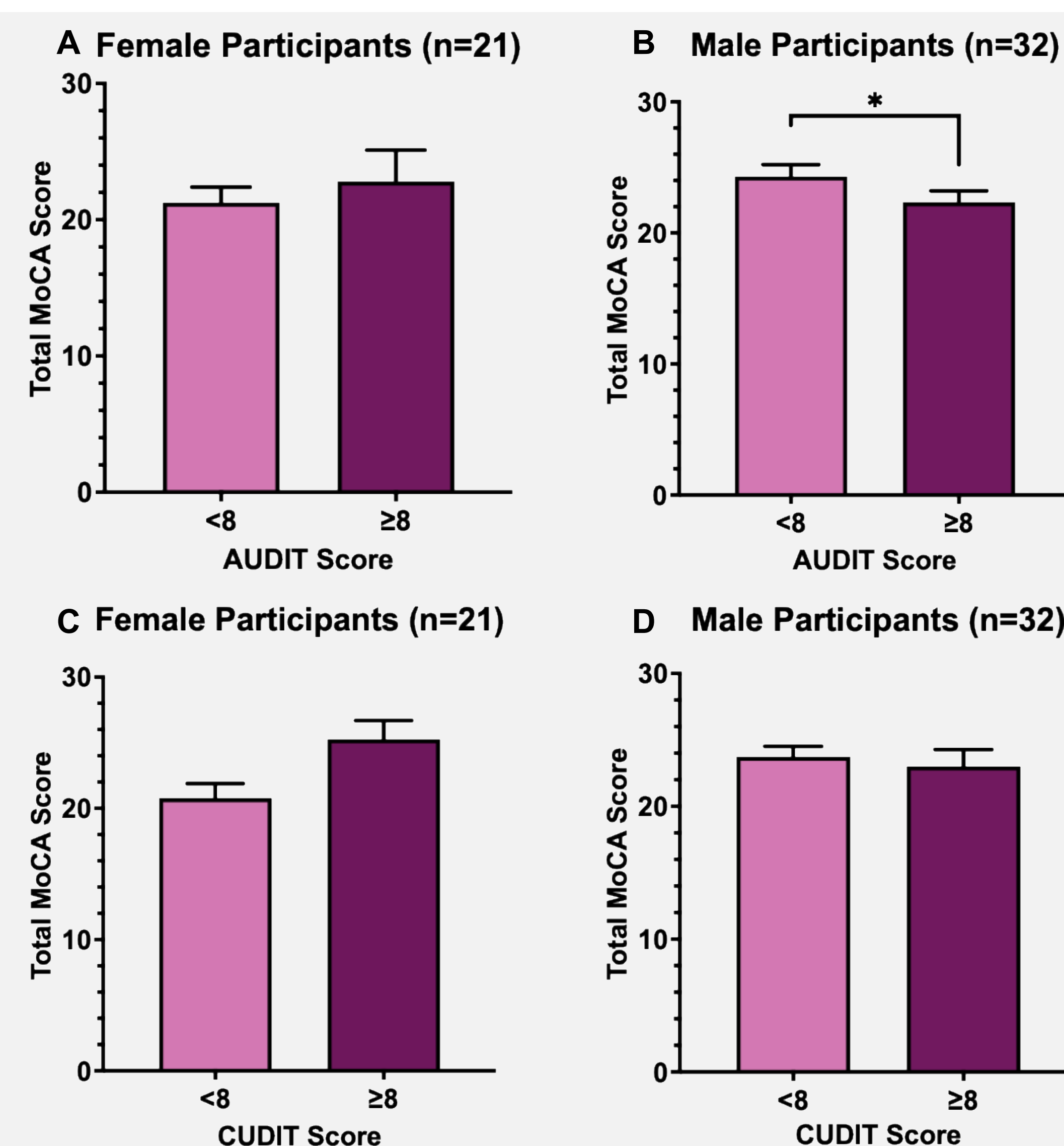


Figure 2. Substance use and cognition. (A) No significant difference in total MoCA scores between female with AUDIT scores greater or equal to 8 and female with AUDIT scores smaller than 8. (B) MoCA scores were significantly lower in male with AUDIT scores greater or equal to 8 compared with male with AUDIT scores smaller than 8 ($p = 0.0455$). (C-D) No significant difference in total MoCA scores between individuals with CUDIT scores greater or equal to 8 and individuals with CUDIT scores smaller than 8 in both female and male participants. Error bars represent SEM. Data analyzed using unpaired t-test.

Co-use and Cognition

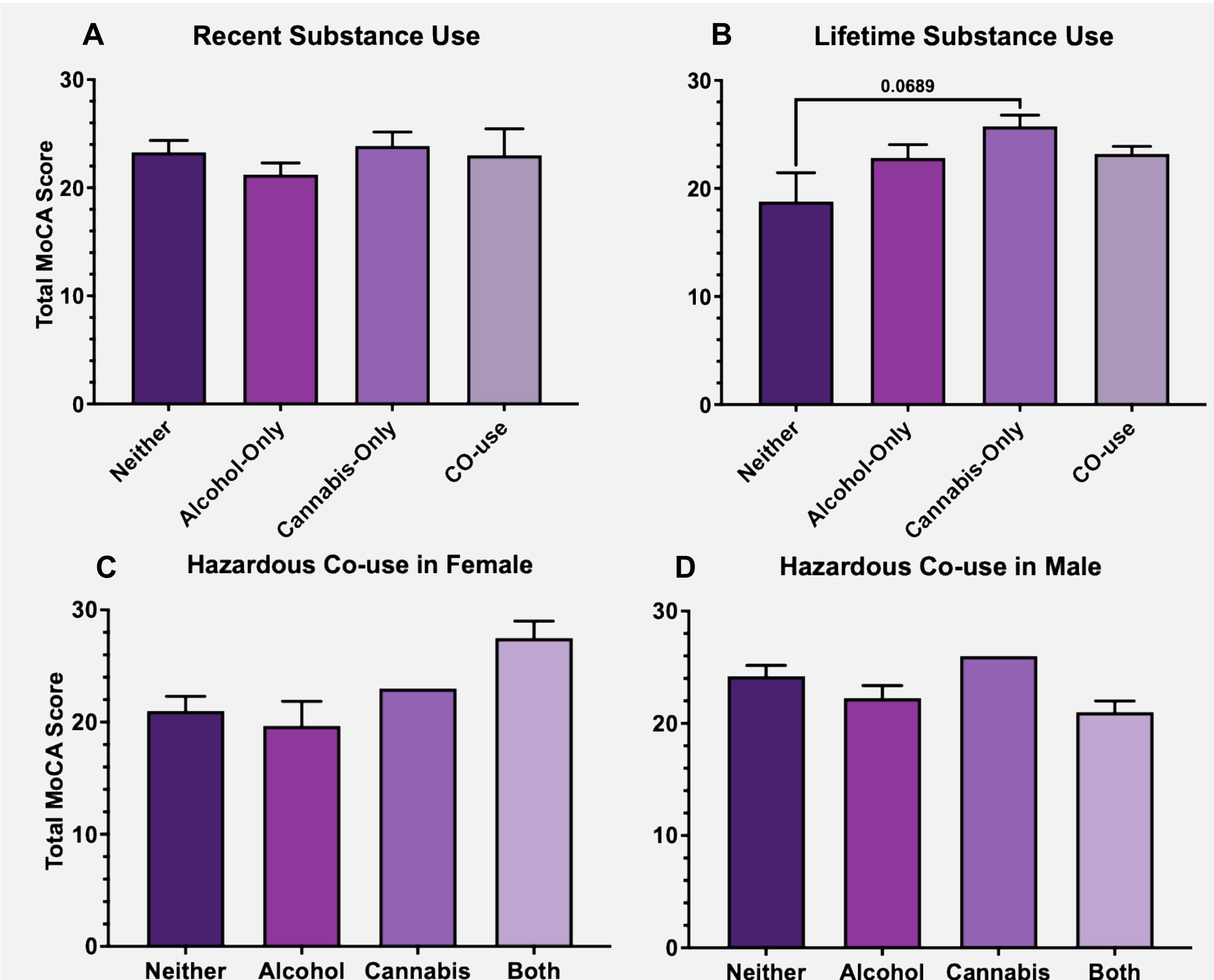
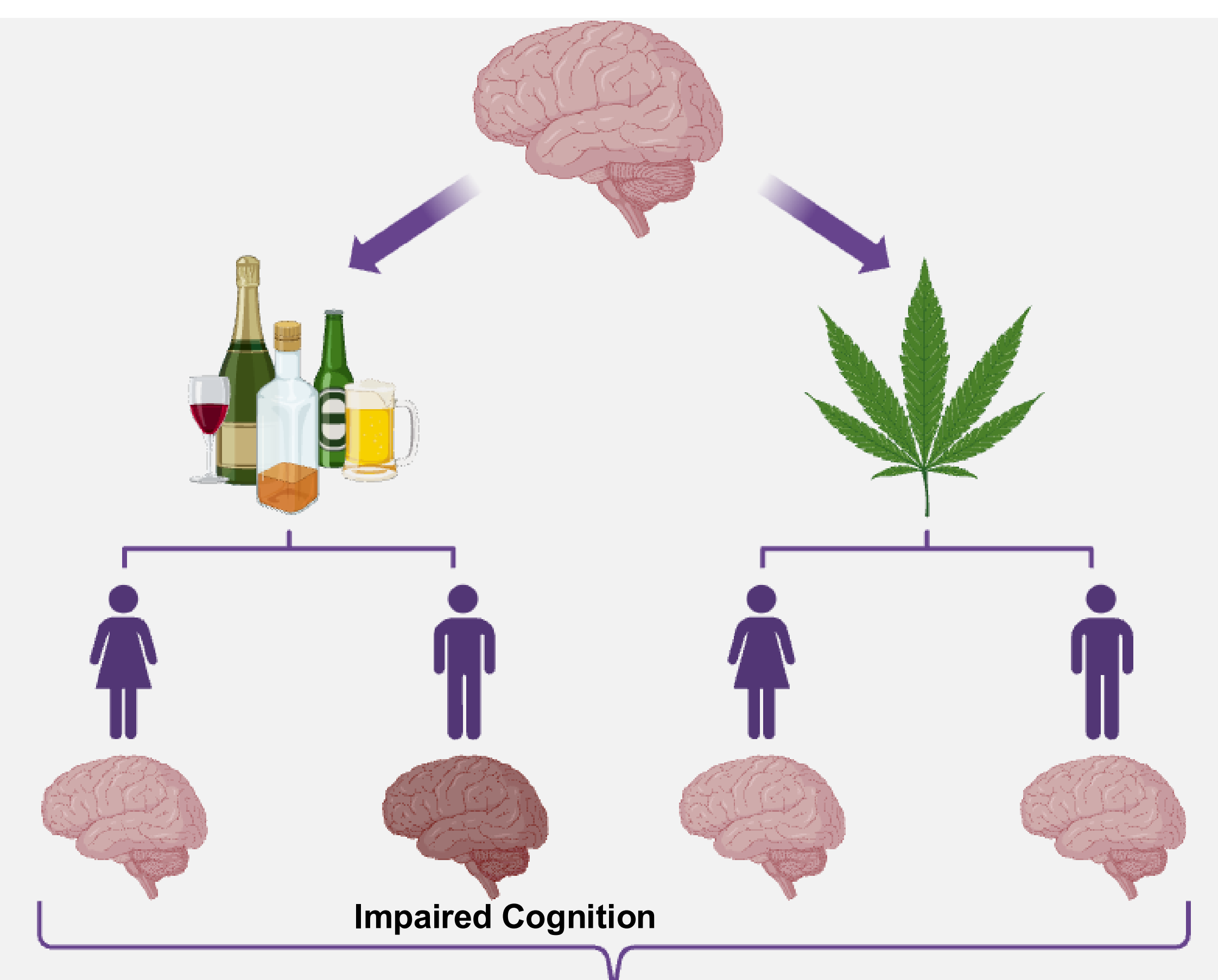


Figure 3. Alcohol Cannabis (AC) co-use and cognition. (A) Recent substance use was determined by past-30-day cannabis use (ASI) and PEth concentration. MoCA scores were not significantly different between neither users, alcohol-only users, cannabis-only users, and AC co-users. (B) Lifetime substance use was determined by lifetime cannabis use (ASI) and years of regular drinking (> 0 years). Alcohol-only users trended toward significantly higher MoCA scores compared with neither users ($p = 0.0689$). (C-D) Hazardous co-use was evaluated by AUDIT-C and CUDIT-R. MoCA scores were not significant between hazardous users in neither substance, individuals at risk of hazardous alcohol use, individuals at risk of hazardous cannabis use, and hazardous users in both substances in female (C) and male (D). Error bars represent SEM. Data analyzed using one-way ANOVA.

Conclusion



Females with co-occurring hazardous use showed a non-significant trend toward higher MoCA scores compared to non-users, alcohol-only users, and cannabis-only users.