Alcohol and Marijuana Use Rates Among American High School Students: An Investigation of the Monitoring the Future Data From 2011

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Introduction

Recent research concerning alcohol and marijuana use among high school students demonstrates that the two substances are used at high rates in American high schools. Overall, alcohol use is more prevalent than marijuana use across the United States (Finn 2006). However, as the nation grows more tolerant of marijuana use, laws are being past to decriminalize and legalize the once taboo substance.

Variables such as gender, race and grade point average appear to influence the degree to which high school students consume alcohol and/or marijuana. For instance, males are more likely to use marijuana in schools than females (Finn 2006). Additionally, there have been conflicting reports concerning the use of these two substances with regard to race. Some studies have demonstrated that Hispanics use drugs at a higher rate than any other racial or ethnic category (Felton et. al 2015). Other studies have shown the opposite trend by explaining that Whites use drugs more than Blacks or Hispanics (Denham2011). Substance abusers are also twice more likely to have lower grades than those who do not use drugs or alcohol (Finn 2012).

My study will investigate how sex, race, and GPA are related to illegal substance abuse among teenagers. These are important variables to look at because they will attempt to give us a clear understanding about who has the highest rate of usage and the effect of the use itself. Examining the statistics could lead to future assistance in treatment or prevention programs intended to keep youth off drugs.

I hypothesize that males are more likely to use, or to have used, both alcohol and marijuana. Furthermore, I hypothesize that Whites will have the highest rates of use among all racial

categories. Finally, students with a lower GPA will be more likely to use marijuana and/or alcohol. Students who have a higher GPA will be the ones who have been able to resist peer pressures and focus more on school work.

This study will contribute to the discussion of who uses alcohol and marijuana. It will also provide a better understanding of why the two substances are becoming more commonplace in American high schools. It is an important study because it will give education professionals and parents a better awareness of the rate of alcohol and marijuana use among high school students.

My data comes from the Monitoring the Future Survey. The Monitoring the Future Survey is conducted at the Survey Research Center on the campus of the University of Michigan. The survey questions are given to $8^{th,}$ $10^{th,}$ and 12^{th} graders. About 50,000 students each year provide responses to each of the questions asked by the MTF Survey.

The next section of this report will outline previous research. Following the literature review, I will detail the methodology of my research in the methods section. I then present my findings and provide recommendations for further research.

Literature Review

Research has demonstrated that marijuana is the most used illicit drug among teenagers and alcohol remains a popular choice for the same demographic group (Finn 2006; Finn 2012). Finn (2006) notes that 63% of students in her study reported that they had used alcohol in the last six months. There is, however, variance in the number of times that these students have used in their lifetime. As the frequency of alcohol use goes up, the percentage of students using

at that frequency goes down. For example, almost half of the students indicated that they have only taken a drink of alcohol once or twice and only 22% indicated that they use weekly (Finn 2006). Among marijuana users the relationship between frequency and use is different than alcohol. Students who happen to smoke marijuana tend to smoke it more regularly (Finn 2006). An interesting finding in Finn's study indicates that 44% of teen marijuana users use weekly in contrast to only 22% percent of alcohol users (Finn 2006). Overall, however, alcohol use was more commonplace than the use of marijuana. This data gives a good overall view of marijuana and alcohol use. Following on this research, I will also investigate how prevalent use is among teenagers of the Monitoring the Future survey. I will compare my findings with Finn's research.

Finn demonstrates that males use both substances, alcohol and marijuana, more than females. The percentage of males that use alcohol at school is 14 compared to only 10 percent of female students (Finn 2006). While 14% of females stated that they use marijuana at school, the percentage of males who use marijuana in a school setting is 19% (Finn 2006). Along with demonstrating a difference between males and females, this research shows that males and Hispanics have higher levels of drug use than Whites and females, although specific drugs were not mentioned (Finn 2006). This will help me formulate my hypothesis about what demographic group has higher usage.

Similar research explores a more in depth relationship between marijuana and gender. In their research Felton, Collado, Shadur, Lejuez, and MacPherson (2015) indicate that high school-aged males use marijuana at greater rates than high school females. Related to that, males are more likely to maintain the same rate of use, or even increase use over time, whereas females are more likely to use marijuana never or rarely over the same period of time

(Felton et al. 2015). This research included a possible reason as to why males have higher rates of marijuana use. According to Felton et al. (2015), the reason for higher use among males may stem from having lower inhibitions. Because one of the independent variables that I have chosen is gender, I feel that this information is useful to this project. Based on Finn and Felton et al.'s research, I expect to find that high school females will show lower usage rates of alcohol and marijuana use than males.

Felton et al. (2015) have indicated that Hispanics use drugs more than Whites. Denham (2011) takes issue with Felton et al. because his research indicated that Whites use the drug marijuana at higher rates than Black and Hispanic respondents. While Denham (2011) disagrees with Felton et al. about racial disparities in marijuana use, his study does back up the conclusion that males use marijuana more than females. The differences in marijuana use between Whites, Blacks, and Hispanics is statistically significant according to Denham (Denham 2011).

Newcomb, Birkett, Corliss and Mustanski also agree with Denham and Felton et al. that males use drugs at a higher rate than females. This research shows that Whites do indeed have a higher prevalence of drug use (Newcomb et al. 2014). Whites use drugs at the highest rate followed by Hispanics and then Blacks (Newcomb et al. 2014). In another article, however, Finn (2012) again indicates that Hispanics have the highest levels of use of marijuana in 10th grade. By the time students get to 12th grade, however, the trend changes (Finn 2012). Reporting on high school seniors shows that Whites use marijuana more (Finn 2012). I can use this in my secondary project research to investigate whether Hispanics begin using marijuana at a younger age and whether Whites eventually catch up.

In regards to grades and achievement-linked behaviors, Finn (2012) shows that marIJuana can impair student participation and engagement. Research shows that lower grades in school are related to marijuana use (Finn 2012). In fact, marijuana users "are twice as likely to have lower grades" than those who do not use the drug (Finn2012). Marijuana users are also more likely to be late to class and skip class more regularly than non-users (Finn 2012). Finn (2012) also indicated that males and females show no statistically significant difference in regards to the relationship between achievement behaviors and marijuana use. The same is true for Black, White, and Hispanic students (Finn 2012). I will be able to use this data to compare my findings with what Finn has already examined to determine if I come up with the same conclusions. Based on Finn's research, I expect to find that there will be a negative relationship between marijuana use and GPA among respondents of the Monitoring the Future survey. The next section will include the Methodology.

Methodology

The data that I will be analyzing is a representative sample from the Monitor the Future Survey of 2011. The Monitoring the Future Survey is conducted at the Survey Research Center at the University of Michigan. Approximately 50,000 students are surveyed each year. Students that are surveyed come from grades 8, 10, 12. Generally, surveys were given to students in regular class sizes. However, in certain situations, surveys were administered to a larger group, due to circumstances in some schools. I will be examining a sample of 1,500 students from the Monitoring the Future Survey of 2011.

In order to get easy-to-read data I recoded a few variables. I recoded the variable "grade" because there were nine possible values ranging from A and A- to C- and D. I recoded

this variable so that there were only four grades, A, B, C, and D in order to make my tables clear and easy to read. The other variables that I analyzed were "sex" and "race". These two variables already had minimal (two or three) possible responses so I did not recode either of them.

I also manipulated my data in order to demonstrate how alcohol and marijuana affected students' grades and how sex and gender influenced alcohol and marijuana use. I did this by constructing bivariate and cross tabulation tables. In addition to the tables, I include chi-square tests to determine the statistical significance in the difference between values of the dependent variables. The next section details the findings of my research.

Findings

My findings will demonstrate how sex and race influence alcohol and marijuana use among high school students. My findings will also detail how grades are related to alcohol and marijuana use. In regards to race, I analyzed Whites, Blacks and Hispanics. Whites represent 68.2% of respondents under the race category. Blacks represent 15.6% and Hispanics represent 16.2% of the sample. Males constitute 49.8% and females constitute 50.2% of the sample. Additionally, the recoded grade variable is broken up into four categories. Thirty-six percent of respondents reported that their grades consisted of As. Forty-eight percent reported having Bs, 15.4% had Cs and one percent had Ds.

The following tables show the results of my analysis of MTF 2011. I will begin by showing how alcohol use relates to different variables. I will then do the same examining marijuana. The first table analyzes sex and alcohol use among high schoolers.

How many times taken more than a few sips of alcohol	Percentage of males	Percentage of females
0 Occasions	26.0	24.0
1-2 times	12.0	13.6
3-5 times	8.6	14.8
6-9 times	10.0	10.3
10-19 times	10.6	12.1
20-39 times	9.7	11.1
40+ times	23.1	14.1
Total	100.0	100.0
N	661	668

This data demonstrates that the percentage of males and females that have never taken more than a few sips of alcohol only differs by two percent. The difference between males and females who have only tried more than a few sips of alcohol 1-2 times is also similar, differing by only 1.6%. However, the percentage of males who have tried more than a few sips of alcohol 40 or more times is 23.1, while the female percentage is only 14.1. In other words, both males and females drink small amounts of alcohol at relatively similar rates but males are more likely than females to drink more as the frequency goes up. The chi-square value is .000 which reveals that there is a significant statistical difference between males' and females' consumption of alcohol.

How many times taken more than a few sips of alcohol	Percentage of Blacks	Percentage of Whites	Percentage of Hispanics
0 Occasions	31.8	23.0	23.6
1-2 times	15.0	11.3	15.7
3-5 times	17.9	10.0	10.7
6-9 times	11.0	10.2	9.0
10-19 times	10.4	12.7	10.1
20-39 times	7.5	11.5	7.9
40+ times	6.4	21.4	23.0
Total	100.0	100.0	100.0
N	173	782	178

The above table examines results of alcohol use with regards to race. Whites represent the highest percentage of students who ever tried more than a few sips of alcohol. The 23% of Whites that have never tried more than a few sips of alcohol is a smaller percentage than Blacks (31.8%) and Hispanics (23.6%). Black students reported that they are the least likely to have tried more than a few sips of alcohol. It is apparent that Hispanics (23%) have tried more than a few sips of alcohol 40 or more times more than Whites or Blacks. Like race, the chi-square value is .000 which reveals that there is a significant statistical difference between Blacks', Whites', and Hispanics' use of alcohol.

How many times used marijuana	Percentage of Males	Percentage of Females
0 Occasions	84.1	92.2
1-2 times	7.3	2.7
3-5 times	3.2	2.4
6-9 times	1.7	1.2
10-19 times	0.8	0.6
20-39 times	0.5	0.0
40+ times	2.6	1.0
Total	100.0	100.0
N	661	667

The amount of students who have used marijuana in the sample is relatively small compared to those who have tried alcohol. Only 15.9% of the 661 males in the sample indicated that they had used marijuana and only 7.8% of females had used. With that being said, the results in the table above demonstrate that males were more likely than females to use marijuana. At each frequency, males were more likely to use than females. Additionally, 2.6% of

males used 40 or more times compared to only 1% of females. The chi-square value for this relationship is .000, which describes the difference between males' and females' usage as statistically significant.

How many times used marijuana	Percentage of Blacks	Percentage of Whites	Percentage of Hispanics
0 Occasions	94.2	87.0	87.0
1-2 times	2.3	5.5	7.1
3-5 times	1.2	3.2	2.2
6-9 times	1.2	1.4	0.5
10-19 times	0.0	0.8	1.1
20-39 times	0.0	0.3	0.5
40+ times	1.2	1.9	1.6
Total	100.0	100.0	100.0
N	173	783	184

This table also demonstrates that the majority of the respondents have never used marijuana. Of those who did report marijuana usage, Whites and Hispanics represent a larger percentage than do Blacks. Thirteen percent of both Whites and Hispanics indicated that they have used marijuana; while only 5.8% of Blacks reported using the substance. Hispanics are more likely than Whites and Blacks to have used marijuana one to two times. Interestingly, however, Whites have a greater likelihood to have used 40 or more times than both Hispanics and Blacks. About 2% of Whites have used 40 or more times. Also worth noting is the fact that frequencies of using the drug 6-39 times is lower than the 40 or more times in all three race categories. What this could indicate is that once an individual had used about five times, they either stop usage or continue using at high rates, not just occasionally. While these statistics are worth noting, the results reveal a chi-square value of .495, which indicates that the difference in usage among races is not statistically significant.

Thus far, I have treated marijuana and alcohol as the dependent variables. I have used race and sex as the independent variables. When I introduced grades, I made that variable the dependent variable and substance use the independent variable. Although grades could have an impact on substance abuse, I feel that substance use affecting grades is more appropriate for this study. The following two tables show this relationship.

Grades and Number of times Taken More than a Few Sips of Alcohol (in percentages)

Grades	0 times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
As	46.2	37.3	34.7	28.0	40.7	32.6	24.6
Bs	43.5	50.0	52.1	49.2	46.9	50.4	48.3
Cs	9.8	10.8	11.8	21.2	12.4	17.1	25.4
Ds	0.6	1.8	1.4	1.5	0.0	0.0	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	338	166	144	132	145	129	232

This table shows that 46.2% of individuals who have never taken more than a few sips of alcohol have grades that consist of As. The percentage of those who have tried more than a few sips 40 or more times and received As is only 24.6. Similarly, those that reported getting As and Bs comprise almost 90% of individuals who have never taken more than a few sips of alcohol. Those that have taken more than a few sips of alcohol 40 or more times reported having grades ranging from Ac to Cs. The results reveal a chi-square significance of .000, which demonstrates a significant statistical difference. Very few of the individuals in the sample reported having grades consisting of Cs.

Grades and Number of Times Using Marijuana (in percentages)

Grades	0 times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
As	37.5	25.0	21.6	6.7	37.5	25.0	17.4
Bs	47.5	51.7	48.6	66.7	25.0	50.0	52.2
Cs	13.9	23.3	29.7	26.7	37.5	25.0	30.4

Ds	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N	1153	60	37	15	8	4	23

Similar to alcohol use, individuals who have never tried marijuana tend to have more As than those who have used. About 38% of those who have never tried the drug got As. The same percentage of individuals who have used 10-19 times got As. This may seem strange but when the two highest grades (As and Bs) are taken into consideration it is clear that those who have never used get better grades. Eighty-five percent of those who have never used got As and Bs. This is a higher percentage than any other usage frequency receiving As and Bs. The chi-square value for this relationship is .027 which indicates that there is statistical significance in the relationship between marijuana use and grades.

These findings from the Monitoring the Future sample are similar to the research discussed in the literature review. Finn (2006) and Newcomb et al. (2014) indicate that males use alcohol at higher rates than females. Studies by Finn (2006) and Felton et al. (2015) also reveal that there is a statistical significance between males and females in regards to marijuana use. Both studies indicated that high school-aged males use marijuana at greater rates than high school females. These males also tend to maintain usage over longer periods of time (Felton et al. 2015). This is, again, evident by the fact that males in the MTF sample have used marijuana 40 or more times at a higher rate than females.

My review of the literature found conflicting results between the studies done by Felton et al. (2015) and Denham (2011) in regards to racial disparities. Felton et al. (2015) indicated that Hispanics use marijuana more than Whites. However, Denham (2011) concluded that

Whites use marijuana at higher rates than any other racial category. My study of MTF data can conclude that both Felton et al. and Denham are correct as indicated by the fact that Hispanics are more likely to use 1-2 times but Whites are more likely to use 40 or more times. Blacks in high school are the least likely to use marijuana among the three racial categories.

Statistics from MTF that speak to grades and substance use also authenticate what Finn (2012) has demonstrated. Namely, that substance abuse is negatively correlated to lower grades in school.

My hypothesis that males are more likely to use marijuana and alcohol was correct. Males tend to use both substances at higher rates than females. I also was correct in hypothesizing that high school students with higher usage of alcohol and marijuana would be lead to lower grades by those individuals. I expected to find that Whites used these two substances at higher rates than Blacks and Hispanics. While I was correct in my hypothesis, there is not a statistically significant relationship among the three racial groups in regards to marijuana use. The next section details the conclusion of my research.

Conclusion

The findings of this study indicate that high school males are more likely to use alcohol and marijuana than high school females. Whites and Hispanics reported using both alcohol and marijuana at higher rates than Blacks. There is a negative correlation between marijuana use and grades. As use goes up, there tends to be a decline in overall grades. I fail to reject any aspects of my hypotheses. My findings have found support for the literature that was examined.

This study could have been improved by including a larger sample of Hispanics and Blacks. The MTF data set included 798 White high school students which doubled the number of Hispanic and Black students combined. The results would have more validity if there were more minorities represented in the survey. It could have also included other racial categories. Black, White, and Hispanic are only three of the many racial categories that are found in high schools throughout the United States. It would be interesting to see if alcohol and marijuana use rates of Asians, Native Americans and other racial categories differ from the already mentioned groups.

Further research could benefit from going into more detail about grades as they relate to alcohol and marijuana use. If a more detailed multivariate analysis was used to compare grades between males and females as they relate to alcohol and marijuana use, we might see substantial differences. Another suggestion of further research would be to include substances other than alcohol and marijuana. The street value of prescription drugs continues to increase, which has led many young adults to turn to other drugs such as meth and heroine.

This research is important because of the relatively new marijuana rulings that have taken place in Washington and Colorado. Marijuana is becoming more familiar in society. In ten years the results of the same study could be substantially different. Although marijuana is becoming more acceptable, alcohol use remains more commonplace among high school-aged individuals.

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