

# Individuals with panic disorder have higher rates of alcohol and tobacco use problems. The relationship among panic disorder and alcohol use problems was greater among males as compared with females.

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## Highlights

- Having a diagnosis of panic disorder (PD) is associated with increased risk for alcohol use problems and tobacco use problems.
- The association of panic disorder and alcohol use problems was greater among males as compared with females.
- No differences in the association of panic disorder and alcohol or tobacco use problems were observed as a function of race/ethnicity.

## Methods

- We used screener questions to assess if individuals had presumed PD, PTSD, AUD, and TUD
- We excluded anyone with SCZ or Bipolar diagnoses
- Chi-squared and independent t-test were used to look at associations between PD and demographic variables
- Linear regression was then used to examine the association of probable PD with alcohol use problem sum scores, tobacco use problems sum scores, and PTSD
- Interaction terms for sex, self-reported race, and presumed PTSD were tested to determine if the association of presumed PD and substance use problems differed among males and females and those of EA and AA, and comorbid PTSD in the GPC

## Abstract

Higher rates of alcohol and tobacco use problems have been observed among individuals with anxiety disorders such as panic disorder (PD). Despite prior research indicating important sex and race differences in substance use problems (SUD) and PD independently, no previous study has examined the associations of these commonly occurring problems by sex and race. This study examines reported rates of alcohol and tobacco use problems and their association with presumed panic disorder in 10,953 individuals drawn from the Genomic Psychiatry Cohort (GPC), comprising 56% of women and 44% of men, and 55% of individuals of European-Caucasian Ancestry (EA) and 45% of African Ancestry (AA). Due to the large sample size of AA individuals, our study is novel in that the EA:AA ratio is nearly 1:1. Using alcohol (AUD) and tobacco use disorder (TUD) screening items and PD screening items, we examined the main effects of PD on alcohol and tobacco use problems and the moderating influence of sex and race. Our findings demonstrate that individuals who endorsed PD screening items (n=342) are at increased risk for alcohol and tobacco use problems. Female gender was associated with a decreased risk for alcohol and tobacco use problems as compared to males and screening positive for PTSD was associated with increased risk for alcohol and tobacco use problems. Associations between PD with alcohol and tobacco use problem scores remained significant after adjustment for age, sex, race and PTSD. The influence of PD on alcohol use problems is greater among males as compared with females. There was no difference in alcohol use problems in relation

## Background

PD often starts in late teens to early adulthood. According to the National Comorbidity Survey (NCS-R), the prevalence is around 4.7% of adults at some time in their lives. It is more prevalent in women (4.7%) than in men (1.6%). It was also seen to afflict more White Americans (4.8%) than their Black counterparts (3.5%) in the NCS-R. There are also many other comorbid psychiatric conditions including SUD. In terms of the general public's tobacco use, men smoke more compared to their female counterparts. But in PD, TUD is highly comorbid and appears to be more prevalent in women than men. There have been a dearth of studies to determine if race has any implications in this association. In terms of the hypothesis of the TUD and PD comorbidity association, there are three notable hypotheses. Firstly, smoking may cause impaired respiration and increased vulnerability for panic attacks (PA) and through expected calming effects of nicotine. Secondly, stimulant properties of nicotine may reduce the threshold for experiencing PA. Thirdly, this association may be moderated by other variables such as anxiety sensitivity, a risk factor for PD development. Another notable comorbidity is PD and AUD. There are two major hypotheses for this association. The first one is the self-medication or tension-reduction theory. The second hypothesis includes physiological and/or environmental stressors from chronic alcohol use creating situations or circumstances in which anxiety symptoms are more likely to emerge or worsen. Past dataset of NESARC and NES data had similar results and showed an increase in AUD use in both PD males and PD females over the ten years, though men still remained higher than women in both timeframes (2001-2002 and 2012-2013): PD males (12.4% to 16.7%) and PD females (4.9% to 9.0%). However, it appears that in two separate studies looking at sex differences of individuals with PD and alcohol use disorder and dependence, women tend to have alcohol use problems comparably to men. In terms of race in PD, Whites generally have a higher prevalence of PD compared to their Black counterparts; however, Blacks showed higher rates of comorbid AUD and PD (with or without agoraphobia) in the most recent NESARC survey. Along the lines of comorbidity, PD and PTSD have a comorbidity rate of 8% to 37% dependent on the study and dependent on whether PD or PTSD were considered primary diagnoses. Both individually have high rates of SUD. Lastly, PTSD have high rates of TUD and AUD.

## Research Questions

1. Do individuals with panic disorder have higher rates of alcohol and tobacco use problems? And how does our data compare to previous studies?
2. Do associations between panic disorder and risk for substance use problems differ among men and women?
3. Do associations between panic disorder and risk for substance use problems differ among individuals who self-identify as African American and European American?

## Results

Table 1. Controls with and without PD

	Panic Disorder (PD) N=342 (%)	No Panic Disorder (noPD) N=10,611 (%)	Significance Difference (p-value)
Female Sex (N, %)	198 (57.9)	5,942 (56.0)	0.488
Male Sex (N, %)	144 (42.1)	4,668 (44.0)	(reference group)
Age (mean, SD)	43.75 (14.789)	42.22 (15.368)	0.069
African American	152 (44.4)	4,763 (44.9)	0.871
European American	190 (55.6)	5,848 (55.1)	(reference group)
PTSD screen positive	103 (30.1)	556 (5.2)	< 0.05

Table 2. The Association of Panic Disorder with Alcohol Use and Tobacco Use Problems and Interactions with Sex and Race

	Alcohol Use Problems		Tobacco Use Problems	
	Effect size (beta)	p-value	Effect size (beta)	p-value
Main Effects				
Panic Disorder**	1.411	<0.05	0.556	<0.05
Interactions				
PD x female sex**	-.974	<0.05	-.355	.083
PD x AA	.017	.918	.125	.594
PD x sex x AA	-.202	.339	.347	.257
PD x PTSD	-.101	.402	-.323	.064

\*\*Significant p<0.05

Figure 2: Alcohol and tobacco use problems\* are higher amongst individuals with PD

As seen in this figure, individuals with PD had higher sum score of alcohol use risk and tobacco use risk sum scores.

\*We utilized screener questions that were based on the DSM-V criteria for AUD and TUD. If an individual endorsed many symptoms, this is represented as a high alcohol and tobacco use scores.

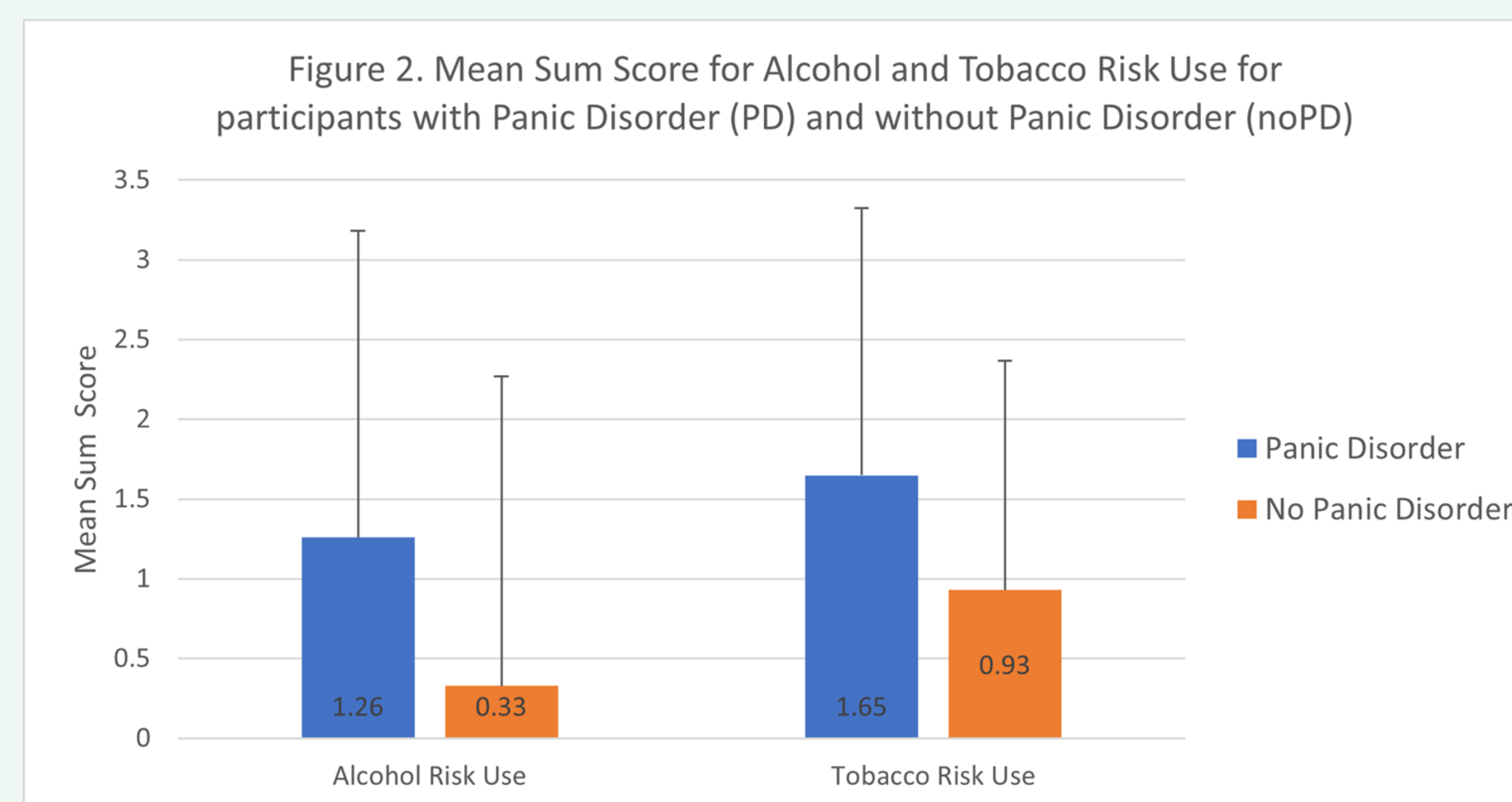
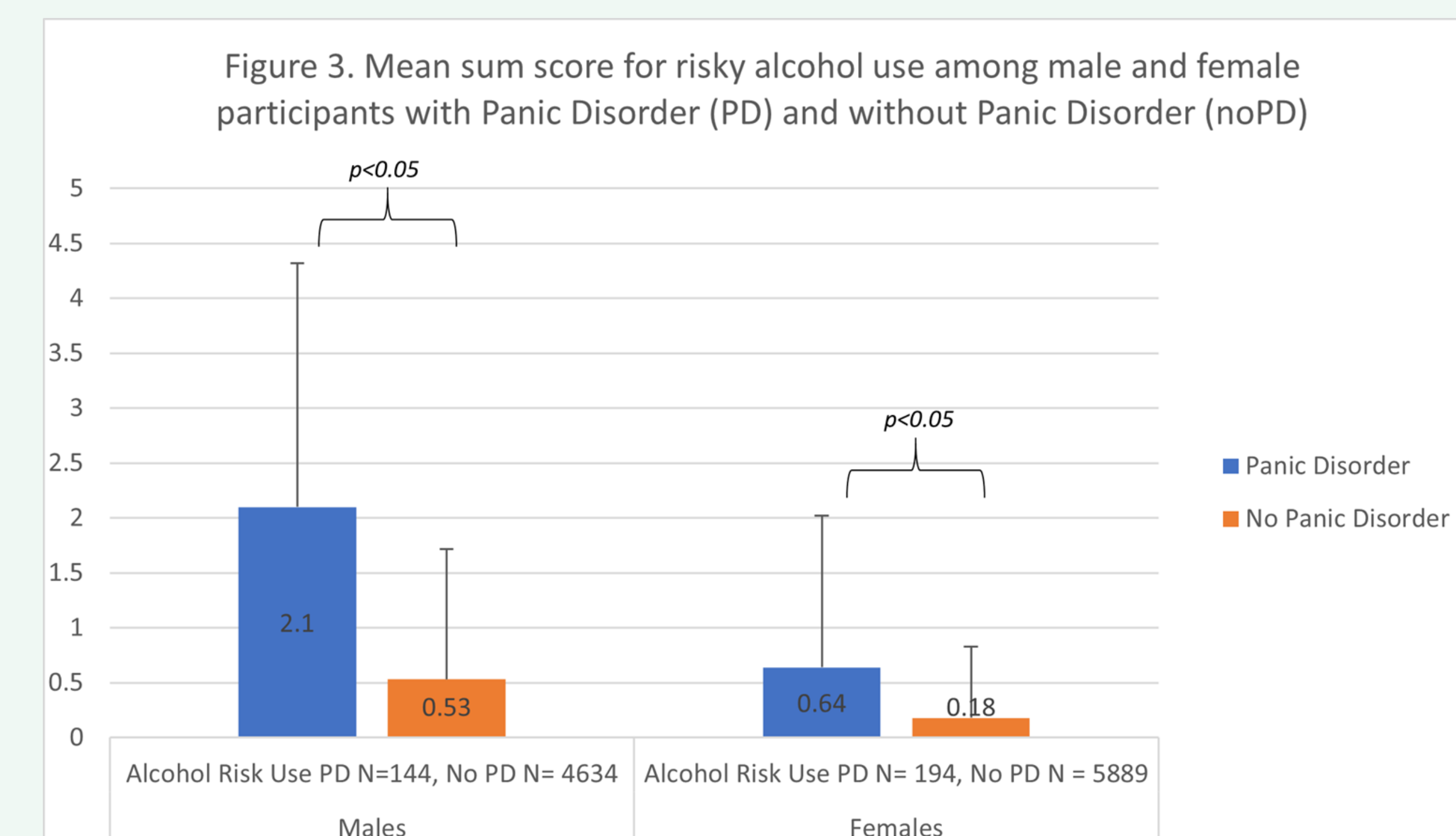


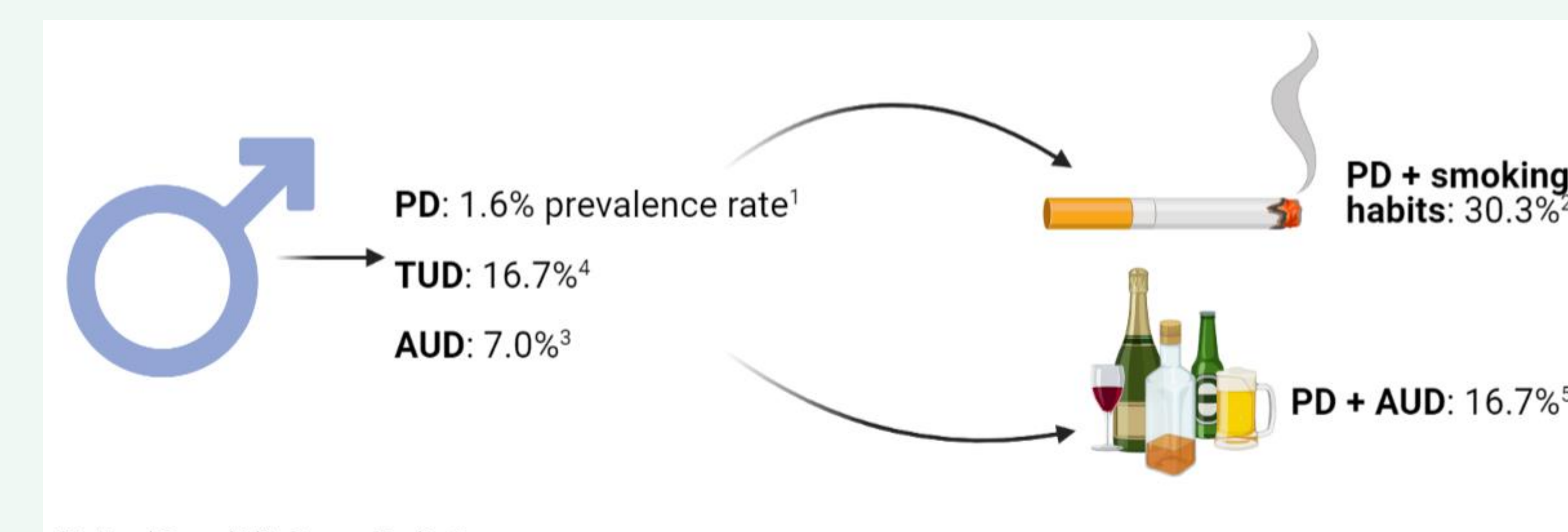
Figure 3: Males with PD have higher rates of risky alcohol use† comparably to their female counterparts with PD

As seen in this figure, alcohol risk use was higher in males with PD compared to females with PD. Tobacco risk use was not significant. Race also had no moderating effect on alcohol or tobacco use problems.

†We utilized screener questions that were based off the DSM-V criteria for AUD. If an individual endorsed many symptoms, this noted a high-risk use score; thus, a high-risk score would mean high risk of misuse or risky use.



## Sex Differences in PD, TUD, AUD, PD-TUD, and PD-AUD



<sup>1</sup>National Comorbidity Survey - Replication  
<sup>2</sup>Fohi et al. 1992  
<sup>3</sup>SAMHSA, 2020  
<sup>4</sup>NIDA, 2020  
<sup>5</sup>SAMHSA, 1999