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Examining the Relationship between GABRA2 & Alcohol Drinking Frequency

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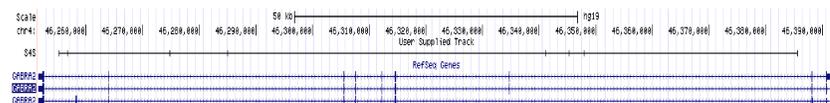
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ABSTRACT

Past research has shown that an individual's level of alcohol use may depend on various factors, both genetic and environmental, along with the interaction between them. Several studies have found that certain variants within the *GABRA2* gene may be associated with elevated levels of alcohol use. This issue is of particular concern in college campuses, where social pressure becomes an important environmental factor. To better understand how genetic and environmental factors come together to influence substance use and emotional health, a group of students attending Virginia Commonwealth University in Richmond, VA submitted DNA samples and answered survey questions as part of the Spit for Science research project. The cohort entered college in the fall of 2011 and took follow-up surveys during the spring of their freshman and sophomore years. A total of one thousand and four participants who reported that they have previously consumed alcohol were asked about the frequency of their alcohol use. Regression analysis was used to examine associations between *GABRA2* genotype, peer deviance, and alcohol consumption. We hypothesized that high levels of peer deviance and specific variants within *GABRA2* correspond to increased levels of alcohol use. The conclusions of this study can be used to create specific techniques for decreasing alcohol abuse among college students and lead to better understanding of how to create effective treatment and prevention strategies.

INTRODUCTION

Figure 1. Evaluated *GABRA2* SNPs



Name	Position
rs3113346	46255176
rs3822051	46256712
rs2439209	46274771
rs558111	46284923
rs17537359	46341106
rs4695148	46345219
rs116039536	46347931
rs16859354	46385578

Recent research has indicated associations between alcohol consumption and single nucleotide polymorphisms (SNPs) in the *GABRA2* gene.^{1,2} The primary objective of this project was to test SNPs in *GABRA2* for association with alcohol drinking frequency. We also tested for moderation of this relationship as a function of peer deviance. Despite past studies addressing this topic, there has been very little research on the association between *GABRA2* and alcohol use phenotypes in college-aged persons transitioning to adulthood.³ It was hypothesized that specific variants in the *GABRA2* gene would be associated with alcohol use frequency, and this relationship would be moderated by peer deviance.

METHODS

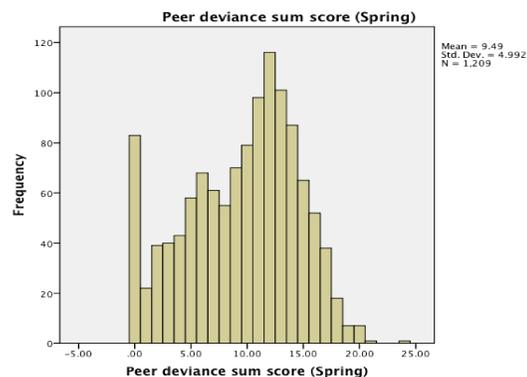
The Spit for Science freshman 2011 cohort (Total N=1004, Effective N=786) completed online surveys and provided saliva samples for DNA collection. Participants who previously drank alcohol were asked about the frequency of alcohol use ("How often do you have a drink containing alcohol?") with response options of: "never", "monthly or less", "2 to 4 times a month", "2 to 3 times a week", and "4 or more times a week." Participants were also asked to rate the level of specific peer deviation behaviors ("How many of your friends have ever done the following: smoked cigarettes, got drunk, had problems with alcohol, drunk alcohol, been in trouble with the law, or smoked marijuana?") with response options of "none", "a few", "some", "most", and "all." Peer deviance sum scores were computed these items. DNA samples were genotypes on Axiom Biobank Arrays and genotypes of 8 *GABRA2* SNPs were examined. Linear regression was used to test for association and moderation. Covariates included sex, age, and ethnicity.

RESULTS

Figure 3. Alcohol Drinking Frequency Distribution



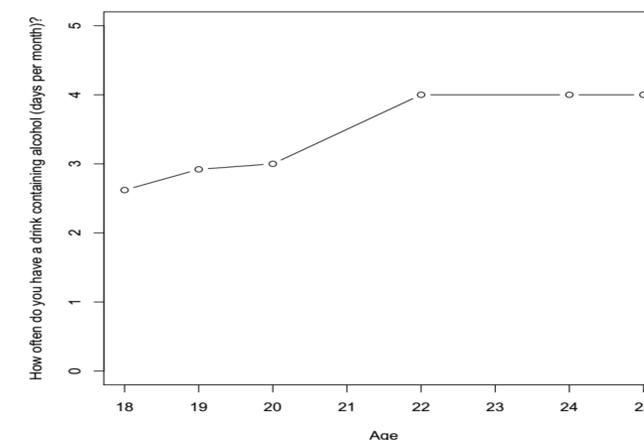
Figure 4. Peer Deviance Sum Score Distribution



- ❖ *GABRA2* variants were not associated with alcohol drinking frequency.
- ❖ The relationship between *GABRA2* and alcohol use frequency was not moderated by peer deviance.

RESULTS, CONT.

Figure 5: Alcohol use and age



A significant association between age and alcohol frequency was found. As age increases, alcohol drinking frequency also increases.

CONCLUSIONS

- ❖ *GABRA2* was not significantly associated with alcohol use frequency, and there was no evidence of moderation by peer deviance.
- ❖ Further research may improve drug and alcohol prevention and treatment on college campuses. Existing programs can be made more effective by considering the specific interactions between genotype and environment in young adults.
- ❖ A significant limitation of the study its use of only one year's cohort. This resulted in a smaller sample size.
- ❖ Future Directions
 - More cohorts (bigger sample size)
 - Older Students with more severe alcohol use outcomes
 - Longitudinal Studies

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