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## The Drinking Patterns and Problems of a National Sample of College Students, 1994

### ABSTRACT

Over 12,000 university students from every state were administered the Student Alcohol Questionnaire during the 1993-1994 academic year. Of all students 72.0% consumed alcohol at least once a year and 20.6% were heavy drinkers (consuming 5 or more drinks per occasion once a week or more) [**"binge drinking" is referred to as heavy drinking** in this article]. A mean of 9.6 drinks per week was consumed by all students in the sample, 31% of males consumed over 21 drinks per week and 19.2% of females consumed over 14 drinks a week. Of the drinkers, 28.4% were heavy and 71.6% were light to moderate drinkers and they consumed a mean of 10.9 drinks per week. A significantly higher proportion of men, Whites, under 21 year olds, Roman Catholics, individuals to whom religion was not important, individuals with low grade point averages, fraternity/sorority members, students attending college in the North East part of the United States, in small communities, private schools and colleges under 10,000 students exhibited heavier drinking and a higher incidence of problems related to drinking. These results are similar to other studies which have been accomplished over the past two decades. The results do not support dramatic changes in the demography of heavier drinkers within most demographic categories.

It was concluded that traditional demographic variables need to be taken into consideration when planning campus educational and prevention programs. vIn times of limited budgets, the primary target needs to be these high risk students.

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### INTRODUCTION

Educational efforts, prevention programming and comprehensive policies concerning alcohol consumption at the university level have increased over the past decade, largely due to increased funding from the federal level. However, this funding is likely to decline. With more limited resources, universities may need to find the most efficient strategies for delivering alcohol abuse prevention (Gonzalez 1993). Rather than aiming efforts at the total student body, limited funds would be better spent on programming for those at greatest risk for alcohol abuse.

Society is constantly changing and groups at greatest risk in an earlier era may no longer be so. Moreover, educational and prevention efforts considered important in the late 1980's may no longer be relevant to the mid 1990's. It is common knowledge that there have been numerous changes in the structure of American society. These include changes in gender roles and behavioral expectations, changes in socio-economic status of racial and ethnic groups, increased religious intermarriage, and social pressures for earlier maturity of youth. In addition, our society has seen changes in the law concerning alcohol use and the decrease in rural urban differences(Stark, 1994).

Because of possible changes in drinking patterns within these demographic categories, the purpose of this study was to gather new baseline information which could be used for curriculum development. A second purpose of this descriptive cross-sectional study was to test the hypothesis that demographic variables are less important now than in the past in relation to drinking behaviors. The null hypotheses is that there are no longer any differences in drinking patterns or problems within the different demographic categories.

## **REVIEW OF THE LITERATURE**

Societal changes in the United States may be reflected in drinking patterns and problems. There is mixed evidence regarding the importance of demographic variables in relation to drinking among the college population. Various personal, academic and social characteristics have been associated with drinking and drinking problems and gender has been one of the most important predictors of these phenomena. The majority of studies have shown that a higher percentage of men drink and experience drinking-related problems than women (Engs and Hanson, 1990; Loughlin and Kayson, 1990; Saltz and Elandt, 1986; Engs and Hanson 1985). In addition, recent studies (Billingham, Post and Gross 1993; Gustafson 1993; and Robinson, Gloria, Roth, and Schuetter 1993), have reported that men generally consume alcohol more frequently and/or in greater quantities than women. Other investigations have disputed this, however, finding little or no difference between males and females (Kodman and Stumack, 1984; Berkowitz and Perkins, 1985; Perkins, 1992).

Another important variable which is predictive of drinking patterns and problems related to drinking is racial or ethnic background. Older studies in the United States have reported non-whites having a higher rate of heavy drinking than whites (Maddox and Williams, 1968). Current research (Wechsler, Dowdall, Davenport and Castillo, 1995; Williams, Newby, and Kanitz 1993; Crowley 1991; Schall, Weede, and Maltzman 1991; and Hanson and Engs 1990) has shown that non-white college students report lower rates of both alcohol consumption and drinking-related problems. On the other hand, one study showed drinking rates equal to that of whites (Connors, Maisto, and Watson, 1989).

The relationship between drinking and religious affiliation suggests the highest proportion of drinkers are typically found among Jews, a slightly a lower rate among Catholics and the lowest among Protestants. This has been found in American (Carlucci, et al. 1993), American and Canadian(Engs, Hanson and Glicksman, 1990) and a Scottish(Mullen, Blaxter, and Dyer, 1986) sample. Some reports (Miller and Garrison, 1982; Engs and Hanson, 1985) also indicate a direct relationship between the lack of importance of religion and frequent or heavy drinking but not all (Reiskin and Wechsler, 1981).

While positive association between both quantity and frequency of drinking with both age and with college year have been documented (Wechsler, Dowdall, Davenport and Castillo, 1995; Engs and Hanson 1985,1989; and Crum, Helzer and Anthony, 1993), some studies have reported either relatively little difference or negative association with college year (Lotterhos, Holbert, and Glover, 1990; Schall, et al. 1991; Gross, 1993). An inverse relationship between student drinking and academic achievement has been reported by numerous studies (Engs and Hanson 1985; Ford and Carr, 1990; Borges and Hansen, 1993). Evidence suggests that pledges or members of sororities and fraternities report greater rates of alcohol consumption and drinking-related problems than non-Greeks (Kodman and Sturmak, 1984; Tampke 1990). Institutional characteristics are also associated with different drinking patterns. The frequency and quantity of drinking are lower in the South, in

urban areas, in large and in public institutions. However, these differences may be waning (Engs and Hanson, 1985; Centers for Disease Control and Prevention, 1994).

## METHODS

### The Instrument

A pre-coded anonymous instrument, the Student Alcohol Questionnaire (SAQ), was used to collect data (Engs 1977; Hanson 1972). The questionnaire includes various demographic items; six questions concerning quantity and frequency of wine, spirits and beer consumption; and 19 items regarding possible negative health/personal, social/academic, legal/violence or drinking/driving consequences resulting from alcohol consumption. The SAQ also contains alcohol knowledge and attitude questions.

For this report, 19 items regarding possible consequences of alcohol consumption are reported. The items are listed in Table III. Students were asked to indicate if a given problem had occurred at least once during the preceding year. Six items used to calculate quantity-frequency and mean amount of alcohol consumed were also utilized.

Instructions explained the voluntary nature of participation, as approved by the authors' Institutional Review Boards. The instrument has been widely used or adapted by a number of authors. Some recent examples include Hong and Isralowitz(1989), Maney(1990), Hughes and Dodder(1992), Carlucci, Genova, Rubackin, and Kayson(1993), Flynn and Brown(1991), Gross(1993) and Haworth-Hoeppner, Globetti, Stem, and Morasco(1993) among others in the United States and other countries. The instrument has demonstrated internal consistency reliability of .79 for all items, excluding demographic factors. An updated reliability analysis (Engs and Hanson 1994) has demonstrated Spearman-Brown reliability coefficients of .84 for the Quantity/Frequency and .89 for the Problems Related to Drinking sub-scales. The values of Cronbach alpha reliability were .86 and .92 respectively, for these sub-scales.

### Sample

This sample is part of an ongoing study of drinking patterns and problems of students attending four-year colleges and universities from every state in the United States that was begun in 1982. A number of studies have been published over the past 15 years from the five times data have been collected(See references for citation by the author's for some examples). Institutions, were selected to form a "quota sample". Colleges were chosen to be representative of all four-year institutions of higher education in terms of financial support(public or private) and size(over and under 10,000 student enrollments). For example, approximately 65% of students attend state supported schools in terms of financial control in the United States(Snyder, 1993). This same proportion of institutions, from each state, were randomly selected from a list of colleges and universities which had health, physical education or sociology departments(Simon, 1987; College Blue Book, 1993; Eta Sigma Gamma, 1992). The department head was then contacted about participation in the study. If an institution declined to participate, another institution with similar demographics, eg, state supported, small community, with over 10,000 students, in the same state was then asked to take part.

For collecting the sample, the authors asked faculty, identified by the departmental chair, who teach general elective survey-type classes for which all students in all academic years are eligible.

Examples would include courses such as personal health, first aid, and basic sociology. These faculty were asked to distribute the SAQ to students for in-class completion and to return the completed questionnaires to the researchers. The return rate for complete and usable questionnaires exceeded 97%. Due to the fact that the whole class was surveyed, this "convenience sample" is limited to students in classes from institutions where instructors were willing to distribute the questionnaire.

The resulting sample consisted of 12,081 students from 168 colleges and universities and included the following Personal demographic characteristics: 38.5% men and 61.5% women, 81.6% white, and 18.4% non-white; 31.8% Roman Catholics, 27.3% Protestants whose religions allowed drinking, 21.5% Protestants whose religion does not allow drinking, 1.9% Jews, and 17.5% none or other. 57.8% were under and 42.2% were over the age of 21 years. The mean age was 20.5. The sample over-represents females and non-whites compared to national statistics regarding the demographics of college students (Snyder, 1993)a.

Among Academic and Social Behavioral characteristics, the sample consisted of 27.7% freshmen, 23.8% sophomores, 24.6% juniors, and 23.9% seniors. 16.2% were pledges or members of a fraternity or sorority.

Institutional characteristics: twenty-four percent of the sample attended school in the Northeastern region of the United States, 28.9% in the North Central region; 30.0% in the Southern, and 17.1% in the Western region (including Alaska and Hawaii) of the United States. Of the total sample, 68.1% were from colleges with enrollments of 10,000 or more, and 31.9% were from colleges with a student body of less than 10,000; 81.7% were from public and 18.3% of were from private institutions; 69.5% were from schools with surrounding communities of populations under 100,000, 20.0% from communities between 100-500,000, and 10.5% were from surrounding communities with populations over 500,000.

A limitation to the study was that the sample over-represents females, non-whites and those who attended public schools compared to the universe of students attending four year institution of higher learning in the United States (Snyder 1993)a. Because of its large size, the sample had high power for detecting significant differences. On the other hand, the large sample size also introduces the chance of type I error.

### Calculations

All calculations were accomplished on the Indiana University VAX computer using the SPSS program(Norusis, 1990).

#### Mean number of drinks per week

Several methods for calculating the amount of alcohol consumed are in common use. They include calculating the mean grams or ounces of absolute alcohol or the mean drinks or units per week or per day. In self report studies, determining grams or ounces is often an imprecise calculation as it is based upon recall. In addition people often underestimate the amount they have consumed (Thomas, Goddard, Hickman and Hunter 1993).

Therefore, in recent years it has become more common to calculate the mean number of drinks, or units, per week or day of all alcoholic beverages consumed in North America and Great Britain

(Lemmon, Tan and Knibbe, 1988; Engs, Hanson, Glicksman and Smythe, 1990; Thomas, Goddard, Hickman and Hunter 1993; Engs 1990; Engs and Hanson, 1994; Gaziano, Buring, Breslow, Goldharber, Rosner, VanDenburgh, Willett and Hennekens, 1993). Calculations for this method are based upon the "rule of thumb" that an average can or glass of tavern beer(12 ounces) is roughly equivalent to an average size glass of wine (5 ounces) or shot of spirits (one and half ounce) in terms of grams (approximately 13) of absolute alcohol(Consumer and Food Economics Institute, 1990).

For the calculations, the instrument assessed the usual frequency and quantity of beer, wine and spirits consumed by student. The frequency and quantity response categories were assigned constant values b. To compute the total number of drinks consumed on a weekly basis, a mean score was calculated by multiplying the re-coded quantity by the re-coded frequency weight for each beverage type and summing the three scores. A One-Way Analysis of Variance and the t-test was used to compare the mean number of drinks within demographic variables. The post-hoc Scheffe test was used to determine where differences occurred.

#### Calculating "at risk drinking" for males and females

Several recent reports suggest that up to 21 drinks per week for males and 14 drinks for females is considered the maximum safe consumption limit in terms of acute and chronic health consequences(Engs and Aldo-Benson, 1995; Cohen, S., Tyrrell, D.A., Russell, M.A., Jarvis, M.J., and Smith, A.P., 1993; Garg, Wagener, and Madans, 1993; Gaziano, J.M., Buring, J.E., Breslow, J.L., Goldharber, S.Z., Rosner, R., VanDenburgh, M., Willett, W. and Hennekens, C.H., 1993; Bofetta and Garfinkel, 1990).

Chi-Square analysis was accomplished for males and females comparing the percent who had consumed over the maximum amount recommended for their gender. These students were defined as at risk drinkers. In contrast, males who consumed 21 and females who consumed 14 drinks or less per week during the previous 12 months were considered low risk drinkers.

#### Quantity/Frequency drinking level

Based upon a method suggested by Cahalen(1969) and adapted by Engs(1977), a quantity/frequency level of drinking was calculated to identify different levels of drinkers for the total group. Individuals were divided into three categories: Abstainers, Light to Moderate, and Heavier Drinkersc. These were analyzed by Chi-Square analysis.

#### Drinking related problems

Only students who had consumed any alcohol during the previous 12 months, ie, "drinkers", were asked to report on problem behaviors associated with drinking. Students who had not consumed any alcohol during the previous 12 months were asked to skip these items. A mean problem score was calculated for each student by assigning one point for each of the 19 problems experienced at least once during the previous 12 months. These scores were subjected to t-tests, and one-way analysis of variance and post-hoc Scheffe tests. In addition Chi-square analyses were used to determine possible differences in the percentages of students exhibiting each of the 19 problems for gender among low risk and among at risk drinkers. Males consuming over 21 and females consuming over 14 drinks per week were select into the at risk drinking category. Likewise, males and females under this level were selected out for the low risk category.



| <b>Importance of Religion</b> |      |      |      |       |      |      |       |
|-------------------------------|------|------|------|-------|------|------|-------|
| Very                          | 7923 | 32.9 | 50.4 | 16.7* | 5315 | 75.1 | 24.9* |
| Not                           | 3985 | 16.0 | 55.4 | 28.7  | 3348 | 65.9 | 34.1  |

\*p<.001 +p<.05

a. Note sample size in each category do not necessarily add up to the total sample due to missing data for each analysis.

Table 2 indicates that among drinkers women consumed significantly ( $p < .001$ ,  $t=27.2$ ) fewer mean drinks per week compared to men.

**Table 2: Results of One-Way Anova and of t-test's of the mean drinks per week consumed and number of problems related to drinking by personal demographic characteristics among DRINKERS.**

|   | <b>N</b> | <b>Mean drinks per week</b> | <b>(sd)</b> | <b>Number of problems</b> | <b>(sd)</b> |
|---|----------|-----------------------------|-------------|---------------------------|-------------|
| <b>Personal Demographic Characteristics</b> |          |                             |             |                           |             |
| <b>Gender</b>                               |          |                             |             |                           |             |
| Males                                       | 4567     | 14.3                        | (17.1)*     | 3.4                       | (3.4)*      |
| Females                                     | 7080     | 6.6                         | (10.6)      | 2.0                       | (2.4)       |
| <b>Race</b>                                 |          |                             |             |                           |             |
| White                                       | 9571     | 10.6                        | (14.4)*     | 2.7                       | (3.0)*      |
| Non-white                                   | 1107     | 4.2                         | (10.1)      | 1.1                       | (3.5)       |
| <b>Age</b>                                  |          |                             |             |                           |             |
| Under 21                                    | 6936     | 9.5                         | (14.0)      | 2.4                       | (2.9)       |
| Over 21                                     | 2891     | 9.0                         | (13.8)      | 2.5                       | (2.9)       |
| <b>Religious Background</b>                 |          |                             |             |                           |             |
| Catholic                                    | 3741     | 12.4                        | (14.7)*     | 3.1                       | (3.0)*      |
| Jewish                                      | 225      | 13.0                        | (16.7)      | 2.7                       | (2.9)       |
| Protestant, drinking                        | 3209     | 10.2                        | (14.1)      | 2.7                       | (3.0)       |
| Protestant, no drinking                     | 2494     | 5.7                         | (11.4)      | 1.8                       | (2.7)       |
| <b>Importance of Religion</b>               |          |                             |             |                           |             |
| Very  | 3568     | 5.3                         | (11.2)*     | 1.6                       | (2.6)*      |
| Not   | 4101     | 10.4                        | (13.5)      | 2.8                       | (2.8)       |

*Race:* A significant difference in student drinking patterns due to race was found ( $p < .001$ ,  $X^2=94.12$ ). More whites compared to non-whites consumed alcohol. Among drinkers ( $p < .001$ ,  $X^2=94.1$ ) twice as many whites compared to non-whites were Heavy Drinkers. White drinkers consumed significantly ( $p < .001$ ,  $t=18.9$ ) more than twice as many drinks per week compared to non-white drinkers.

*Age:* There was a significant difference ( $p < .001$ ,  $X^2 = 57.3$ ) in the drinking patterns of older compared to younger students. Likewise among drinkers, a significantly higher percent ( $p < .001$ ,  $X^2 = 55.4$ ) of underage students were heavy drinkers compared to legal age students. Among the legal-aged drinkers, there was a higher percentage of light-moderate consumers but no difference in the mean number of drinks per week, compared to under age drinkers.

*Religion:* Almost half of all Protestants, whose religion does not allow drinking (Mormon, Baptist, Pentecostal, etc.), and about a fifth of Protestants whose religion does allow drinking were abstainers. In contrast few Catholics and Jews fell into this category ( $p < .001$ ,  $X^2 = 58.3$ ). Among drinkers, Catholics ( $p < .001$ ,  $X^2 = 61.3$ ) had the highest percentage of Heavy Drinkers compared to the other groups. The Scheffe post hoc test for the MANOVA revealed that Catholics and Jews consumed the highest mean number of drinks per week ( $p < .001$ ,  $F = 102.2$ ) compared to the two Protestant groups.

*Importance of Religion:* A higher percent of drinkers were found among those who did not consider religion important compared to those who considered it important ( $p < .001$ ,  $X^2 = 474.34$ ). Among drinkers, individuals to whom religion was not important were also more likely to be Heavy Drinkers ( $p < .001$ ,  $X^2 = 85.3$ ). The less religious also consumed twice as many drinks compared to very religious individuals ( $p < .001$ ,  $t = 18.1$ ).

#### Academic and Social Characteristics

*Class standing:* Table 3 reveals that the drinking patterns of students changed by year in school ( $p < .001$ ,  $X^2 = 227.77$ ). Among drinkers, there was a gradual decrease, however, in the percent of Heavy Drinkers from the first to the fourth years of college ( $p < .05$ ,  $X^2 = 8.1$ ). However, there was no significant difference in mean drinks consumed per week (See table 4).

**Table 3: Chi-square results of the percent of students exhibiting each quantity-frequency level for ALL STUDENTS, and for DRINKERS ONLY within academic and social characteristics <sup>a</sup>.**

|                            | All Students |         |                |       | Drinkers Only |                |                   |
|----------------------------|--------------|---------|----------------|-------|---------------|----------------|-------------------|
|                            | N            | Abstain | Light/Moderate | Heavy | N             | Light/Moderate | Heavy             |
| <b>Class Year</b>          |              |         |                |       |               |                |                   |
| Freshman                   | 3352         | 35.8    | 45.2           | 19.0* | 2152          | 70.4           | 29.6 <sup>+</sup> |
| Sophomore                  | 2883         | 28.6    | 50.0           | 21.4  | 2059          | 70.0           | 30.0              |
| Junior                     | 2973         | 23.9    | 54.6           | 21.5  | 2262          | 71.8           | 28.2              |
| Senior                     | 2527         | 19.4    | 59.3           | 21.3  | 2036          | 73.6           | 26.4              |
| <b>Grade Point Average</b> |              |         |                |       |               |                |                   |
| 4.0                        | 537          | 41.0    | 50.3           | 8.8*  | 317           | 85.2           | 14.8*             |
| 3.5                        | 2387         | 32.6    | 52.6           | 14.7  | 1608          | 78.1           | 21.9              |
| 3.0                        | 4499         | 27.0    | 53.5           | 19.5  | 3285          | 73.3           | 26.7              |
| 2.5                        | 3205         | 21.9    | 52.3           | 25.8  | 2502          | 66.9           | 33.1              |
| 2.0                        | 814          | 23.8    | 47.5           | 28.6  | 620           | 62.4           | 37.6              |
| <2.0                       | 179          | 24.6    | 39.7           | 35.8  | 135           | 52.6           | 47.4              |

| Member/pledge of fraternity/sorority |        |      |      |       |      |      |       |
|--------------------------------------|--------|------|------|-------|------|------|-------|
| Member                               | 1,719  | 12.2 | 53.8 | 34.0* | 1509 | 61.3 | 38.7* |
| Non-member                           | 10,115 | 29.7 | 52.0 | 18.3  | 7111 | 73.9 | 26.1  |

\*p<.001 +p<.05

a. Note sample size in each category do not necessarily add up to the total sample due to missing data for each analysis.

*Grade Point Average (GPA)*: There was a significant inverse relationship between GPA and the percent of students who drank or were Heavy Drinkers ( $p < .001$ ,  $X^2=277.17$ ). Among drinkers the lower the GPA the higher the percentage who drank or were heavy drinkers ( $p < .001$ ,  $X^2 =143.9$ ). Those students with 4.0 GPAs consumed a third of the number of drinks compared to those with GPAs under 2.0 ( $p < .001$ ,  $F=38.5$ )

**Table 4: Results of One-Way ANOVA and of t-test's of the mean drinks per week consumed and number of problems related to drinking by academic and social characteristics among DRINKERS.**

|   | N    | Mean Drinks per week | (sd)                | Number of problems | (sd)               |
|---|------|----------------------|---------------------|--------------------|--------------------|
| <b>Class Standing</b>                       |      |                      |                     |                    |                    |
| Freshman                                    | 3307 | 8.6                  | (14.2) <sup>+</sup> | 2.0                | (2.7)              |
| Sophomore                                   | 2818 | 9.6                  | (14.0)              | 2.5                | (2.9)              |
| Junior                                      | 2881 | 10.0                 | (13.7)              | 2.7                | (2.9)              |
| Senior                                      | 2429 | 10.7                 | (14.0)              | 2.9                | (2.9)              |
| <b>Grade Point Average</b>                  |      |                      |                     |                    |                    |
| 4.0   | 495  | 5.9                  | (14.5) <sup>*</sup> | 1.4                | (2.4) <sup>*</sup> |
| 3.5   | 2245 | 7.6                  | (12.4)              | 2.0                | (2.6)              |
| 3.0   | 4406 | 9.2                  | (13.6)              | 2.4                | (2.8)              |
| 2.5   | 3159 | 11.4                 | (14.4)              | 3.1                | (3.1)              |
| 2.0   | 812  | 12.2                 | (16.4)              | 3.1                | (3.2)              |
| <2.0  | 176  | 14.8                 | (18.8)              | 3.7                | (3.7)              |
| <b>Member/Pledge of fraternity/sorority</b> |      |                      |                     |                    |                    |
| Member                                      |      | 15.4                 | (17.0) <sup>*</sup> | 3.6                | (3.2) <sup>*</sup> |
| Non-member                                  |      | 8.6                  | (13.1)              | 2.3                | (2.8)              |

*Pledge/member of fraternity/sorority(Greeks)*: A higher percentage of Greeks were drinkers compared to non-Greeks ( $p < .001$ ,  $X^2 =64.9$ ). Greek drinkers also had a higher percentage of Heavy Drinkers compared to non-members ( $p < .001$ ,  $X^2 =97.4$ ). In addition Greeks consumed almost twice as many drinks per week compared to non-Greeks ( $p < .001$ ,  $t=15.6$ ).

Demographic Characteristics of Institutions Students attended

*Region of the country:* Student drinking patterns also varied according to the region of the country in which they were attending school ( $p < .001$ ,  $X^2=433.82$ ). The highest proportion of drinkers were found in the North central region, followed by the North Eastern, Southern, and Western regions, respectively (See table 5). Among drinker, the percentage of Heavy Drinkers ( $p < .001$   $X^2 =151.5$ ) was greatest in the North Eastern portion of the country, followed by the North Central, Southern and Western areas. However, there were no significant difference in alcohol consumption between the four regions of the country.

**Table 5: Chi-square results of the percent of students exhibiting each quantity-frequency level for ALL STUDENTS, and for DRINKERS ONLY, within institutional characteristics <sup>a</sup>**

|   | All Students |         |                |       | Drinkers Only |                |                   |
|---|--------------|---------|----------------|-------|---------------|----------------|-------------------|
|   | N            | Abstain | Light/Moderate | Heavy | N             | Light/Moderate | Heavy             |
| <b>Region of Country</b>                            |              |         |                |       |               |                |                   |
| Northeast   | 2900         | 21.5    | 49.9           | 28.6* | 2277          | 63.5           | 36.5*             |
| Northcentral  | 3497         | 20.7    | 55.5           | 23.8  | 2772          | 70.0           | 30.0              |
| South   | 3377         | 35.7    | 48.9           | 15.4  | 2170          | 76.0           | 24.0              |
| West  | 2228         | 33.0    | 53.7           | 13.3  | 1492          | 80.2           | 19.8              |
| <b>Community Size Institution located</b>           |              |         |                |       |               |                |                   |
| <100,000  | 8402         | 25.9    | 51.5           | 22.6* | 6222          | 69.5           | 30.5*             |
| 100-500,000   | 2419         | 32.1    | 51.5           | 16.4  | 1642          | 75.8           | 24.2              |
| >500,000  | 1180         | 28.3    | 56.4           | 15.3  | 846           | 78.7           | 21.3              |
| <b>Type of school in terms of financial support</b> |              |         |                |       |               |                |                   |
| Public  | 9876         | 26.5    | 53.3           | 20.2* | 7258          | 72.5           | 27.5*             |
| Private   | 1942         | 32.5    | 45.4           | 22.0  | 1310          | 67.3           | 32.7              |
| <b>School-Size</b>                                  |              |         |                |       |               |                |                   |
| <10,000   | 8233         | 228.6   | 50.3           | 21.1* | 5879          | 70.5           | 29.5 <sup>+</sup> |
| >10,000   | 3769         | 24.9    | 55.5           | 19.7  | 2832          | 73.8           | 26.2              |
| <b>Total<sup>a</sup></b>                            | 12003        | 27.4    | 52.0           | 20.6  | 8711          | 72.6           | 28.4              |

\* $p < .001$  + $p < .05$

a. Note sample size in each category do not necessarily add up to the total sample due to missing data for each analysis.

*Type of School, School-size and Community-size:* A slightly lower percentage of drinkers was found among students attending private schools, compared to publicly funded schools ( $p < .001$ ,  $X^2=43.6$ ).

On the other hand, among drinkers, slightly more private than public school students were Heavy Drinkers ( $p < .001$ ,  $X^2 = 14.7$ ), but there was no difference in amount consumed.

There was also a significant difference between the percent of drinkers by size of school ( $p < .001$ ,  $X^2 = 15.7$ ) and community ( $p < .001$ ,  $X^2 = 46.7$ ). Schools with enrollments under 10,000 reported lower proportion of drinkers, compared to schools with enrollments greater than 10,000. The mean number of drinks did not differ between large and small schools or between private and public schools (see Table 6). Individuals attending schools in smaller communities consumed significantly more alcohol than did those at schools in large cities ( $p < .001$ ,  $F = 24.2$ ).

**Table 6: Results of One-Way ANOVA and of t-test's of the mean drinks per week consumed and number of problems related to drinking by institutional demographic characteristics among DRINKERS**

|   | N    | Mean drinks per week | (sd)    | Mean number of problems | (sd)   |
|---|------|----------------------|---------|-------------------------|--------|
| <b>Region of the country</b>                        |      |                      |         |                         |        |
| Northeast   | 2601 | 13.6                 | (15.0)  | 3.1                     | (2.9)  |
| North Central                                       | 3153 | 11.6                 | (14.5)  | 3.0                     | (2.9)  |
| South   | 2714 | 9.4                  | (14.2)  | 2.7                     | (2.9)  |
| West  | 1782 | 8.4                  | (13.1)  | 2.6                     | (2.8)  |
| <b>Community-Size institution located</b>           |      |                      |         |                         |        |
| <100,000  | 8177 | 10.2                 | (10.6)* | 2.6                     | (2.9)+ |
| 100-500,000   | 2333 | 8.2                  | (9.8)   | 2.2                     | (2.9)  |
| >100,000  | 1155 | 8.3                  | (9.2)   | 2.2                     | (2.8)  |
| <b>Type of school in terms of financial support</b> |      |                      |         |                         |        |
| Public  | 9560 | 9.6                  | (14.0)  | 2.6                     | (2.9)+ |
| Private   | 1923 | 9.8                  | (14.6)  | 2.3                     | (3.0)  |
| <b>School-Size</b>                                  |      |                      |         |                         |        |
| <10,000   | 8001 | 9.7                  | (14.5)  | 2.5                     | (3.0)  |
| >10,000   | 3665 | 9.5                  | (13.0)  | 2.6                     | (2.8)  |
| <b>Total</b>  |      | 10.9                 | (13.7)  | 2.5                     | (2.9)  |

### Problems related to drinking

Males had a significantly ( $p < .001$ ,  $t = 23.4$ ) higher mean drinking problem score compared to females (see table 2). Chi-square analysis of 19 problems related to drinking were performed (See Table 7) separately for low risk and for high risk drinkers for each gender. In most cases, a higher

percent of males exhibited the problem. The exceptions were nausea and vomiting, missing classes because of hangover and being forced to have sex among the higher risk drinkers.

**Table 7: Chi-square results of percentage of drinkers who reported health/personal, social/academic, legal/violence and drinking/driving behaviors as a result of alcohol consumption for low-risk drinkers and for high risk drinkers (over 21 drinks per week for males and over 14 drinks per week for females).**

|   | Low Risk Drinkers   |                       | High Risk Drinkers  |                      |
|---|---------------------|-----------------------|---------------------|----------------------|
|   | <21 Males<br>N=2232 | <14 Females<br>N=4938 | >21 Males<br>N=1426 | >14 Females<br>N=766 |
| <u>Health/Personal</u>                          |                     |                       |                     |                      |
| Hangovers                                       | 50.4                | 49.2                  | 92.6                | 94.0                 |
| Nausea and vomiting                             | 33.1                | 33.2                  | 76.1                | 81.8+                |
| Thought might have problem with drinking        | 3.7                 | 2.6+                  | 21.3                | 15.8+                |
| <u>Academic/Social</u>                          |                     |                       |                     |                      |
| Attended class after drinking                   | 3.3                 | 1.5*                  | 21.3                | 13.1*                |
| Cut classes after drinking                      | 4.5                 | 3.0+                  | 29.8                | 23.1*                |
| Missed classes due to hangover                  | 10.7                | 10.6                  | 53.8                | 58.6+                |
| Lower grade because of drinking                 | 2.4                 | 1.5+                  | 19.3                | 15.2+                |
| Played drinking games                           | 74.4                | 70.0*                 | 75.1                | 50.0*                |
| Been criticized by a date for drinking too much | 9.6                 | 6.8*                  | 31.6                | 22.5*                |
| <u>Legal</u>                                    |                     |                       |                     |                      |
| Forced someone or were forced to have sex       | 3.0                 | 3.3                   | 6.2                 | 12.2*                |
| Had trouble with the law                        | 2.9                 | 1.3*                  | 22.5                | 11.0*                |
| In trouble with school administration           | .9                  | .5                    | 7.4                 | 4.7                  |
| Got into fights                                 | 7.8                 | 5.8+                  | 38.8                | 29.8*                |
| Used a fake ID                                  | 13.3                | 13.8                  | 40.9                | 49.5*                |
| Damaged Property                                | 6.1                 | 1.8*                  | 33.2                | 12.5                 |
| <u>Drinking/Driving</u>                         |                     |                       |                     |                      |
| Driving after dinking                           | 27.0                | 19.5*                 | 72.1                | 59.8*                |
| Drinking while driving                          | 16.3                | 11.8*                 | 59.2                | 48.3                 |
| Driving Drunk                                   | 16.9                | 10.1*                 | 55.9                | 42.8*                |
| DWI offense                                     | .7                  | .3+                   | 3.4                 | 1.4+                 |

+p<.05 \*p<.001

Whites had a higher mean problem score than did non-whites ( $p < .001$ ,  $t=21.8$ ). There was a significant difference in mean problem scores ( $p < .001$ ,  $F=102.3$ ) between religious groups, with Catholics having the highest mean(see Table 2). Those to whom religion was not important had the highest score ( $p < .001$ , $t=19.2$ ), as did those with the lowest GPA ( $p < .001$ ,  $t=6.1$ ), and those associated with Fraternity/sororities ( $p < .001$ ,  $t=15.6$ ). Students who attended college in the North East and North Central part of the country ( $p < .001$ ,  $F=38.2$ ), or small communities ( $p < .05$ ,  $F=22.2$ ), or public schools ( $p < .05$ ,  $t=3.2$ ) also had the highest mean problem scores(Table 6).

## DISCUSSION AND RECOMMENDATIONS

There were significant differences in drinking patterns for all demographic groups. In terms of mean drinks per week there were no differences in consumption due to age, type of school, and school size. For the number of drinking related problems there were no differences due to age, year in school, region of the country and size of school.

Major findings were that whites, males, Catholics, the non-religious, those with low grade point average, those affiliated with fraternities/sororities, those attending colleges located in the Northeast, which are private, have enrollment under 10,000 and in small communities were most at risk for heavier drinking. These results do not indicate dramatic changes in drinking patterns between most of the demographic groups as these results have been found over the past two decades by various researchers.

Although there have been social changes which have given women more freedom for career choices and independence, this was not reflected in a smaller gap between male and female students in this sample in regard to alcohol consumption. When the percent of males and females who were considered at risk drinkers for their gender were examined (over 21 drinks per week for males and 14 for females), about one out of three males compared to about one out of five females fell into the At Risk category for their gender.

The higher percent of underage students classified as heavy drinkers can perhaps be explained by Reactance Theory (Engs and Hanson, 1990; Allen, Sprenkel and Vitale, 1994 ). Drinking is perceived as part of the college experience by most students. Prohibition of alcohol for those under the age of 21, makes it more alluring since it is illegal. Since students feel they have the right to drink, illicit alcohol consumption has gone "underground" away from adult monitoring. Because these illegal drinkers do not have adult social pressure to limit their consumption to more moderate levels, they are likely to consume more drinks on the fewer occasions when alcohol is available. The increase in percent of students who drink from freshmen to seniors may also supports this hypotheses.

As discussed in the section concerning limitations to the study, the sample is over-represented in females, non-white's state supported institutions compared to the universe of students in the United States. This sample bias may have caused underestimated of drinking levels for some of the demographic categories. For most of the problem related to drinking, a higher proportion of males reported problems compared to females among both Low Risk and High Risk drinkers even when the gender effect of maximum safe limit is taken into consideration.

The results of this study can be useful for curricular planning. Rather than directing massive unfocused prevention efforts indiscriminately at all university students, it would appear prudent to tailor

and target efforts to those groups that are at most risk for alcohol abuse. These would include being under age 21, white, male, low grade point average, fraternity member/ pledge and non religious. Programs aimed at these specific groups would be a much more efficient use of resources in an era of fiscal restraint.

#### FOOTNOTES

a. The percent of women among university students as a whole in the United States was 52% in 1991, the last year for which data are available, 14% of students were non-white and 68% attended public institutions (Snyder 1993, Table 174, p 180).

b. Loading values used to calculate mean number of drinks per week. For the usual frequency of drinking by each respondent: every day = 7.0; at least one a week but not daily = 3.5; at least once a month but not weekly = 0.5; more than once a year but not monthly = 0.12; one a year or less = 0.02; never = 0. Values for number of drinks of beer, wine, distilled spirits: 7+ =7.5; 5-6= 5.5; 3-4 = 3.5; 1-2 = 1.5; < 1 = 0.5; 0 = 0

c. The Quantity-Frequency measure for each subject was calculated from the beverage (beer, wine or distilled spirits) most frequently used and the amount consumed on a typical occasion. Drinking category of **Abstainer**: drinks less than once a year or not at all; **Light to Moderate Drinker**: drinks at least once a month but not weekly and consumes no more than 1 to 2 drinks at any one sitting; drinks at least once a month but not weekly and consumes no more than 5 to 6 drinks per occasion; drinks at least once a week but not daily and consumes no more than 3 to 4 drinks per sitting, or once a day but consumes no more than 1 or 2 drinks. **Heavy Drinker**: drinks more than 5 drinks at any one sitting once a week or more.

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