A Survey to Investigate Student Drinking Norms at Foxfield

Neil Guha, Ellen J. Bass, Senior Member, IEEE, Susan E. Bruce

Abstract — Drinking plays a role in the social activities of University of Virginia (UVA) students, including the annual Foxfield Horse Races. However, no data gauge the levels of binge, or high-risk, drinking at Foxfield. A web-based survey has been developed to begin to measure the drinking norms at Foxfield with the hopes of using the data to create a safer environment at future events. Using a limited sample of 78 students, the preliminary data show that students drink more at Foxfield than each day of a normal week. Students also report drinking more and longer at Foxfield than during Halloween and football games (events known to be large social events at UVA). 66% of respondents also reported at least one negative consequence as a result of another’s drinking and 68% reported at least one negative consequence as a result of his own drinking. This work helps to lay the groundwork for a large sample data collection after the 2006 running of the Foxfield Races on April 29th.

I. INTRODUCTION

Binge drinking, or high-risk drinking, is generally defined as consumption of alcohol that causes negative consequences to oneself and others. It has been quantified as 5 or more drinks in two hours for a man and 4 or more drinks in two hours for a woman [1]. Estimated Blood Alcohol Concentration (eBAC) is a more exacting method used to quantify the amount of alcohol consumed by an individual and is calculated differently for men and women:

- Women: \(eBAC = \frac{\text{number of drinks}}{2} \times \frac{7.5}{\text{weight in pounds}} - 0.16 \times \text{hours spent drinking}\)
- Men: \(eBAC = \frac{\text{number of drinks}}{2} \times \frac{9}{\text{weight in pounds}} - 0.16 \times \text{hours spent drinking}\)

According to the National Institute on Alcohol Abuse and Alcoholism, binge drinking contributes to at least 1,400 university student deaths and 500,000 injuries per year [2]. Due to the large negative outcomes with binge drinking at universities, researchers are interested in understanding this phenomenon. For example, the Harvard School of Public Health conducted a survey in 2001 of 119 four-year colleges to track heavy alcohol use. The study found that approximately two out of every five college students reported binge drinking [3]. This confirmed previous studies at the same colleges in 1993, 1997 and 1999. Binge-drinkers were also found to be 21 times more likely than non-binge drinkers to have missed class, to have been injured or hurt, or to have driven a car intoxicated. At colleges with high binge drinking rates, 71% had sleep or study interruptions caused by drinkers and 57% had to take care of an intoxicated student [3].

The Department of Psychiatric Medicine and the Center for Alcohol and Substance Education (CASE) conduct a yearly Health Behavior Study (HBS) to gauge controlled substance norms at the University of Virginia [4]. Both the results from HBS and prior research have shown that high levels of binge drinking contribute to unwanted negative effects from both one’s own drinking and someone else’s drinking. Although fatality is an extreme consequence of alcohol consumption, binge drinking is also associated with numerous other negative consequences. For example, in 2003, 46% of UVA students said they assumed a caretaking role and 44.1% had their sleep disrupted as a result of someone else’s drinking [4]. Additionally, the Office of Health Promotion at UVA conducts a yearly Health Promotion Survey (HPS) which focuses solely on alcohol use and protective behaviors [5]. The study has shown an increase in median drinks per week for all UVA undergraduates from 2 in 2001 to 3 in 2003 (Figure 1).

![Fig. 1. Median weekly drinks for UVA Undergraduates (2001-2003) [5].](image)

At the University of Virginia, drinking plays a role in students’ social activities, including the Foxfield Races. Thousands attend the annual event held in April, many of whom are students at the University of Virginia. Students who attend do so individually or with an organization, which may purchase a plot. Attendees bring food and both...
alcoholic and non-alcoholic beverages in order to picnic from approximately 10am to 4pm.

Foxfield has taken several preventative measures to help curb binge-drinking and its consequences such as incentives for sober drivers, ability to leave vehicles at the venue overnight, and increasing law enforcement (with plans to increase police presence for the 2006 races). Foxfield also has a first-aid tent located by the entrance to the plots for anyone who is seeking medical attention.

There are no recorded data on drinking, preventative measures and their effects at the Foxfield Races. The purpose of this project is to conduct a web-based survey that collects data on drinking norms at Foxfield. CASE is interested in seeing if students drink more at Foxfield than during the course of a week and during other eventful weekends at UVA. It is also useful to examine the extent to which students take preventative measures such as taking advantage of the first-aid tent and consuming foods and non-alcoholic beverages. CASE is interested in finding out if some preventative policies, such as the Savvy Fox program which gives free food to sober drivers, may actually increase the levels of high-risk drinking among non-drivers. CASE is also interested in understanding the negative consequences students report as a result of one’s own or someone else’s drinking and if affiliation with organizations impact drinking-related behaviors.

To accomplish these goals, the survey provides data to test the following specific hypotheses:

1. Student drinking at Foxfield is greater than student drinking during the course of a normal week at UVA as measured by average number of drinks consumed and eBAC.
2. Student drinking at Foxfield is greater than student drinking during eventful weekends at UVA (Halloween) as measured by average number of drinks and eBAC.
3. Student drinking at Foxfield is greater than student drinking at a UVA home football game as measured by average number of drinks consumed and eBAC.
4. Drunk driving prevention measures cause an increase in alcohol consumption among non-drivers as measured by average number of drinks consumed and eBAC.
5. Members of Greek-affiliated organizations drink more than non-Greek organizations at Foxfield as measured by average number of drinks consumed and eBAC.
6. An increase in alcohol consumption increases the risk for negative consequences both from personal drinking and secondhand effects from someone else’s drinking.
7. Attending Foxfield more than once reduces eBAC and the average number of drinks consumed by an individual.

This paper focuses on designing and testing a web-based survey on drinking norms at Foxfield by conducting a preliminary data collection and analysis. A larger-scale sample will be collected and analyzed after the 2006 running of the Foxfield Races on April 29th.

II. METHODS

A. Institutional Review Board

Approval was granted by the Institutional Review Board for Social and Behavioral Sciences (IRB-SBS) before survey data were collected.

B. Sample

For purposes of testing the survey, a “Beta Test” population was chosen. This population was pooled from three sources:

- EDHS 224, Substance Abuse in Society
- SYS 334, Systems Evaluation
- Sigma Nu Fraternity

EDHS 224 is a course on substance education taught in the Curry School of Education. It is a class of predominantly fourth-years although a few underclassmen are enrolled. SYS 334 is a third-year course required for all Systems Engineering majors. Sigma Nu is a national fraternity and is a member of the Inter-Fraternity Council at UVA.

The potential respondents in the two courses were contacted via the class toolkit e-mail and Sigma Nu was contacted via the fraternity group e-mail list. They were informed that all data collected would be stripped of identifying information and be anonymous. Furthermore, all potential respondents were informed that their participation is voluntary.

EDHS 224 has an enrollment of 152 with 27 respondents (response rate of 17.76%). Sigma Nu has a brotherhood of 70 with 23 respondents (response rate of 32.86%). SYS 334 has an enrollment of 84 with 28 respondents (response rate of 33.33%).

Thus the total sample size for the Beta Test was N = 78. Table I identifies demographic data for the respondents according to year at UVA and gender.

<table>
<thead>
<tr>
<th>Type of Group</th>
<th># of Respondents</th>
<th>% of Sample (N = 78)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Years</td>
<td>8</td>
<td>10.25%</td>
</tr>
<tr>
<td>2nd Years</td>
<td>8</td>
<td>10.25%</td>
</tr>
<tr>
<td>3rd Years</td>
<td>33</td>
<td>42.30%</td>
</tr>
<tr>
<td>4th Years</td>
<td>28</td>
<td>35.89%</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>1</td>
<td>1.20%</td>
</tr>
<tr>
<td>Males</td>
<td>47</td>
<td>60.26%</td>
</tr>
<tr>
<td>Females</td>
<td>31</td>
<td>39.74%</td>
</tr>
</tbody>
</table>
C. Survey Instrument

The 24-question survey instrument was developed in a collaboration by the authors and other CASE professionals. It was iteratively improved following a pilot test by a 20-person sample. It is divided into three main sections:

- Background Information
- UVA-Related Questions
- Foxfield-Related Questions

Each of the 24 questions either helps test one of the 7 hypotheses or provides CASE data to compare with prior studies. The first section includes 5 questions: year at the university, gender, age, weight, and extra-curricular activities. Gender and weight help calculate eBAC and the activities involved help test Hypothesis #5. Although this hypothesis essentially measures drinking norms of Greeks vs. non-Greeks, the question supports comparisons between other groups and organizations (which will be helpful in the larger sample study).

The second section contains 6 questions attempting to measure drinking norms at non-Foxfield events. Questions #6-11 include average number of drinks consumed and hours spent drinking each of day of the week, average number of drinks consumed and hours spent drinking at UVA home football games, and average number of drinks consumed and hours spent drinking during Halloween. These questions target Hypotheses #1-3, comparing drinking norms at Foxfield to each day of a normal week, to the day of a home football game and Halloween. Football game-day was chosen as a measure of comparison because it is a staple University event. Halloween was chosen as a measure of comparison because it is a social non-University related event, similar to Foxfield.

The third section, Questions #12-24 gather data about drinking norms at the Foxfield Races. Question #12 asks the respondents whether or not they have attended Foxfield. Questions #13-24 only apply to respondents who have attended Foxfield. Question #13 asks the respondents how many times they have attended Foxfield. This targets Hypothesis #7 to analyze norms across those who have attended the yearly event more than once. Questions #14-15 asks the average number of drinks and hours spent drinking at the races. These data are required to test each of the 7 hypotheses. Questions #16-17 are related to transportation methods and gauging levels of drunk driving. Question #16 asks the respondents to select their method of transportation to and from Foxfield. The options provided are:

1) I was a designated sober driver to and from Foxfield;
2) I rode the CTS bus;
3) I had a sober friend drive me to and from Foxfield;
4) I drove to Foxfield but left my car there overnight and found another transportation source back;
5) I drove to Foxfield and back because I did not think I drank enough to impact my driving;
6) I drove to Foxfield and back even though I had too much to drink;
7) My group chartered a bus;
8) Other Please Specify:

This question contributes to Hypothesis #4 which tests whether policies instituted to help prevent drunk driving may cause an increase in binge-drinking among non-drivers. Question #17 simply asks if an individual may be inclined to drink more if he knew he were being driven to and from Foxfield by a sober driver. Questions #18-19 ask the respondent to check all the negative consequences that apply as a result of another’s drinking and his own drinking. These data target Hypothesis #6 which assumes that an increase in alcohol consumption yields an increase in negative consequences. The options provided for consequences as a result of another’s drinking are:

1) Placed me in a caretaking role (helping someone who is sick, helping someone get home, etc.);
2) Damaged my personal property (car, clothing, etc.);
3) I was a passenger in a vehicle driven by a drunk driver;
4) I experienced physical pushing, shoving or hitting;
5) Jeopardized a relationship (caused a verbal argument);
6) I experienced an unwanted sexual advance;
7) Disrupted my study time;
8) Disrupted my sleep;
9) Prevented me from enjoying the horse races;
10) Other Please Specify:

The options provided for consequences as a result of personal drinking are:

1) Had a hangover;
2) Was nauseous or vomited;
3) Was taken to the ER (UVA or other);
4) Got into a physical fight;
5) Took advantage of someone sexually;
6) Experienced unwanted sexual advance or sexual assault;
7) Drove a car under the influence;
8) Was arrested for DUI/DWI;
9) Been in trouble with police for something OTHER THAN DUI;
10) Urinated in public;
11) Blacked out (had memory loss);
12) Other Please Specify:

Question #20 simply asks if the respondent knows where the first aid tent is. Questions #21-22 asks the respondent what foods were consumed before attending Foxfield and while at Foxfield. The options for both these questions are the same:

1) Water;
2) Juice (without alcohol mixed);
3) Soda (without alcohol mixed);
4) Fruits;
5) Vegetables;
6) Bread product;
7) Dairy product;
8) Meat;
9) Other Please Specify:
Similar to Questions #17, 20, the data for Questions #23-24 are not used to test the hypotheses but are for the sole purpose of giving CASE more insight into possible future interventions. Question #23 asks the respondents how long it took for their group to run out of food. This would help CASE target whether or not more resources are needed to supply students with food during the event. Question #24 asks the respondents about their preferences in watching the actual horse races. With 6 races between the hours of 12:00PM and 3:00PM, CASE is interested in understanding the intentions of the students when they attend Foxfield.

The survey was administered on the World Wide Web. Data from the survey are gathered using a Microsoft Access database.

D. Data Analysis

The data from the Beta Test were analyzed using SPSS Version 13.0. If a respondent skipped an individual question or provided an invalid response, that response was removed from any tests associated with the particular question. Descriptive statistics were derived for the survey questions and t-tests were run based on the original hypotheses. All data that reported never having attended Foxfield were excluded from all Foxfield-related analyses, but were still used for calculating means related to Questions #1-11.

III. Results

All results are report with an alpha level of 0.05. The first analysis compared average number of drinks consumed throughout the course of the week vs. average number of drinks at Foxfield (Hypothesis #1). Table II row 2 presents the baseline Foxfield data for number of drinks consumed and rows 3-9 show the two-sided t-tests that compared each day of the week to the baseline.

<table>
<thead>
<tr>
<th>Event</th>
<th>n</th>
<th>Mean</th>
<th>Std Dev</th>
<th>T-Ratio</th>
<th>P-Value</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foxfield</td>
<td>54</td>
<td>11.61</td>
<td>6.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>74</td>
<td>0.50</td>
<td>1.31</td>
<td>12.11</td>
<td>&lt;0.001</td>
<td>55.99</td>
</tr>
<tr>
<td>Tuesday</td>
<td>75</td>
<td>1.80</td>
<td>2.63</td>
<td>10.28</td>
<td>&lt;0.001</td>
<td>65.03</td>
</tr>
<tr>
<td>Wednesday</td>
<td>76</td>
<td>1.38</td>
<td>2.28</td>
<td>10.86</td>
<td>&lt;0.001</td>
<td>61.92</td>
</tr>
<tr>
<td>Thursday</td>
<td>78</td>
<td>5.31</td>
<td>3.70</td>
<td>6.32</td>
<td>&lt;0.001</td>
<td>75.78</td>
</tr>
<tr>
<td>Friday</td>
<td>78</td>
<td>7.21</td>
<td>3.88</td>
<td>4.38</td>
<td>&lt;0.001</td>
<td>77.90</td>
</tr>
<tr>
<td>Saturday</td>
<td>78</td>
<td>6.87</td>
<td>3.79</td>
<td>4.73</td>
<td>&lt;0.001</td>
<td>76.82</td>
</tr>
<tr>
<td>Sunday</td>
<td>73</td>
<td>0.51</td>
<td>1.37</td>
<td>12.09</td>
<td>&lt;0.001</td>
<td>56.32</td>
</tr>
<tr>
<td>Halloween</td>
<td>78</td>
<td>8.17</td>
<td>4.98</td>
<td>3.23</td>
<td>&lt;0.001</td>
<td>92.61</td>
</tr>
<tr>
<td>Football</td>
<td>77</td>
<td>6.32</td>
<td>4.66</td>
<td>5.04</td>
<td>&lt;0.001</td>
<td>88.46</td>
</tr>
</tbody>
</table>

The tests conclude that there is a significant difference between the mean number of drinks at Foxfield and the number of drinks throughout the course of a week at UVA. The data show that respondents self-reported drinking more at Foxfield than any typical day of the week.

An ANOVA test was also used to compare mean number of drinks for each day of the week (Table III). The test revealed the there is a significant difference in means for 1 or more days of the week. Figure 2 shows the box-plots for number of drinks consumed on each day of the week. The post-hoc Tukey’s test revealed:

- There is a significant difference between the mean number of drinks on Monday compared to Thursday, Friday, and Saturday respectively.
- There is a significant difference between the mean number of drinks on Tuesday compared to Thursday, Friday, and Saturday respectively.
- There is a significant difference between the mean number of drinks on Wednesday compared to Thursday, Friday, and Saturday respectively.
- There is a significant difference between the mean number of drinks on Thursday compared to every other day.
- There is a significant difference between the mean number of drinks on Friday and every other day except for Saturday.
- There is a significant difference between the mean number of drinks on Saturday and every other day except for Friday.
- There is a significant difference between the mean number of drinks on Sunday compared to Thursday, Friday, and Saturday respectively.

The second analysis compared the average number of drinks consumed and hours spent drinking at Halloween vs. Foxfield (Hypothesis #2). Table II row 10 shows the two-sided t-test comparing number of drinks consumed at
Foxfield to Halloween. It concludes that there is a significant difference between the mean number of drinks at Foxfield and number of drinks during Halloween. Table IV row 3 shows the two-sided t-test comparing hours spent drinking at Foxfield to Halloween. There is a significant difference between the mean number of hours spent drinking at Foxfield and number of hours spent drinking during Halloween. In both cases, respondents self-report drinking longer and consuming more drinks at Foxfield.

### Table IV
**Descriptive Statistics and T-Test Results for Hours Drinking at Halloween and Football Games vs. Foxfield**

<table>
<thead>
<tr>
<th>Event</th>
<th>n</th>
<th>Mean</th>
<th>Std Dev</th>
<th>T-Ratio</th>
<th>P-Value</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foxfield</td>
<td>54</td>
<td>7.30</td>
<td>3.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halloween</td>
<td>78</td>
<td>4.29</td>
<td>2.27</td>
<td>5.31</td>
<td>&lt;0.001</td>
<td>80.44</td>
</tr>
<tr>
<td>Football</td>
<td>77</td>
<td>3.78</td>
<td>3.04</td>
<td>5.75</td>
<td>&lt;0.001</td>
<td>99.57</td>
</tr>
</tbody>
</table>

The third analysis compared average number of drinks consumed and hours spent drinking during UVA football games to that of Foxfield (Hypothesis #3). Table II row 11 shows the two-sided t-test comparing number of drinks consumed at Foxfield to home football games. Table IV row 4 shows the two-sided t-test comparing hours spent drinking at Foxfield to football games. Both tests showed that there is a significant difference in mean number of drinks and hours spent drinking between football games and Foxfield. Respondents self-reported drinking longer and consuming more drinks at Foxfield.

The fourth analysis compared average number of drinks among Greek students and non-Greek students (Hypothesis #5). Table V row 2 presents the baseline data for number of drinks consumed by Greek students (member of a fraternity or sorority) and row 3 shows the two-sided t-test that compared non-Greek students to the baseline. There is no significant difference between the mean number of drinks for Greeks and non-Greeks at Foxfield.

### Table V
**Descriptive Statistics and T-Test Results for Number of Drinks for Greeks vs. Non-Greeks**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean</th>
<th>Std Dev</th>
<th>T-Ratio</th>
<th>P-Value</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greek</td>
<td>37</td>
<td>11.62</td>
<td>6.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Greek</td>
<td>17</td>
<td>11.59</td>
<td>6.54</td>
<td>0.17</td>
<td>0.99</td>
<td>32.25</td>
</tr>
</tbody>
</table>

The final analysis compared average number of drinks among those who attended Foxfield once and those who attended multiple times (Hypothesis #7). Table VI row 2 presents the baseline data for number of drinks consumed for students having reported attending Foxfield once and row 3 shows the two-sided t-test that compared those who attended multiple times to those who attended only once. There is no significant difference between the mean number of drinks for respondents that attended Foxfield once and respondents that attended multiple times.

Hypotheses #4 and 6 were not tested because there were not sufficient data for means testing. However, the data from Questions #17-20 were used to calculate simple percentages (Fig. 3). Question #17 asked whether or not the respondent would consume more alcohol if he/she knew they were to get a ride to and from Foxfield via a sober driver. There were 52 valid responses. Of the 52 responses, 30 said “yes” (57.7%).

Questions #18-19 asks whether respondents experienced a negative consequence as a result of another’s drinking and their own drinking, respectively. For Question #18, there were 56 valid responses with 37 respondents checking at least 1 negative consequence (66.1%). For Question #19, there were 56 valid responses with 38 respondents checking at least 1 negative consequence (67.9%).

Question #20 asked whether or not the respondent knew where the first-aid tent is at Foxfield. There were 54 valid responses with 21 “yes” responses (38.8%). Figure 3 shows a breakdown of the responses for Questions #17-20.

![Fig. 3. Breakdown of “no” and “yes” responses for Questions #17-20.](image)

**IV. DISCUSSION AND FUTURE RESEARCH**

With the lack of data that quantify and model the drinking norms at Foxfield, it is difficult for organizations such as the Center for Alcohol and Substance Education and Foxfield management to understand where to focus limited resources available to support safer events, with respect to alcohol consumption and general safety. This project paved a path for research on Foxfield that may support this goal. The survey that has been designed and implemented collects data to test several hypotheses. The Beta Test of this survey was crucial in laying the groundwork for a larger-scale study.

Although the findings are based on a small, non-random sample, the Beta Test has shown that drinking at Foxfield is...
an issue worth of attention. The data in Table II clearly show that some students drink more at Foxfield than during the course of a normal week at UVA. Furthermore, both Tables II and IV show that students self-report drinking more and longer at Foxfield than during Halloween and football games, known to be high drinking events.

Prior research by CASE has shown that in general, students that are associated with Greek organizations tend to drink more at on-grounds events than non-Greek students [4]. This result has caused CASE to focus intervention activities on the Greek community. However, the present analysis has also shown that there is no difference in drinking patterns at Foxfield for Greek and non-Greek students, meaning that CASE may have to try other strategies for the Foxfield event. Resources to educate students on high-risk drinking at Foxfield should not just be focused on the Greek community but on the entire student body. In addition, the results show that experience at Foxfield does not seem to dictate drinking behavior so educational programs should not only be focused on more junior students.

With respect to potential interventions, the data show that focusing exclusively on drunk driving may actually increase levels of binge drinking for non-drivers. As a result, interventions may need to focus more globally on high-risk drinking rather than only to reduce the number of drunk drivers. More than half of the respondents also admitted to negative consequences, corroborating the results of the HBS. These data uphold the assumption that high-risk drinking poses a health threat and creates an unsafe environment for drinkers and non-drinkers alike. Information concerning how to prepare for a day of alcohol consumption may be beneficial. Additionally, less than 40% of the respondents knew where the first-aid tent was, indicating that better communication regarding available resources at Foxfield may be necessary.

The 2006 running of the Foxfield Races will be held on Saturday, April 29th. Following this year’s Foxfield event, this survey will be sent to a much larger sample of ~2,000 undergraduate UVA students. This sample will be analyzed and will provide a more accurate model than the Beta Test. The analysis will be presented to CASE in order to begin focusing resources and implementing programs to curb binge drinking at the 2007 Foxfield Races.

While drinking at Foxfield is the major concern of this endeavor, there is a larger problem that it is identifying. Although alcohol is a staple facet to the culture of college life, it is the choices that students make that are the root of the problem. Some of the data retrieved through the Beta Test reveal the disturbing truth that many students drink with an apparent lack of care for the safety of themselves and others. These students seem to take on a philosophy of “it will never happen to me” when there have indeed been hundreds of thousands of college students that have paid a high price as a result of their drinking choices.

ACKNOWLEDGEMENTS

The authors thank the professionals at the Center for Alcohol and Substance Education who provided their expertise for this study, particularly Health Educator, Kelly McCabe Sisk. The authors would also like to thank all of the respondents to the Beta Test.

REFERENCES

[1] Wechsler, Henry, Ph.D; Jae Eun Lee, DrPH; Meichun Kuo, ScD; Mark Seibring, BA, BS; Toben F. Nelson, MS; Hang Lee, PhD, "Trends in College Binge Drinking During a Period of Increased Prevention Efforts" Journal of American College Health, Vol. 50, No. 5, March 2002.