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Prescription Stimulant Use

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Abstract

This study examines whether GPA affects the rate at which students use nonmedical prescription stimulants for academic purposes. A web-based survey was sent to students at a public northeastern university via email and social media. Data from 362 completed surveys were collected and analyzed using Qualtrics. A statistically significant correlation was found between my independent variable, GPA, and dependent variable, use of nonmedical prescription stimulants (p-value 0.00). Alcohol use and nonmedical stimulant use show positive, linear correlations. The study found that binge drinking and non-medical stimulant use were highly associated. The more one drinks alcohol to get drunk, the more likely they are to use nonmedical stimulants. I also found a positive linear relationship between binge drinking frequency and moral acceptance of stimulant use for academic purposes. A larger, more representative sample would provide more accurate results.

Introduction and Literature Review

This study looks at the nonmedical use of Attention Deficit Hyperactivity Disorder medications by college students at a public university in the northeastern U.S. Non-medical use describes use of a prescription stimulant (such as Adderall, Ritalin, Dexadrine, Vyvanse, and Concerta) without a prescription (Sepulveda, Thomas, McCabe, Cranford, Boyd, Teter 2014). The use of drugs has fascinated and appalled the American public for decades. College campuses across the US are seeing a steady rise in misuse of prescription drugs (Ross and DeJong 2009). In a national survey of 119 colleges, the authors found 6.9% of students had reported life-time use of a nonmedical prescription stimulant. (McCabe, Knight, Teter, Wechsler 2005). At individual universities and colleges across the country, rates of nonmedical prescription stimulant use varied from 0 to 25% (McCabe et al. 2005). Most users did not find nonmedical use morally wrong if used for academic purposes, and only 2% of these users thought that the use of these stimulants posed a “very dangerous” health risk (Desantis, Webb, and Noar 2008). This begs the question, why are these drugs so popular? The consistent increase of use over time, accompanied by the disregard

towards the dangers of use, and acceptance of illegal use is why I find studying nonmedical prescription stimulant use so interesting and important.

There has been some research conducted investigating the rise in use of prescription drugs on college campuses. DeSantis and Hane (2009) conducted in-depth interviews with a convenience sample of 175 students. The study looked at justifications made by college students for illegal use of ADHD medications. The most common and recurring justifications for use were compare-and-contrast, moderation, self-medicating, and minimization. The compare-and-contrast argument involved student's claims that they were using "good prescription stimulants" opposed to "bad street narcotics." Student's use of nonmedical stimulants was found to be strategic and infrequent. Most of those interviewed took stimulants during midterm or final exams. This infrequent use, "in moderation," is why users feel little or no anxiety concerning taking these drugs. Students often self-diagnose ADHD, and feel there is no need to see a doctor or cannot afford to get prescribed. Lastly, users viewed these drugs as having little to no harmful side effects and compared them a cup of coffee or a Coca-Cola (Desantis and Hane 2009).

A second study looked at college students' perceptions and use of nonmedical prescription stimulant use. DeSantis et al. (2008) studied 1,811 students at a southeastern US university using surveys and 175 in-depth interviews. The authors found that men, white students, members of Greek life, and upperclassmen were significantly more likely to use nonmedical ADHD medications. An overwhelming majority of users acquired their stimulants from someone they know, usually a friend with a prescription (89%). Of the 1,811 students, only 4% had a prescription for a

stimulant while 34% reported taking a stimulant. Participants were asked about reasons for using stimulants and could select multiple reasons. The most common reasons was to aid concentration (65% of participants), followed by use to help study (59.8%), and use to increase alertness (47.5%). Other reasons for use included getting high (31.0%) and experimentation (29.9%). The authors found that students showed an overall lack of knowledge towards the dangers of illegal prescription drug use. Before taking their first dose, not one of the 175 students interviewed sought out information from a doctor, pharmaceutical reference guide, or even conducted a Google search (Desantis and Hane 2009).

While non-medical use of stimulant medication is well documented, misuse and diversion of one's own prescription has minimal research. Sepulveda et al. (2011) used a web-based survey to examine diversion and substance use disorders among college students with a stimulant prescription. Out of the 1738 participants, 55 reported having a stimulant prescription. Of those, 40% reported misusing their stimulants. The most common misuses were overuse (36%) and intentional use with alcohol or other drugs (19%). Those who misuse were significantly more likely to smoke cigarettes, binge drink, use cocaine, and screen positive on the Drug Abuse Screening test. Misusers also saw their diversion rates, the transfer of prescription medications from a legally prescribed user to a non-prescribed person, increase from 36% to 57% (Sepulveda et al. 2011). These statistics show that misuse of prescription stimulants could be more dangerous for those with a prescription.

Pedersen (2014) compared the ADHD diagnosis process in America and Norway. Qualitative data was collected in the form of 100 interviews. Rates of prescription

and abuse are much lower in Norway, and when controlling for many variables the author suggested that cultural factors might play a role. He found that Americans are more likely to accept use of nonmedical stimulants when that use aligns with cultural ideals of American society such as working hard, getting an education, and becoming successful (Pedersen 2014).

These studies provide insight into the reasons fueling the rise in use of prescription stimulants, but they also have limitations. Both studies led by DeSantis used in depth interviews to collect data. DeSantis and six paid undergraduate students conducted interviews that lasted about 25 minutes each. The undergraduate students had no training or prior experience conducting interviews. There is a chance that these untrained interviewers elicited more biased responses, which would lower validity. Interviews are useful as they allow for probing or follow-up questions that elaborate on a topic. For in-depth interviews, 25 minutes is short. Even a practiced interviewer would have little time to probe for essential detail.

Limitations of the study by Sepulveda et al. (2011) lie in its small sample size. They looked at misuse of one's own prescribed stimulant. Only 55 of 1,738 students had a prescription. To get more accurate results concerning those who misused their own prescription, a much larger sample would be needed. There are two ways to do this: 1) Send a web based survey to colleges and universities across the US. This would provide a more representative sample of college students and increase the sample size dramatically. Or, 2) If a non-random sampling method is used, such as quota sampling, large numbers of those with a prescription could be found from a smaller population.

Research Methods

I used two research methods to collect data, an online survey and secondary data analysis. The main method used was an online survey. A survey was the best method for data collection considering the high internal validity provided and our lack of financial resources. There were 86 total questions, all of which were closed-ended. Before starting the survey, an informed consent form was provided to respondents. This page explained the purpose of the survey and any risks or benefits of taking the survey. If consent was given the first question was about age. If the participant selected under 18 years old, they would be automatically kicked out of the survey. This served as a safety feature to ensure no minors could take the survey. The population used to obtain our sample was college students at a public university in the northeastern United States. Convenience method was used to obtain our sample. After IRB approval in mid-November, emails containing the survey were sent out. The survey was emailed to friends and classmates or posted to online. While convenience sampling allowed us to get results very quickly, our sample is not random or representative.

I also used secondary data analysis of a prior semester's survey to gather data. Questions concerning my independent and dependent variable were asked that provide data to answer my research question. Results from Spring and Fall semester

surveys were very similar. The number of surveys completed, dropout rate, demographics (class standing, race, gender, social class) were almost the same, and even skewed the same in terms of gender, race, and social class. Since the two surveys are so similar, data can be compared and analyzed. No direct correlations can be found from comparisons, but ideas for potential future research or limitations in the study can be found.

My research question is: Does GPA affect whether students will use non-medical prescription stimulants for academic purposes? My independent variable is GPA. The question associated with this was “What is your current GPA?” This question is on both surveys. However the intervals are different. Fall semester response categories are: <1.99, 2-2.49, 2.5-2.99, 3-3.49, and 3.5-4. Response categories for Spring semester are: 1-2.09, 2.1-2.59, 2.6-3.09, 3.1-3.59, and 3.6-4. My dependent variable is whether a student will take a nonmedical prescription stimulant to help study. This question appears on the Spring semester survey and was “Did you ever use a stimulant prescription medication that was not prescribed to you to help you study or improve your grades?” Responses were “Yes” or “No.” I also asked “Do you agree with the following statement, ‘Using stimulants to better academic performance can be morally justified?’” This question was answered using a Likert scale that contained four responses (strongly agree, agree, disagree, or strongly disagree). My null hypothesis is there is no connection between GPA and likelihood of taking nonmedical prescription stimulant. My alternative hypothesis is that the higher the GPA, the more likely a student will use a nonmedical prescription stimulant.

Results

- **Section One**

Of the 459 surveys started, 362 were completed for a response rate of 79%.

Demographic information of the sample data can be found on Table 1. Almost three-quarters of the sample identified as female (74.7%). Men accounted for 23.1% of the sample, followed by gender nonconforming (1.2%). Transgender men, women, and those identifying as “other” made up less than 1% combined. When distributed by class standing the sample is comprised of mostly juniors (39.5%) and sophomores (21.8%). Seniors at 18.4%, freshman at 14.5%, and Other (e.g. Non-traditional, Graduate Student) at 5.9% made up the rest of the sample.

When compared to Fall semester survey, the sample characteristic from Spring 2016 semester’s survey are very similar. An 82% response rate was recorded, 358 of 437 surveys were completed. 71.6% of the sample identified as female, 27.8% as male; non-binary and other had one identifier each (.6%). Class standing was much more evenly dispersed in the Spring semester sample. Sophomores and juniors each contained 26% of the sample, seniors were 24%, and freshman were 23%. Less than 1% belonged to the fifth category, graduate students. The difference in wording of this fifth category between surveys may help explain the surprising changes in distribution. On the Fall survey the category reads, “Other (Non-Traditional, Graduate Student)”. International or part-time students who would have selected from freshman, sophomore, junior, or senior while taking the Spring survey could have chosen “other”.

Table 1

What is your current gender identity?	Fall 2016		Spring 2016		Count
	%	Count	%	Count	
Man	23.1%	95	27.8%	99	
Woman	74.7%	307	71.6%	255	
Transgender Man	0.7%	3	0.0%	0	
Transgender Woman	0.0%	0	0.0%	0	
Gender Nonconforming			1.2%	5	0.3% 1
Other	0.2%	1	0.3%	1	
Total	100%	411	100%	356	

What is your class standing at UNH?	Fall 2016		Spring 2016		Count
	%	Count	%	Count	
Freshman	14.5%	59	23.3%	83	
Sophomore	21.8%	89	26.4%	94	
Junior	39.5%	161	26.1%	93	
Senior	18.4%	75	23.6%	84	
Other (e.g. Non-Traditional, Graduate Student)*			5.9%	24	* *
Graduate † † †			0.6%	2	
Total	100%	408	100%	356	

* Fall 2016 survey

† Spring 2016 survey

- **Section Two**

Note: Data from Table 3 from Spring 2016 survey. Table 4 is from our Fall 2016 survey.

Results from Table 2 show 88 students (24.3% of the sample) had used a nonmedical prescription stimulant for academic purposes. When my independent and dependent variables are cross-tabulated, as seen in Table 3a, the results are telling. The number that jumps off the page is the p-value of 0.00. This means I can reject my null hypothesis at a .01 alpha level. The chi square is 17.27 and the degrees of freedom are 3. For analysis purposes, I merged the GPA attributes of 1.00-2.09 and 2.10-2.59. The group with the highest GPA (3.60-4.00) had the lowest rate of use (11.88%). Those with GPAs between 3.10 and 3.59 reported nonmedical stimulant use at 24.33%. Those most likely to use stimulants for academic purposes have GPA between 2.60 and 3.1 and reported rates of 37.93%. Exactly one-quarter of the merged GPA group of 1.00-2.59 reported use. The data does not support my alternate hypothesis that the higher the GPA, the more likely a student will use a nonmedical prescription stimulant for academic purposes. In fact, I found that the higher a student's GPA the less likely they are to use prescription stimulants.

Table 2

Did you ever use a stimulant prescription medication that was not prescribed to you to help you study or improve your grades? %			Count
Yes	24.3%	88	
No	75.7%	274	
Total	100%	362	

Data from both surveys shows a positive correlation between alcohol use and nonmedical stimulant use. Table 3b shows a cross tabulation where the independent variable is frequency of drinking to get drunk and the dependent variable is nonmedical use of a prescription stimulant for academic purposes. Chi square is 27.20 and degrees of freedom is 3. The p-value is 0.00, and findings are statistically significant. Of the 53 respondents that never drank alcohol to get drunk, none used illegal stimulants. Of the 191 respondents, 33.4% that drank alcohol to get drunk “Often “or “Almost all the time” also reported stimulant use. There is a fairly strong positive linear correlation. Data from Table 4b shows a positive, linear covariation between consumption of alcohol and moral justification for nonmedical use of prescription stimulants. The independent variable was number of times consuming five or more drinks in a row, during a typical week. Responses were never, one, two, three, and four or more. The dependent variable is moral justification of stimulant use. Starting with those who never binge drink, 40.85% agreed or strongly agreed with the statement: “Using stimulants to better academic performance can be morally justified.” Percent of respondents that strongly agree or agree with this statement increase with the amount of times consuming five or more drinks in a row. Of those who would binge drink once a week, 44.94% strongly agreed/agreed; those who would binge drink twice a week, 64.58% strongly agreed/agreed; those who would binge drink three times a week, 67.44% strongly agreed/agreed; and finally, 82.62% of those who would binge drink four or more times strongly agreed/agreed. This data is statistically significant, the p-value is 0.00.

Table 4a shows data shows statistical significance (p-value: .01) in the relation of the independent variable GPA (taken from Fall semester survey) and the dependent variable, moral justification of stimulant use to increase academic performance. Those with a GPA between 2.50-2.99 were most likely (68.24%) to strongly agree or agree with the statement: Using stimulants to better academic performance can be morally justified. Only 45.26% of those with a GPA between 3.50 and 4.00 agreed or strongly agreed with the statement. As GPA increases, moral justification declined. When comparing this finding to data on Table 3a, we see that the students with a GPA of 2.60-3.10, the same group that were most likely to justify stimulant use for academics, were also most likely to use a stimulant. The use of stimulants and moral justification for using stimulants follow similar patterns of correlation by GPA. Both stimulant use and moral acceptance of using illegal stimulant peak in those with a GPA between approximately 2.5-3.0, then use and moral acceptance decline as GPA increases. Maintaining a GPA above 3.50 takes hard work and dedication. These students place high value on their education and may feel their accomplishments are devalued because others used non-prescribed stimulants to achieve the same grades. They may also view use of a prescription drug that does not belong to you would as cheating. This data also shows those who are in danger of academic ineligibility may be more likely to turn to stimulants.

Table 3a

		What is your cumulative GPA?				Total
		1.00 – 2.09, 2.10 – 2.59	2.60 – 3.09	3.10 – 3.59	3.60 – 4.00	
Did you ever use a stimulant prescription medication that was not prescribed to you to help you s...	Yes	7 25.00%	33 37.93%	36 24.66%	12 11.88%	88 24.31%
	No	21 75.00%	54 62.07%	110 75.34%	89 88.12%	274 75.69%
Total		28 100.00%	87 100.00%	146 100.00%	101 100.00%	362 100.00%

		What is your cumulative GPA?
		Did you ever use a stimulant prescription medication that was not prescribed to you to help you s...
Degrees of Freedom	3	
p-value	0.00	

Table 3b

Nonmedical Stimulant Use in Binge

		How often do you drink alcohol to get drunk?				Total
		Never	Sometimes	Often	Almost all the time	
Did you ever use a stimulant prescription medication that was not prescribed to you to help you s...	Yes	0 0.00%	23 19.83%	39 33.91%	25 32.89%	87 24.17%
	No	53 100.00%	93 80.17%	76 66.09%	51 67.11%	273 75.83%
	Total	53 100.00%	116 100.00%	115 100.00%	76 100.00%	360 100.00%

		How often do you drink alcohol to get drunk?
Did you ever use a stimulant prescription medication that was not prescribed to you to help you s...	Chi Square	27.20
	Degrees of Freedom	3
	p-value	0.00

Moral justification of stimulant use by

Do you agree with the following statement? "Using stimulants to better academic performance can b...

Table 4a

	What is your current GPA?					Total
	1.99 or less	2 - 2.49	2.5 - 2.99	3 - 3.49	3.5 - 4	
Strongly Agree, Agree	3 60.00%	7 38.89%	58 68.24%	80 49.38%	43 45.26%	191 52.33%
Disagree, Strongly disagree	2 40.00%	11 61.11%	27 31.76%	82 50.62%	52 54.74%	174 47.67%
Total	5 100.00%	18 100.00%	85 100.00%	162 100.00%	95 100.00%	365 100.00%

		What is your current GPA?
Do you agree with the following statement? "Using stimulants to better academic performance can b...	Chi Square	12.51*
	Degrees of Freedom	4
	p-value	0.01

Moral Justification of stimulant use by drinking

Table 4b

		In a typical week, about how many times have you had five or more drinks in a row?					Total
		Never	Once	Twice	Three	Four or more	
Do you agree with the following statement? *Using stimulants to better academic performance can b...	Strongly Agree, Agree	29 40.85%	40 44.94%	62 64.58%	29 67.44%	11 84.62%	171 54.81%
	Disagree, Strongly disagree	42 59.15%	49 55.06%	34 35.42%	14 32.56%	2 15.38%	141 45.19%
	Total	71 100.00%	89 100.00%	96 100.00%	43 100.00%	13 100.00%	312 100.00%

		In a typical week, about how many times have you had five or more drinks in a row?
Do you agree with the following statement? *Using stimulants to better academic performance can b...	Chi Square	20.22
	Degrees of Freedom	4
	p-value	0.00

Discussion

In this study, quantitative data analysis was used to find that non-medical stimulant use for academic purposes was negatively correlated with GPA, meaning as GPA goes up, stimulant use goes down. My hypothesis that nonmedical stimulant use would be most prevalent in the group with the highest GPA was not supported by data.

It was found that those with GPAs between 2.60 and 3.10 were the most likely to justify the use of non-medical prescription stimulants, and were also the most likely to use them. The overwhelming majority of those with GPAs between 3.50-4.00 are not using stimulants to achieve such excellent grades. This is important because

this study has not only identified the group most likely to take non-medical stimulants, but also the reasons they take stimulants. Stimulants are being used far more by students to “just get by” or by those who struggle with their coursework than by students that use stimulants to be academically superior.

I found that a strong positive correlation between student’s drinking habits and their likely to use non-medical stimulants, and their moral justification of said use. When analyzed with data concerning GPA, understanding of those at risk of using stimulants becomes even more clear. Drinking alcohol in combination with prescription stimulants can have dangerous side effects, an unsettling notion when considering the findings of this study.

It must not be forgotten that the study by Desantis and Hane (2009) found that students are shockingly uneducated about prescription stimulants. The fact that not one of the students in this study did any research about prescription stimulants before taking someone else’s medication is cause for concern. Colleges and universities should take this issue very seriously and look to educate their students on the dangers of using drugs not prescribed to them and mixing prescription drugs and alcohol.

Limitations

A common problem with secondary data analysis (the method used to collect Spring 2016 semester data) is that someone else had control over creating questions for the survey. In this case, the intervals of each attribute of GPA are not the same as mine and attributes are separated at strange places on the 4-point GPA scale (e.g. 2.1-2.59 instead of 2-2.49). The middle three attributes (2.10-2.59, 2.60-3.09, and

3.1-3.59) all have intervals of .49. The low group (1.00-2.09) has an interval of 1.09, and the high group (3.60-4) only has an interval of .4. The question's responses are mutually exclusive, but are not completely exhaustive and there are slight problems with balanced responses. These unbalanced responses can lead to small sampling errors. The fact there is no attribute for GPA of .99 or less has the potential to cause more of a problem. Survey takers with GPA of .99 or less would be forced to skip the question or select the closest GPA. Fortunately, through simple observation we could reason that a very small percentage of the sample would have a GPA so low. Though the poor formatting of this question may have caused minute sampling errors, the data is still usable.

Another limitation is selection bias. Certain groups of the college population are more likely to complete an online survey. Three-quarters of respondents were female. From the Fall semester survey data, 70% had a GPA above 3.00. Only 6% (23 out of 365) reported having a GPA under 2.5. Both surveys are very similar in terms of response rate, demographics of the sample, and distribution of their responses. Not only does the survey have a biased sample through a self-selection process, but it appears the same selection bias occurs each semester. The best way to fix this problem would be to increase sample size and use a random sampling technique. For this class obtaining a completely random sample may be too costly and involved to be plausible.

Future Research

Future research could be aimed at misuse in students with a prescription for stimulants.

With more research we could identify students likely to misuse their prescription. These students are at a higher risk of mixing prescription stimulants with alcohol and other drugs, developing a substance use disorder, and are more likely to give away or sell their medication (Sepulveda et al. 2011). Education and possible treatment for these students would look to decrease rates of personal misuse and lower diversion rates. This would reduce health risks from the overuse of prescription stimulants and combination of these medications with alcohol and other drugs. Lower diversion rates would help keep stimulants out of the hands of those without a prescription.

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