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GABRA2, Peer Deviance and Illicit Drug Use in College-Aged Students

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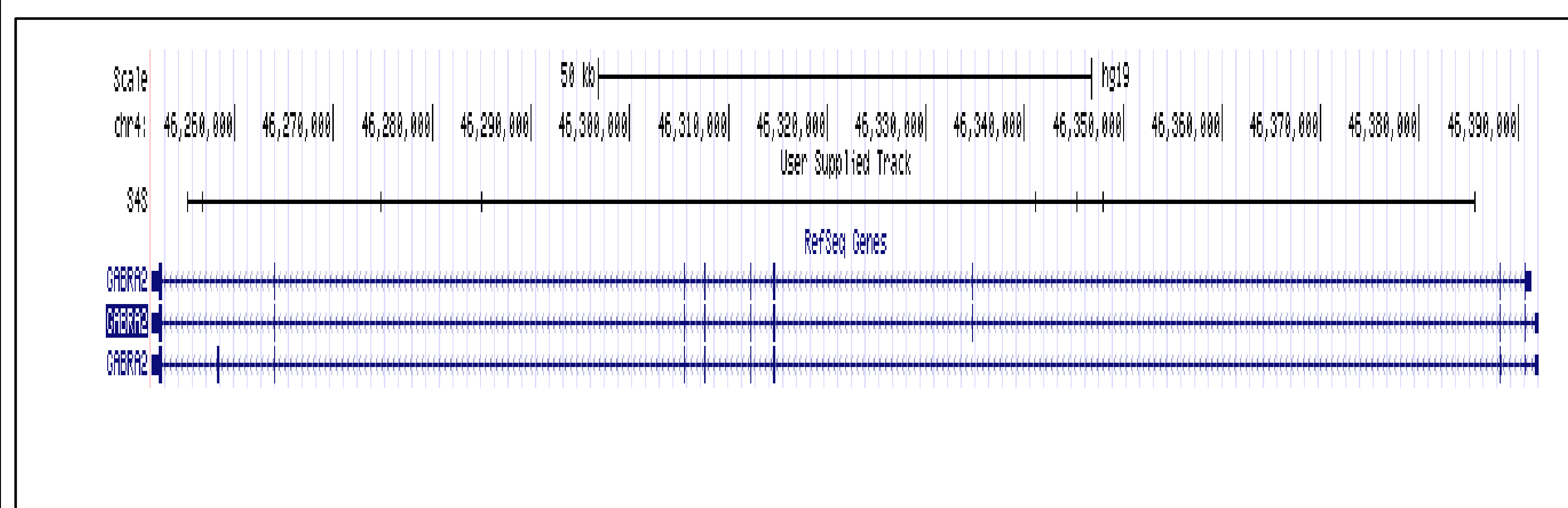
ABSTRACT

Recent studies have shown that single nucleotide polymorphisms (SNPs) in the *GABRA2* gene may influence one's susceptibility to illicit drug use. In order to determine whether an association is present in young adults, we will be performing a study within the Spit for Science research project at Virginia Commonwealth University in Richmond, Virginia. The Spit for Science project aims to understand how genetic and environmental factors come together to influence substance use and emotional health. A cohort of 1523 incoming freshman donated a saliva sample in the fall of 2011 and answered surveys regarding their use of the following categories of drugs: cannabis, sedatives, stimulants, cocaine, or opioids. Follow-up surveys were given during the spring of their freshman year and the spring of their sophomore year. Data on drug abuse was converted to a numerical score between zero and five, depending on how many of the five categories of drugs the respondent had ever tried. We will also be using survey responses to measure the moderating variable of peer deviance. The saliva samples were processed and genotyped for 8 SNPs in the *GABRA2* gene. Specific associations will be determined through use of regression analysis. It is hypothesized that the study will show an association between *GABRA2* SNPs, illicit drug use, and the additional influence of peer deviance. These findings can be used to improve strategies that aim to decrease drug use among college students and allow them to successfully recover.

INTRODUCTION

- Recent research on genetics and drug use has shown that certain variants of the *GABRA2* gene are associated with increased levels of addiction and psychiatric disorders.^{1,2}
- Studies have also shown that genetic factors may interact with environmental factors to influence alcohol and drug use.^{3,4}
- Our study is among the first to look at *GABRA2* variation and drug use in college-aged students transiting to adulthood.
- In order to study this, we will be using a combination of genetic data and survey responses to determine whether there is an association between illicit drug use and eight *GABRA2* SNPs (see Figure 1).
- We will also test to for moderation of the association between drug use and *GABRA2* as a function of peer deviance.
- Based on the findings of previous research studies, it was hypothesized that this project would find association between *GABRA2* and illicit drug use in college students. Furthermore, we hypothesized that individuals with high risk genotypes and more deviant peers would have increased illicit drug use sum scores.

Figure 1. Investigated SNPs in *GABRA2*



METHODS

The Spit for Science 2011 cohort (N=1523) was genotyped at 8 *GABRA2* SNPs were used in this analysis. Participants were asked about their level of illicit drug use through a survey question and assigned a sumscore between 0 and 5 representing the amount of drug types they have used (stimulants, sedatives, cocaine, opioids, or marijuana). Participants were also assigned a sumscore based on their responses to questions regarding peer deviance levels. Deviant behaviors included smoking cigarettes and getting in trouble with the law. Response options ranged from "none" up to "all." Each sumscore pair was matched to its corresponding genotype, and regression analysis was used to determine the presence of any associations between *GABRA2* and illicit drug use as well as moderation by peer deviance. Age, sex and ethnicity were also used as covariates in data analysis.

RESULTS

Figure 1. Illicit drug use sum score

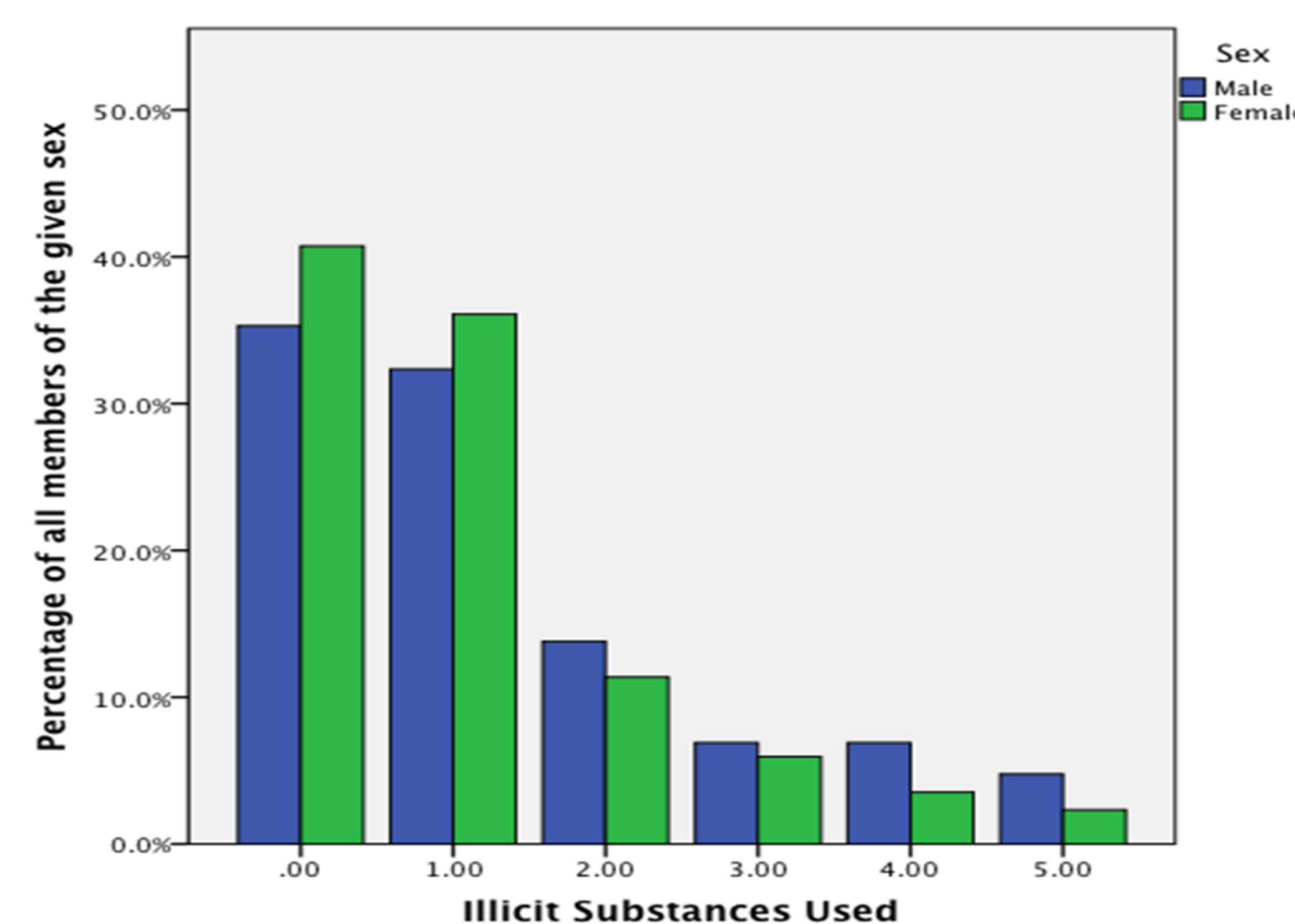
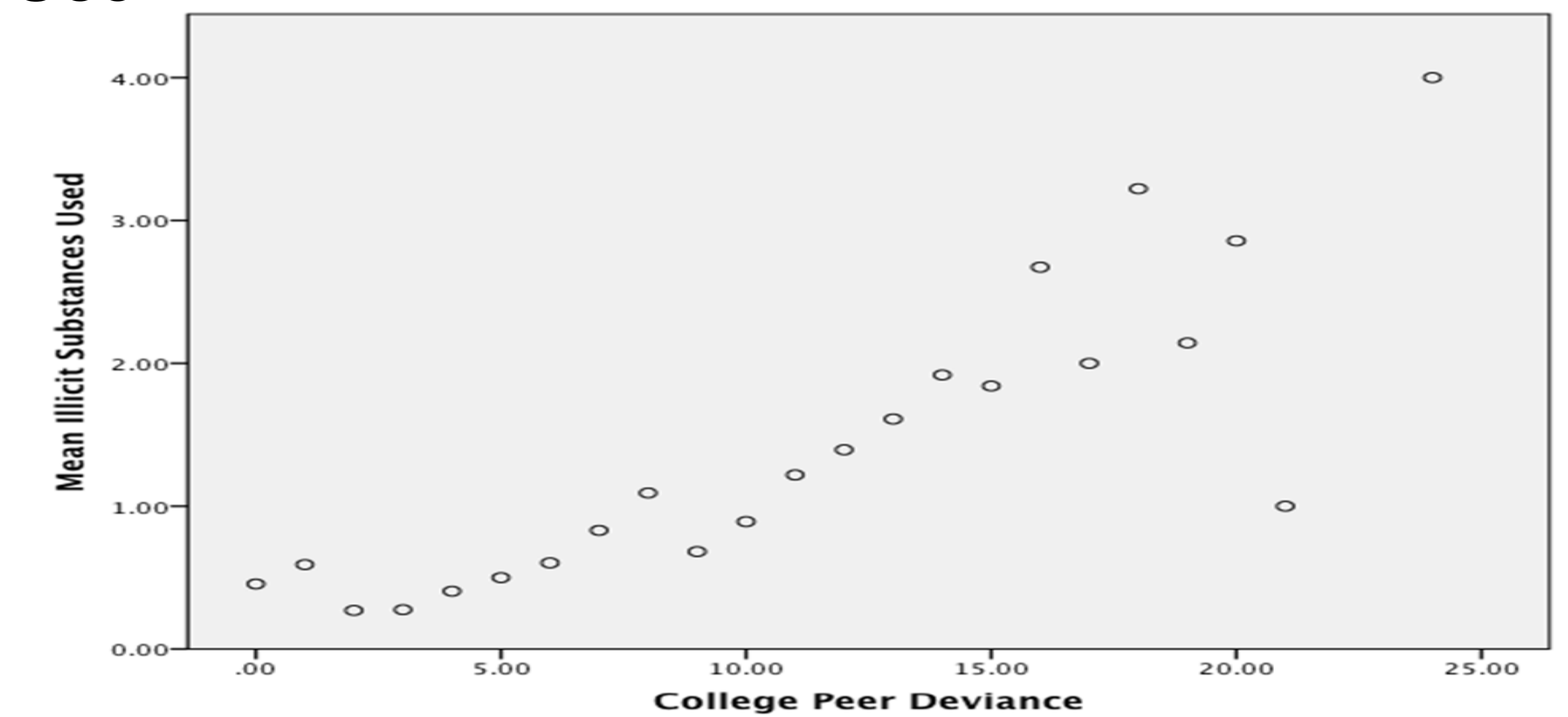


Figure 2. Illicit drug use sum score and *GABRA2* genotype

SNP	0 copies of minor allele (N)	1 copy of minor allele (N)	2 copies of minor allele (N)
rs3113346	1.282 (401)	1.131 (734)	1.042 (381)
rs3822051	1.137 (977)	1.199 (477)	0.939 (66)
rs2439209	1.089 (576)	1.160 (687)	1.237 (228)
rs558111	1.275 (396)	1.138 (727)	1.033 (393)
rs17537359	1.124 (1375)	1.341 (135)	1.6 (5)
rs4695148	1.120 (1247)	1.274 (252)	1.467 (15)
rs116039536	1.156 (1414)	0.960 (101)	1.143 (7)
rs16859354	1.2 (725)	0.967 (734)	1.025 (158)

Regression analysis failed to show a statistical association between illicit drug use *GABRA2*. Peer deviance did not moderate the association between drug use and *GABRA2*.

Figure 4. College Peer Deviance and Illicit Drug Use



Peer deviance levels were shown to have a significant association with illicit drug use. As college peer deviance increased, so too did illicit drug use.

CONCLUSIONS

- ❖ *GABRA2* variation was not associated with illicit drug use in our college-aged students.
- ❖ College peer deviance is associated with increased illicit drug use.
- ❖ One limitation was that the participants' survey responses were self-reported and subject to bias. Also, only one year's cohort was used, therefore limiting the sample size.
- ❖ Additional research can investigate the specific relationship between peer deviance and increased drug use. Possible methods include longitudinal studies and multiple cohorts.

REFERENCES

- Bauer, L.O., Covault, J., & Gelernter, J. (2012). *GABRA2* and *KIBRA* genotypes predict early relapse to substance use. *Drug and Alcohol Dependence*, 123, 154-159. doi:10.1016/j.drugalcdep.2011.11.004
- Lynskey, M., Agrawal, A., & Heath, A. (2010). Genetically informative research on adolescent substance use: methods, findings, and challenges. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49 (12), 1202-1214. doi: 10.1016/j.jaac.2010.09.004
- Enoch, M., Hodgkinson, C., Yuan, Q., Shen, P., Goldman, D., & Roy, A. (2010). The influence of *GABRA2*, childhood trauma, and their interaction on alcohol, heroin, and cocaine dependence. *Biological Psychology*, 67, 20-27. doi:10.1016/j.biopsycho.2009.08.019
- Sakai, J., Stallings, M., Crowley, T., Gelhorn, H., McQueen M., & Ehringer, M. (2010). Test of association between *GABRA2* (SNP rs279871) and adolescent conduct/alcohol use disorders utilizing a sample of clinic referred youth with serious substance and conduct problems, controls and available first degree relatives. *Drug and Alcohol Dependence*, 106, 199-203. doi:10.1016/j.drugalcdep.2009.08.015

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