University Students Illicit Drug Use and Frequency of Driving Under the Influence of Alcohol

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Background
According to the United States (US) National Highway Traffic Safety Administration (NHTSA), an estimated 17,448 people were killed in alcohol-related traffic crashes in 2001, accounting for approximately 41% of all traffic fatalities.\textsuperscript{1} Surveys conducted in 1999 revealed that in the previous year more than two million American university students drove while under the influence of alcohol, and over three million rode in a car with a driver who was intoxicated.\textsuperscript{2}

A number of studies also indicate that more people are driving while under the influence of illicit drugs, especially marijuana.\textsuperscript{3} For example, an Australian roadside study of individuals stopped for reckless driving found that 59% tested positive for illicit drugs, including 33% for marijuana, 13% for cocaine, and 12% for both.\textsuperscript{4} More than half of the reckless drivers who were not intoxicated on alcohol, were impaired by other drugs.

There is also evidence that illicit drug use is related to a number of unsafe driving practices, including driving under the influence of alcohol (DUI). A recent study on correlates of DUI among American university students found that frequency of drinking, average number of drinks consumed, and marijuana use were positively correlated with frequency of DUI.\textsuperscript{5} Research also indicates that both marijuana users, and users of illicit drugs in combination with alcohol, are less likely to wear safety belts and more likely to DUI or ride with someone who is DUI.\textsuperscript{6}

A number of studies of university students in the US indicate a significant increase in the use of marijuana and other illicit drugs in the 1990s. The prevalence of marijuana use in the last 30 days rose from 12.9% to 15.7% between 1993 and 1999.\textsuperscript{7} An effect that occurred in 66% of 119 universities surveyed and among all demographic subgroups except for Hispanics. Another study of American university students found that the prevalence of marijuana use in the last year rose from 23% to 30% between 1993 and 2002.\textsuperscript{8} Past use of other drugs increased from 11% to 14% over the same period. Thus use of marijuana by university students in the US has increased more than any other illicit drug.

Objectives
Together these studies suggest that illicit drug use, especially marijuana use, may be an important factor related to DUI. Given the increases in marijuana use over the last decade, and the relatively high rates of DUI among university students, the current study investigated the relation between illicit drug use and DUI among a sample of American university students. The goal of this study was to determine if illicit drug use is related to...
DUI, and to identify specific subpopulations within the university student population that are at greatest risk for DUI.

Methodology
Participants and Setting
Seventy-five hundred randomly selected university students attending a large university (approx. 25,000 students) in the Mid-Atlantic Region of the United States were surveyed. Members of fraternities and sororities and student athletes were over-sampled. Entrance in a raffle for $500 was used as an incentive for participation. A total of 2697 surveys (36%) were returned. The sample included 1243 men and 1372 women, 545 students who were members of a fraternity or sorority, and 267 student athletes.

Procedures
The CORE alcohol and Drug Survey, a 4-page scannable instrument produced by the CORE Institute at Southern Illinois University that measures alcohol and other drug (AOD) behaviors was mailed to students. A pre-letter asking students to complete the survey and signed by the president of the university was mailed one week before the survey. Two reminder cards were mailed at two-day intervals following the mailing of the survey.

The survey included demographic variables and questions concerning the frequency of alcohol and other drug use over the last year (including marijuana, designer drugs, cocaine, hallucinogens, sedatives, amphetamines, and inhalants). Yearly frequency of alcohol and other drug use were measured using the following categories of use over the last year: never used, once/year, 6-times/year, once/month, twice/month, 3-times/week, 5-times/week, and every day. Additional alcohol use measures included average number of drinks consumed per week and at-risk drinking. At-risk drinking was defined as the frequency of consuming five or more drinks in a sitting during the last two weeks (0 – 14).

Demographic variables included gender, age, ethnicity, (Hispanic vs. Asian/Pacific Islander vs. White vs. Black), residence (on vs. off campus), and status (yes vs. no) as a: a) student athlete, b) participant in a sports club, c) member of a fraternity/sorority, d) member of the corps of cadets, and e) leader in a student organization. Students were also asked to indicate whether either of their parents had ever had alcohol or other drug problems.

Our survey also asked questions concerning the frequency of DUI and arrests for DUI over the previous year. These questions were added to the standard CORE questionnaire. It is important to note that this measure represents a person’s perception of being “under the influence,” and may not reflect actual blood alcohol levels (i.e., .08) that indicate legal impairment. The following categories were used for responses: never, once, twice, 3-5 times, 6-9 time, 10 or more times.

Results and Analysis
Drug Use Correlates of Drinking and Driving
Significant correlations were found between DUI frequency and use of alcohol ($r = .67$), marijuana ($r = .38$), designer drugs ($r = .14$), cocaine ($r = .11$), hallucinogens ($r = .10$), sedatives ($r = .09$), amphetamines ($r = .07$), and inhalants ($r = .08$), $p < .05$. Results of a stepwise multiple regression, regressing number of drinks per week, average weekly frequency of drinking and yearly frequency of alcohol, marijuana, designer drug, cocaine, hallucinogen, sedative, amphetamine, and inhalant use on frequency of DUI indicated that number of drinks per week ($R^2 = .268$), frequency of marijuana use in the last year ($6R^2 = .053$), frequency of alcohol use in the last year ($6R^2 = .008$), frequency of cocaine use in
In the last year ($R^2 = .005$), and at-risk drinking ($R^2 = .003$) accounted for 33.7% of the variance in frequency of DUI.

Results of a 2 drug use (yes vs. no) x 2 DUI (yes vs. no) Chi-Square indicated that students who used any illicit drugs during the previous year (35.1% of students) were more likely to DUI (64.2%) than those who did not use illicit drugs in the last year (35.8%), $\chi^2(1) = 485.93, p < .001$. Follow-up analysis on marijuana use indicated that students that used marijuana during the previous year (33.1% of students) were more likely to DUI (60.9%) than student who had not used marijuana in the last year (18.9%), $\chi^2(1) = 474.45, p < .001$.

**Demographics Characteristics of Students Who DUI**

Overall, 32.8% of university students had driven under the influence of alcohol within the last year, and that 0.5% had been arrested for DUI. A series of Ch-Squares were calculated on the frequency of DUI in the last year (zero vs. 1 – 3 times vs. 6 or more times) and various demographic variables: including gender, age, ethnicity, residence, fraternity/sorority membership, parent drug problems, student athlete, member of a sports club, student leader, and member of the corps of cadets. The significant results of these analyses can be found in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Zero</th>
<th>1 – 3</th>
<th>6 or More</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>65.2%</td>
<td>24.0%</td>
<td>10.7%</td>
<td>$\chi^2(2) = 15.19$</td>
</tr>
<tr>
<td>Women</td>
<td>69.1%</td>
<td>24.4%</td>
<td>6.5%</td>
<td>$p &lt; .01$</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt; 21 yrs.</td>
<td>71.7%</td>
<td>21.6%</td>
<td>6.7%</td>
<td>$\chi^2(2) = 43.90$</td>
</tr>
<tr>
<td>21+ yrs.</td>
<td>59.5%</td>
<td>29.2%</td>
<td>11.3%</td>
<td>$p &lt; .001$</td>
</tr>
<tr>
<td>Ethnicity:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>64.9%</td>
<td>26.0%</td>
<td>9.1%</td>
<td>$\chi^2(6) = 34.30$</td>
</tr>
<tr>
<td>Hispanic</td>
<td>69.0%</td>
<td>25.3%</td>
<td>5.7%</td>
<td>$p &lt; .001$</td>
</tr>
<tr>
<td>Asian</td>
<td>78.2%</td>
<td>16.6%</td>
<td>5.2%</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>80.8%</td>
<td>15.8%</td>
<td>3.4%</td>
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</tr>
<tr>
<td>Residence:</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>On-Campus</td>
<td>78.3%</td>
<td>17.1%</td>
<td>4.6%</td>
<td>$\chi^2(2) = 151.40$</td>
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<td>Off-Campus</td>
<td>55.9%</td>
<td>32.0%</td>
<td>12.1%</td>
<td>$p &lt; .001$</td>
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<tr>
<td>Fraternity/Sorority:</td>
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<td></td>
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</tr>
<tr>
<td>Member</td>
<td>53.1%</td>
<td>33.8%</td>
<td>13.1%</td>
<td>$\chi^2(2) = 61.63$</td>
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<tr>
<td>Non-Member</td>
<td>70.7%</td>
<td>22.1%</td>
<td>7.2%</td>
<td>$p &lt; .001$</td>
</tr>
<tr>
<td>Parent:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AOD Problem</td>
<td>60.4%</td>
<td>27.4%</td>
<td>12.2%</td>
<td>$\chi^2(2) = 10.87$</td>
</tr>
<tr>
<td>No Problem</td>
<td>68.2%</td>
<td>24.0%</td>
<td>7.8%</td>
<td>$p &lt; .01$</td>
</tr>
</tbody>
</table>

Table 1. Percentage of students who had driven under the influence over the last year by gender, age, ethnicity, residence, fraternity/sorority membership, and having a parent with an alcohol or other drug problem.
Discussion
The frequency of DUI over the last year was positively correlated with the use of most illicit drugs, including marijuana, designer drugs, hallucinogens, sedatives, amphetamines and inhalants. The relation between DUI and marijuana was by far the largest, accounting for 10x more variance in DUI than the other drugs. These findings support previous research indicating a positive relation between DUI and marijuana use, and reinforce the need for additional research on marijuana use and driving.

The finding that marijuana use predicted 5% of the variance in DUI, even after controlling for average weekly alcohol consumption, is supported by other research. What was surprising was the finding that American university students who used marijuana in the last year were three-times more likely to DUI than those who had not used marijuana in the last year. These findings beg the question as to whether individuals who drive under the influence of alcohol are also likely to drive while under the influence of marijuana. This question deserves further study.

While we also found that students who used any illicit drug in the last year were more likely to DUI, the relation between marijuana use and DUI was much greater. For example, although we found that the use of cocaine and other illicit drugs were related to DUI, the correlations were small, and only significant because of our large sample size. While other research indicates a relation between the use of illicit drugs other than marijuana and driving while under the influence of alcohol, those relations are also small.

Overall, these findings indicate that marijuana use, and in general any illicit drug use, are related to increase risk for DUI. Given the steady increase in marijuana use in the US, and in other countries, a greater emphasis should be placed on the prevention and detection of driving while under the influence of illicit drugs, especially marijuana. This may be difficult given the existing need to improve and expand the prevention and detection of drivers who are driving while under the influence of alcohol.

While there is some evidence that the effects of marijuana on driving performance are relatively small, recent evidence on the effects of marijuana intoxication on driving performance indicates significant impairments in psychomotor performance, and decrements in driving-related tasks, especially when alcohol and marijuana are used together. Thus, the most appropriate strategy may be to increase the efforts to identify marijuana intoxication among those individuals arrested for DUI.

In regards to preventing DUI, our findings indicate a need to target specific subpopulations within the university environment. Specifically our findings indicate a need to target the higher drinking and driving rates among men, members of fraternities and sororities, students of legal drinking age (21+ years), whites, Hispanics, students living off-campus, and students with a substance abusing parent.

We found no increased risk fro DUI among student athletes, members of the corps of cadets, members of sports clubs, and student leaders. These finding were surprising in regards to student athletes, members of sports clubs, and student leaders given the relatively consistent finding of high rates of alcohol consumption among these American university student populations. These findings deserve further study, as they may provide valuable clues to specific personal or environmental factors among these students that cause them to be at lower risk for DUI.
Conclusions
Overall, these findings suggest that marijuana users are more likely to DUI. While we did not assess driving while under the influence of other drugs, our findings suggest that this may be an important issue in the university student population. Both researchers and practitioners would be well served to investigate the prevalence of driving under the influence of illicit drugs among university students, and to develop interventions to prevent driving under the influence of illicit drugs, especially marijuana.

References