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ABSTRACT

This study examined whether female undergraduate students who share with male undergraduates similar demographics, perceptions, and alcohol use locations, also share similar alcohol usage patterns, negative consequences, and predictors for both. Secondary analysis was conducted using 1992 and 1993 U.S. Department of Education Core Survey data collected from 345 male and 584 female undergraduates at two private, midwestern liberal arts colleges. Male and female multiple regression predictor models for alcohol usage and negative consequences were created and compared. Results indicated that the demographics, perceptions, usage locations, alcohol as the drug of choice, age of first usage, and moderate usage were similar for both genders. Females, however, preferred occasional drinking, whereas males preferred heavy drinking, except in residence halls where both were heavy binge drinkers. Despite their predominantly occasional and moderate drinking, females were still similar to men in suffering 15 negative consequences of drinking, such as memory loss, thoughts of suicide, arrested for driving under the influence of alcohol, or missing classes. The paper concludes with 12 recommendations for preventive and intervention programs for institutions of higher education. (Contains 75 references.) (DB)

Title: NEGATIVE CONSEQUENCES OF UNDERGRADUATE ALCOHOL USAGE: A MULTIVARIATE GENDER COMPARISON

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ABSTRACT

The Problem

While the literature indicates that many male undergraduates suffer numerous negative consequences from alcohol usage, little is known about what, if any, consequences female undergraduates experience. Therefore, this study empirically tested if female undergraduates, ages 17-24, who share similar demographics, perceptions, and alcohol use locations as male undergraduates, also share similar alcohol usage patterns, negative consequences, and predictors for both.

Method

Secondary analysis was conducted on 1992 and 1993 United States Department of Education CORE Survey data collected from 345 male and 584 female undergraduates at two Midwestern private liberal arts colleges. Frequency, chi-square ($p < .01$), and correlational analysis ($p < .01$) data were used to compare gender usage patterns and negative consequences. Male and female multiple regression predictor models for alcohol usage and negative consequences were created and compared.

Results

Both genders' demographics, perceptions, usage locations, alcohol as the drug of choice, age of first usage, and moderate usage were similar. Females,

however, preferred occasional drinking, whereas, males preferred heavy drinking; except in residence halls where both were heavy binge drinkers. Despite their predominately occasional and moderate drinking, females were still similar to men in suffering 15 negative consequences.

Inter-correlation r values between the independent variables (demographics, perceptions, use locations) were non-existent or low for both genders. Use location and wanting alcohol on campus had moderate r values with each gender's usage patterns and negative consequences. Male and female predictor models were similar in explaining 17-54% of the usage patterns' variance. As usage increased, so did the number of predictors and the amount of variance explained for males, whereas both remained fairly constant for females. Male and female predictor models contained similar numbers of predictors for 15 of the 19 negative consequences while simultaneously explaining similar percentages of variance for 18 of the 19 negative consequences.

Conclusions

With little exception, females use less alcohol than males but they suffer similar negative consequences. Therefore, male and female undergraduates need similar alcohol intervention and prevention programs. Why female undergraduates experience similar negative consequences as males, while not using as much alcohol, warrants further research.

Introduction

One of the most significant issues on college campuses is the negative consequences generated from alcohol usage (Carnegie Foundation, 1990). Since 1991, females (6.6 million) have accounted for more than half of the national undergraduate population (United States Department of Education, 1993). However, their alcohol usage has been considered unimportant for research, discussion, or intervention by college administrators (Hunnicutt, 1995).

Problem

There has been little, if any, empirical research regarding whether female undergraduates share similar alcohol usage patterns and negative consequences from usage as their male counterparts (Liljestrand, 1993). However, recent studies (e.g., Hunter, 1990; Posavac, 1993; Presley & Meilman, 1992; Presley, Meilman, & Lyeria, 1993; Wechsler & Issac, 1992) have suggested female undergraduates use as much alcohol, and experience similar negative consequences from usage, as males.

Purpose

Therefore, the purpose of this study was to quantify and compare empirically male and female undergraduate alcohol usage patterns and the negative consequences suffered from alcohol usage at two Midwestern religious liberal arts colleges.

Literature Review

Alcohol is the undergraduate drug of choice (e.g., Dillard, 1990; Engs, 1977; Hunter, 1990; Kraft, 1984; McIntire & Williams, 1990; Tricker & Cook, 1989). Student demographics (e.g., Crowley, 1991; Curtis, General, Roberts, & Kayson, 1990; Ford & Carr, 1990; Saltz & Elandt, 1986; Wechsler & McFadden, 1979), campus social environments (e.g., Carey, 1993; Dull, 1992; Elkind & Weiner, 1978; Faulkner, Alcorn, & Knox, 1989; Martin & Hoffman, 1993), and individual perceptions (Bentler & Huba, 1980; Gomberg, 1994; Goodwin, 1990; Lo, 1991; O'Hare, 1990) are significantly related to undergraduate alcohol usage. However, more research is needed on the patterns of undergraduate alcohol usage (e.g., Berkowitz & Perkins, 1987; Liljestrand, 1993; O'Connell & Patterson, 1989; Wechsler & Issac, 1992; Wechsler & McFadden, 1979) and their generated negative consequences (Hanson & Engs, 1986; Hunnicutt, 1995; Kraft, 1981, 1984, 1988; Perkins & Berkowitz, 1989; Presley et al., 1993).

Historical Overview

Studenski's (1937) research for the New York Liquor Commission regarding potential alcohol sales to undergraduates was one of the first surveys focusing upon college students. However, interest in undergraduate usage remained low until the 1950s.

Research in undergraduate alcohol usage increased during the 1950s and 60s, with cross-sectional studies as the primary research methodology (Strauss & Bacon, 1953). By 1970, cross-sectional and longitudinal studies were conducted

with similar frequency (Kraft, 1981). Alcohol usage was no longer defined as "having used alcohol," but rather delineated as yearly, monthly, weekly, and bingeing frequency (Kraft, 1981). Also, researchers began to use and evaluate a wide variety of independent and dependent study variables (Liljestrand, 1993).

Nevertheless, there remained a lack of research on undergraduate substance abuse (Presley & Meilman, 1992). Therefore, the United States Congress mandated in The Anti-Drug Act of 1986 that colleges conduct substance abuse research on their campuses (Presley & Meilman, 1992). Additionally, Congress commissioned the United States Department of Education to develop and implement a survey instrument for assessing undergraduate substance abuse. This instrument, the CORE Survey (United States Department of Education Core Alcohol and Drug Survey), was developed, tested, validated, and ready for use by colleges in 1992 (Presley & Meilman, 1992).

Age of First Alcohol Usage

Age of first use (Barnes & Welte, 1983; Sampson, Maxwell, & Doyle, 1989) and frequency of alcohol usage in high school (Johnston, O'Malley, & Bachman, 1993; Wechsler & McFadden, 1979) were the best predictors of undergraduate alcohol usage. That is, the younger the age of first use, the greater the prevalence of undergraduate usage (Barnes & Welte, 1983) with subsequent alcohol-related problems (Rachal, Guess, Hubbard, Maisto, Cavaugh, Waddell, & Benrud, 1982). Age of first use predicted undergraduate binge drinking (Wechsler & McFadden, 1979) and alcohol-related violence and criminal acts (Fagan, 199.

Alcohol as the Drug of Choice

Alcohol is the first psychoactive drug used by American youth (DuPont, 1984; Hanson, 1974; Johnston et al., 1993). More than 75% of high-school seniors use alcohol annually, 50% monthly, 44% weekly, and 25% biweekly (Johnston , O'Malley, & Bachman, 1991, Johnson et al., 1993; Kraft, 1984). These usage patterns tend to continue through college (Barnes, 1981; Hunter, 1990; Johnston et al., 1991, 1993; Johnston, O'Malley, & Bachman, 1994; Kraft, 1984; Presley & Meilman, 1992). The use of other drugs (excluding caffeine and nicotine) by undergraduates is minimal, when compared to alcohol usage (Dillard, 1990; Engs, 1977; McIntire & Williams, 1990; Presley & Meilman, 1992; Presley et al., 1993; Presley, Harrold, Scouten, Lyeria, & Meilman, 1994; Tricker & Cook, 1989).

Binge Drinking

While approximately 28% of high-school seniors binge drink (Engs & Hanson, 1992; Johnston et al., 1991, 1993, 1994; United States Department of Education, 1993), an even larger percentage (about 33%) of undergraduates binge drink (Kraft, 1988; United States Department of Education, 1993; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler & Issac, 1992).

Negative Consequences From Alcohol Usage

Approximately 50% of alcohol using undergraduates suffer serious alcohol-related negative consequences (Engs & Hanson, 1994; Hansen, 1993; Liljestrand, 1993; O'Connell & Patterson, 1989; Wechsler & McFadden, 1979).

Almost 10% experience five or more problems each week (Meacci, 1990; Wechsler et al., 1994). As undergraduate alcohol usage increases, so do the negative consequences from usage (Bennett, McCrady, Frankenstein, Laitman, VanHorn, & Keller, 1993; Brown, 1989; Engs, 1977; Hanson & Engs, 1986). For example, college date rape and physical fighting are correlated with the amount of alcohol used by offender and victim (Collins & Messerschmidt, 1993).

Perceived Peer Alcohol Usage and Individual Use

Perceived peer alcohol usage is a very strong predictor of young adult and undergraduate alcohol usage (Dull, 1992; Faulkner, Alcorn, Knox, & Carvin, 1989; Goodwin, 1990; Kandel, 1985; Kandel, Kessler, & Margulies, 1978; Kandel & Logan, 1984; Kuh & Arnold, 1993; Martin & Hoffman, 1993; O'Hare, 1990). This is also true for the negative consequences suffered from usage (Lo, 1991; Williams, Kirkman-Liff, & Sziveh, 1990;). Undergraduates are followers, conforming to peer customs and behaviors, sharing the good and the bad (Lo, 1991; McDowell, 1995).

The Need for Undergraduate Sub-population Research

There is little, if any, research on the alcohol usage occurring within undergraduate sub-populations (Hunnicutt, 1995; Liljestrand, 1993; Parker, 1993a; Saltz & Elandt, 1986). Before college administrators can address the substance abuse needs of all college students, undergraduate sub-populations must be identified, isolated, and studied (Hunnicutt, 1995; Liljestrand, 1993; Saltz & Elandt, 1986; Wechsler et al., 1994). Studies that focus only upon

undergraduates-at-large miss important and major differences between sub-groups (Liljestrand, 1993). Likewise, research regarding campus sub-populations cannot be used for inferences about undergraduates-at-large (Liljestrand, 1993).

The Need for Female Undergraduate Research

There is inadequate literature on female undergraduate alcohol usage (Berkowitz & Perkins, 1986a, 1986b, 1987; Hunnicutt, 1995; Johnson, 1989; Liljestrand, 1993; United States Department of Education, 1993).

The few research studies that have addressed female undergraduate alcohol usage recommend further research on (1) usage patterns (Geller. Kalsher, & Clarke, 1991; Johnston et al., 1991, 1993, 1994; Liljestrand, 1993; Wechsler & Issac, 1992), (2) negative consequences (Johnston et al., 1991, 1993, 1994; Liljestrand, 1993; Wechsler & Issac, 1992), (3) demographics (Curtis et al., 1990; Ford & Carr, 1990; Lease & Schmeck, 1990; Parker, 1993a, 1993b; Wechsler & McFadden, 1979), (4) perceptions (Leavy & Dunlosky, 1989; Posavac, 1993; Skacal & Merritt, 1991), and (5) peer social settings (Dull, 1992; Faulkner et al., 1989; Goodwin, 1990; Hunter, 1990; Martin & Hoffman, 1993).

Theoretical Framework

This study's theoretical framework was extrapolated from the Kandel et al. (1992) Alcohol Stage Development Theory. The Alcohol Stage Development Theory was formulated from a developmental psychology framework (Kandel, 1985; Kandel & Yamaguchi, 1984a, 1984b; Kandel et al., 1978; Kandel, Yamaguchi, & Chen,

1992). Developmental psychology, an international academic discipline and professional field of science, provides many theoretical frameworks and models for understanding the development of human cognitive growth, language acquisition, mental maturation, psychosocial skills, etc. (Barnes, 1993; Kandel, 1985; Kandel et al., 1978; Kandel & Logan, 1984; Kandel & Yamaguchi, 1984a, 1984b; Kandel et al., 1992; Newcomb et al., 1986). The rationale used by Kandel et al. (1992) for the creation of the Alcohol Stage Development Theory was the same rationale employed for the developmental theories formulated by Sigmund Freud, Jean Piaget, and Erik Erikson (Barnes, 1993; Kandel, 1985; Kandel et al., 1978; Kandel & Logan, 1984; Kandel & Yamaguchi, 1984a, 1984b; Kandel et al., 1992).

The Kandel et al. (1992) Alcohol Stage Development Theory was tested and validated on a non-college drinking population (Kandel, 1985; Kandel & Yamaguchi, 1984a, 1984b; Kandel et al., 1978, 1992). The Kandel et al. (1992) theoretical framework states, in part, that males and females, ages 17-24, sharing similar demographics, perceptions, and social environments, also share similar alcohol usage patterns and negative consequences. Until this study, the Kandel et al. (1992) theory had never been tested on college undergraduates.

Therefore, it follows that female college undergraduates, ages 17-24, sharing similar demographics, perceptions, and alcohol use locations as male undergraduates, share similar alcohol usage patterns and negative consequences from alcohol usage.

Methodology

Research Sample

The sample included 345 undergraduate males and 584 females from two Midwestern religious liberal arts colleges of similar size and geographic location. Both colleges prohibited alcohol usage by students under age 21 and restricted on-campus use of alcohol by students age 21 and older to their private living quarters.

Secondary Analysis

This study was a secondary analysis of 1992 and 1993 United States Department of Education Core Survey data. The purpose of this study was to quantify empirically whether female undergraduates experienced similar alcohol usage patterns and negative consequences from alcohol usage as male students.

The demographic, perception, and alcohol use location independent variables (see Table 1) and alcohol usage pattern and negative consequence dependent variables (see Table 2) were extrapolated from the Kandel et al. (1992) Stage Development Alcohol theory. Furthermore, the testing of my theoretical model was completed in two steps. First, frequency analysis compared each gender according to: (1) demographics, (2) perceptions, (3) alcohol use locations, (4) alcohol as the undergraduate drug of choice, (5) alcohol usage patterns, and (6) the negative consequences suffered from alcohol usage.

The second step was multivariate analysis. Chi-square analysis ($p < .01$) was used to determine which demographics, perceptions, and alcohol use

TABLE 1

INDEPENDENT STUDY VARIABLES

Independent Variables [a]	CORE Survey Question Number
Demographics	
Current age	2
Ethnic origin	3
Marital status	4
Campus residence	6
Employment status	7
Permanent address	13
Father has alcohol or drug problem	22b
Perceptions	
Wanting alcohol on campus	10b
Campus has an alcohol policy	12a
Campus alcohol policy is enforced	12b
Campus has alcohol abuse prevention	12c
Campus is concerned about prevention	12d
Involvement with alcohol abuse prevention	12e
Perception of peer usage	19b
Alcohol Use Locations	
Campus events	20b2
Residence hall	20b3
Fraternity/sorority	20b4
Bar/restaurant	20b5

[a] Frequency analysis indicated < 1% of either gender had a mother with an alcohol or drug problem. This small response made statistical manipulation impossible.

TABLE 2

DEPENDENT STUDY VARIABLES

Dependent Variables	CORE Survey Question Number
Alcohol Usage Patterns	
Age of first alcohol use	16
Previous year	17
Previous month	18
Average drinks each week	15
Binge drinking during prior two weeks	14
Abuse Indicators [a]	
Hangover	21a
Nausea/vomiting	21f
Memory loss	21k
Thought I had a problem with alcohol	21j
Unsuccessful attempts at stopping alcohol use	21p
Regretted behavior	21l
Been criticized	21I
Physical Harm Variables [a]	
Thought about suicide	21q
Attempted suicide	21r
Been hurt/injured	21s
Having argued/fought	21e
Criminally-Related Behavior Variables [a]	
Trouble with police/college	21c
Damaged property/pulled fire alarm	21d
Drove car under influence of alcohol	21g
Drove car under influence of alcohol arrest	21m
Been taken sexual advantage of	21n
Taken sexual advantage of another	21o
Poor Academic Performance Variables [a]	
Poor test score	21b
Missed class	21b

[a] Denotes a category of negative consequences during the previous year from alcohol usage.

locations were significantly related ($p < .01$) to each alcohol usage pattern. Then, for each significantly related demographic, perception, and alcohol use location, the frequencies of each alcohol usage pattern were delineated and compared by gender. This process was then repeated for the negative consequences.

The next step in analysis for many researchers would have been factor analysis. However, this was not done since Cronbach alpha scores and factor analysis findings were already available from the United States Department of Education and the University of Minnesota Statistical Lab. These factor analysis findings and the Cronbach alpha scores showed high factor loadings on the alcohol usage patterns and the negative consequences data generated from the Core Survey (Presley et al., 1993).

Next was the construction and analysis of inter-correlations between the independent variables (demographics, perceptions, and use locations). Then, correlations between the independent variables with each alcohol usage pattern were generated and compared according to gender. Regression male and female predictor models predicting each alcohol usage pattern were created and compared. Then, correlations between the independent variables with each negative consequence were created and compared by gender. Finally, predictor models were created for each negative consequence and compared according to gender.

The two major goals of multiple regression are to (1) determine the degree the independent variables were inter-correlated and (2) the degree each dependent variable's variance was explained by each independent variable (Tabachnick &

Fidell, 1989). The purpose of multiple regression is to (1) find important predictors for each dependent variable, (2) eliminate unimportant predictors, and (3) produce simple, easy-to-read, easy-to-interpret, and easy-to-use predictor models (Tabachnick & Fidell, 1989). A good predictor model meets the above criteria and contains no more than three, four, or five predictors (Tabachnick & Fiedell, 1989). Theory, the literature, logic, and the researcher's knowledge, instead of an arbitrary statistical level, should make the final determination of which variables are good predictors with a model (Tabachnick & Fidell, 1989).

Ideally, for predictor model building, the independent variables should not be inter-correlated (Tabachnick & Fidell, 1989). Therefore, as a prelude to multiple regression predictor model building in this study, the correlations between the independent variables were produced and analyzed.

Male and female forward and backward multiple regression models were produced and compared for each alcohol usage pattern and negative consequence (using the .01 level as the stopping point). Forward and backward multiple regression consistently generated identical predictor models. However, for the few forward and backward predictor models which were different for a specific alcohol usage pattern or negative consequence, the forward regression model was chosen because of better conformity to (1) theory, (2) the literature, (3) logic, (4) my knowledge on the subject, and (5) the forward regression models contained fewer predictors than the backward models while explaining a similar percentage of the variance.

Descriptive Research Findings

Research Questions 1-3

Question 1 asked: *"Do both genders share similar demographics?"*

Question 2 asked: *"Do both genders share similar perceptions?"*

Question 3 asked: *"Do both genders share similar alcohol use locations?"*

The theoretical model for this study required similarities of both genders in demographics, perceptions, and alcohol use locations. Therefore, descriptive research questions 1, 2, and 3 investigated whether or not this was true (see Table 3). The exception to both genders being similar in these three areas was that significantly more females than males reported a grade point average B+ and above; and significantly more males than females reported a C+/B- grade point average. Otherwise, both genders were similar in all seven demographics, seven perceptions, and all four use locations.

Research Questions 4 and 5

Questions 4 asked: *"Is alcohol the drug of choice for both genders?"*

Question 5 asked: *"Do both genders share similar alcohol usage patterns?"*

The Kandel et al. (1992) Alcohol Stage Development theory (from which this study's theoretical model was extrapolated) and the review of literature indicated that alcohol was the drug of choice for young adults. Therefore, descriptive research question 4 was designed to ascertain if this was also true for the undergraduates in the study sample.

TABLE 3

DEMOGRAPHIC, PERCEPTIONS, AND ALCOHOL USE LOCATION COMPARISON BY GENDER

Independent Variables	Male Pattern	Female Pattern	Similar Pattern
Demographics			
Current age (17, 18, 19, 20, 21, 22, 23, 24)			X
Employment status (employed, not employed)			X
Student status (full-time, part-time)			X
Ethnic origin (White, Non-White)			X
Marital status			X
Permanent address (in-state, out-state)			X
Campus residence (on-campus, off-campus)			X
Living arrangement (house/apartment, residence hall, fraternity/sorority)			X
Grade point average (B+/above)		X	
Grade point average (B, C/below)			X
Grade point average (C+, B-)	X		
Perceptions			
Wanting alcohol on campus			X
Campus has an alcohol usage policy			X
Campus alcohol policy is enforced			X
Campus has an alcohol abuse prevention program			X
Campus is concerned about alcohol abuse			X
I am involved with alcohol abuse prevention			X
Perceived peer usage of alcohol			X
Alcohol Use Locations			
Campus events			X
Residence hall			X
Fraternity/sorority			X
Bar/restaurant			X

Male N = 345, female N = 584

Results for question 4 are presented in Table 4. These show that alcohol was the drug of choice for both male and female undergraduates in the study sample. The use of marijuana, the second most popular drug (excluding caffeine and nicotine), was negligible when compared to alcohol usage (see Table 5). Regarding whether the alcohol usage patterns were similar for both genders (question 5), analysis of the findings indicated that both genders were similar in their abstaining from alcohol and their moderate usage of alcohol during the previous year and month (see Table 6). Significantly more females than males were low rate users, while significantly more males than females were heavy rate users, during the previous year and month. Regarding average weekly drinking and binge drinking during the previous two weeks, both genders were similar in their low and moderate rates of drinking. However, significantly more females than males abstained from alcohol and significantly more males than females were heavy users.

TABLE 4

DRUG OF CHOICE COMPARISON BY GENDER

Drug of Choice [a] Difference [b]	Percentage saying "yes"		
	Male	Female	Gender
Alcohol	89.0	88.0	1.0
Marijuana	18.0	11.0	7.0
Amphetamines	4.0	2.0	2.0
Cocaine	3.0	1.0	2.0
Hallucinogens	0.8	0.2	0.6

[a] Used at least once the previous year. [b] Bold numbers signify genders were similar reporting that category--10.0% or less difference.

TABLE 5

ALCOHOL AND MARIJUANA USAGE TWO OR MORE TIMES EACH MONTH COMPARISON BY GENDER

	Percentage saying "yes"		
Drug of Choice [a]	Male	Female	Gender Difference [b]
Alcohol	76.0	61.0	15.0 (m)[c]
Marijuana	10.0	4.0	6.0

[a] Based upon using at least twice a month during the previous year. [b] Bold numbers signify genders were similar reporting that category--10.0% or less difference. [c] (m) signifies a preferred male pattern--10.1% or more males than females reported that category.

Research Question 6

Questions 6 asked: *"Do both genders share similar negative consequences?"*

The 19 negative consequence dependent variables used in this study were broken down into seven abuse indicators, four physical harm variables, six criminally related behavior variables, and two poor academic performance variables (see Table 7).

Frequency analysis revealed that both genders were similar experiencing six out of seven abuse indicators (nausea/vomiting, thinking I had a problem with alcohol, unsuccessful attempts at stopping alcohol use, memory loss, regretting behavior, and having been criticized) during the previous year (see Table 7). Both genders, however, were not similar experiencing the same number of hangovers during the previous year. Both genders were similar in having one and two hangovers during the previous year. However, significantly more females than males did not have a hangover during the prior year. And, significantly more males than females experienced three or more hangovers during the previous year.

TABLE 6

ALCOHOL USAGE PATTERNS COMPARISON BY GENDER

Dependent Variables	Male Pattern	Female Pattern	Similar Pattern
Age of First Use			No use Under 13 14-15 16-17 18-24
Previous Year Usage	1+ drinks/month	1-6 drinks/year	No use 1-2 drinks/month
Previous Month Usage	10+ drinks/month	1-5 drinks/month	No use 6-9 drinks/month
Average Weekly Usage	10+ drinks/week	No use	1-3 drinks/week 4-9 drinks/week
Binge Drinking Prior Two Weeks	6+ binges/2 weeks	No use	1-2 binges/2 weeks 3-5 binges/2 weeks

Note. Male N = 345; female N = 584

TABLE 7

NEGATIVE CONSEQUENCES COMPARISON BY GENDER

Dependent Variables	Male Pattern	Female Pattern	Similar Pattern
Abuse Indicators			
Hangover	3+	1	None, 2
Nausea/vomit			None, 1, 2, 3+
Had a problem			None, 1+
Memory loss			None, 1, 2+
Can't stop using			None, 1+
Regretted behavior			None, 1, 2, 3+
Been criticized			None, 1, 2, 3+
Physical Harm Variables			
Thought suicide			None, 1+
Attempted suicide			None, 1+
Been hurt/injured			None, 1+
Having argued/fought			None, 1, 2, 3+
Criminally Related Behavior Variables			
Trouble with police/college			None, 1, 2+
Damaged property/pulled fire alarm	1+		None
Drove under influence of alcohol	3+	None	1, 2
Arrest for driving under the influence of alcohol			None, 1+
Have been taken sexual advantage of			None, 1+
Have taken sexual advantage of another			None, 1+
Poor Academic Performance			
Poor test score			None, 1, 2+
Missed class	3+	None	1, 2

Note. Male N = 345; female N = 584.

Both genders were similar experiencing the four physical harm variables (thought of suicide, attempted suicide, having been hurt/injured, having argued/fought) during the prior year (see Table 7).

Males and females were similar experiencing four out of six criminally related behavior variables (trouble with police/college, driving under the influence of alcohol arrest--DUI, having been taken advantage of sexually, taking sexual advantage of another) during the previous year (see Table 7).

However, males and females were not similar damaging property/pulling fire alarm and driving under the influence of alcohol (DUI). Significantly more females than males did not damage property/pull fire alarm; whereas, significantly more males than females damaged property/ pulled fire alarm one or more times during the previous year. Likewise, significantly more females than males did not drive under the influence of alcohol; and, significantly more males than females drove under the influence of alcohol three or more times during the previous year. However, both genders were similar in driving under the influence of alcohol one and two times during the previous year.

Both genders were similar experiencing one out of two poor academic performance variables (poor test score) during the previous year (see Table 7). In contrast, significantly more females than males did not miss class during the prior year; whereas, significantly more males than females missed class three or more times during the previous year. Both genders were only similar in missing class one and two times during the previous year.

Multivariate Analysis Findings

Multivariate Research Questions 1 and 1a

Question 1 asked: *"Which demographics, perceptions, and use locations are significantly related to male and female alcohol usage patterns?"*

Chi-square analysis indicated that all four alcohol use locations and wanting alcohol on campus (perception) were significantly related ($p < .01$) to each alcohol usage pattern (see Table 8). However, there were only a few other perceptions and demographics significantly related to any specific usage pattern.

Question 1a asked: *"For each significantly related demographic, perception, and use location, are the frequencies of each usage pattern similar for both genders?"*

A summation of the independent variable distribution for each alcohol usage pattern is presented in Table 9. The following conclusions were made about the alcohol usage patterns:

1. Males and females were similar in each age of first alcohol usage except for significantly more non-White Males than non-White females starting alcohol usage age 16 and older.

2. Both genders were similar in abstaining from alcohol and in the moderate usage of alcohol during the previous year and month.

3. Significantly more females than males were low rate users of alcohol, whereas significantly more males than females were high rate users of alcohol during the previous year and month.

TABLE 8

DEMOGRAPHICS, PERCEPTIONS, AND USE LOCATIONS SIGNIFICANTLY RELATED TO ALCOHOL USAGE PATTERNS

Usage Pattern	Demographic	Belief	Use Location
Age of first use	Ethnic origin	Campus alcohol policy enforced Wanting alcohol on campus	Campus event Residence hall Bar/restaurant Fraternity/sorority
Previous Year	Ethnic origin	Perceived peer usage Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Previous Month	Ethnic origin Marital status Campus residence	Perceived peer usage Involvement with prevention Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Weekly Average	Marital status Campus residence	Perceived peer usage Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Binge Drinking	Marital status Campus housing	Involvement with prevention Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority

Note. $p < .01$; Male $N = 185$; female $N = 345$.

TABLE 9

SUMMATION OF THE INDEPENDENT VARIABLE DISTRIBUTION FOR EACH ALCOHOL USAGE PATTERN

	Demographics			Alcohol Use Perceptions			Alcohol Use Locations		
Age of First Use	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
13/Under			2 [a]			4			8
14-15			2			4			8
16-17	1		1			4			8
18/older	1		1			4			8
Total demographic variables = 2				Total belief variables = 4			Total location variables =8		
Previous Year Use	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
No Use		1	1	1	1	6			8
1-6/yr		1	1		4	4		6	2
1-2/mo			2		2	6		3	5
1+/wk	2			7		1	8		
Total demographic variables = 2				Total belief variables = 8			Total location variables = 8		
Previous Month Use	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
No Use		3	3		1	7			8
1-5/mo		3	3		5	3			2
6-9/mo	2		4			8		6	7
10+/mo	4		2	4		4	6	1	2
Total demographic variables = 6				Total belief variables = 8			Total location variables = 8		
Average Weekly Drinks	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
No Use		4			7	1		8	
1-3/wk			4		1	7		4	4
4-9/wk	1		3			8			8
10+/wk	3		1	7		1	6		2
Total demographic variables = 4				Total belief variables = 8			Total location variables = 8		
Binge Drinking	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
No Use		4			2	2		8	
1-2/Biwk	1		3		1	3			8
3-5/Biwk	2		2			4	2		6
6+/Biwk	2		2	1	1	2	5		3
Total demographic variables = 4				Total belief variables = 4			Total location variables = 8		

[a] Bold indicates largest number of independent variables per use pattern.

4. Both genders were similar in their low rate and moderate rate of using alcohol during each week and in binge drinking during the prior two weeks.

5. Significantly more females than males abstained from weekly and binge drinking during the prior two weeks, and significantly more males than females used alcohol at the heaviest rate each week and when bingeing during the prior two weeks.

6. No single demographic, perception, or alcohol use location indicated that males and females were similar in all four previous year alcohol usage frequencies (abstaining, low, moderate, and heavy).

7. When peer alcohol usage was perceived to be high, when there was involvement with alcohol abuse prevention, and when alcohol was not used at one of the four alcohol use locations, both genders were similar in all four previous month alcohol usage frequencies (abstaining, low, moderate, and heavy).

8. When alcohol was not wanted on campus both genders were similar in all four average weekly frequencies (abstaining, low, moderate, and heavy) drinking during the previous year.

9. When there was involvement with alcohol abuse prevention, both genders were similar in all four binge drinking frequencies (abstaining, low, moderate, and heavy) during the previous 2 weeks.

10. Many of the independent variables indicated that both genders were only similar in no more than three (e.g., abstaining, low, moderate) of the four alcohol usage frequencies used to describe each alcohol usage pattern.

11. When alcohol was used at a residence hall, both genders were similar in their moderate usage of alcohol during the previous year, month, and each week; as well as their heavy binge drinking during the past 2 weeks.

12. When alcohol was used at a fraternity/sorority, males and females were similar in their moderate usage of alcohol during the previous month and each week; as well as their moderate binge drinking during the past 2 weeks.

13. When alcohol was used at a bar/restaurant, both genders were similar in their moderate usage of alcohol during the previous month and each week, and their low binge drinking during the past 2 weeks.

14. When alcohol was used at campus events, males and females were similar in their moderate usage of alcohol during each week and their moderate binge drinking during the past 2 weeks.

15. Males and females were similar in heavy binge drinking only when alcohol was used in a residence hall. Otherwise, heavy binge drinking was a male preferred pattern.

16. Males and females using the least amount of alcohol were non-single, lived off-campus, did not want alcohol on campus, and did not use alcohol at one of the four alcohol use locations.

17. Males and females using the most alcohol were single, lived on-campus, wanting alcohol on campus, and used alcohol at one or more of the four alcohol use locations.

18. Both genders were similar using alcohol at the low and moderate rates when peer alcohol usage was perceived to be low.

19. Significantly more females than males used alcohol at the low and moderate rates when peer alcohol usage was perceived to be moderate or heavy.

20. Significantly more males than females used alcohol at the heaviest rate regardless of the perceived peer alcohol usage.

Multivariate Research Questions 2 and 2a

Question 2 asked: *"What demographics, perceptions, and use locations are significantly related to the negative consequences reported by males and females?"*

The demographics, perceptions, and alcohol use locations which were significantly related ($p < .01$) to the 19 negative consequences suffered from alcohol usage are shown in Table 10. The negative consequences were divided into seven abuse indicators, four physical harm variables, six criminally related variables, and two poor academic performance variables.

Overall, wanting alcohol on campus and alcohol usage at one of the four alcohol use locations were significantly related to 16 out of the 19 negative consequences. Perception about whether or not the campus had an alcohol policy and whether or not that policy was enforced, was significantly related to most of the abuse indicators.

Having a father with an alcohol/drug problem was significantly related to thinking about suicide (physical harm). Perception about campus alcohol policy enforcement was significantly related to having trouble with the police/college (criminally related behavior). Perception about the campus having alcohol abuse prevention and wanting alcohol on campus, were significantly related to having

TABLE 10

DEMOGRAPHICS, PERCEPTIONS, AND USE LOCATIONS SIGNIFICANTLY RELATED TO NEGATIVE CONSEQUENCES

Abuse Indicator	Demographic	Perception	Use Location
Hangover		Campus alcohol policy enforced Wanting alcohol on campus	Campus event Residence hall Bar/restaurant Fraternity/sorority
Nausea/ Vomit	Employment	Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Thought I Had a Problem		Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Memory Loss		Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Can't [a] Stop		Wanting alcohol on campus	Residence hall
Regret Behavior	Campus housing	Campus has alcohol policy Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Been Criticized		Campus has alcohol policy Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Physical Harm			
Argued/ Fought		Wanting alcohol on campus	Campus event Residence hall Bar/restaurant Fraternity/sorority
Thought Of Suicide	Father has alcohol/drug problem		

Table 10—Continued.

Attempt Suicide			
Hurt/ Injured		Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Criminal Related			
Trouble With Police/ College		Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Damage Property/ Pull Fire Alarm		Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
DUI		Wanting alcohol on campus	Residence hall
DUI Arrest		Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Been Taken Adv. Of Sexually		Campus has alcohol abuse prevention Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Taken Adv. Of other Sexually		Wanting alcohol on campus	Campus events Residence hall Bar/restaurant
Poor Academic			
Poor Test Score	Campus residence	Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority
Missing Class	Campus residence	Campus alcohol policy enforced Wanting alcohol on campus	Campus events Residence hall Bar/restaurant Fraternity/sorority

Note. $p < .01$. Male $N = 185$; female $N = 345$.

thoughts about suicide (physical harm). Perception about campus alcohol policy enforcement was significantly related to having trouble with the police/college (criminally related behavior). Perception about the campus having alcohol abuse prevention and wanting alcohol on campus, were significantly related to having been taken sexual advantage of (criminally-related behavior). No demographic, perception, or alcohol use location was significantly related to attempting suicide (physical harm variable).

Question 2a asked: *"For each significantly related demographic, perception, and alcohol use location, are the frequencies of each negative consequence similar for both genders?"*

A summation of the independent variable distribution for each negative consequence is shown in Table 11. The following conclusions are made about the suffering negative consequences from alcohol use:

Abuse Indicators

The seven abuse indicators were (1) hangover, (2) nausea/vomiting, (3) thought I had a problem with alcohol, (4) memory loss, (5) unsuccessful attempts at stopping alcohol use, (6) regretting behavior, and (7) having been criticized. Frequency analysis revealed that males and females were similar in each frequency of (1) nausea/vomiting, (2) thinking they had a problem with alcohol, (3) memory loss, (4) unsuccessful attempts at stopping alcohol usage, (5) regretting behavior, and (6) having been criticized during the previous year.

But, both genders were not similar experiencing hangovers. Males and

TABLE 11

SUMMATION OF THE INDEPENDENT VARIABLE DISTRIBUTION FOR EACH NEGATIVE CONSEQUENCE

	Demographics			Perceptions			Use Locations		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Hangover									
None				1		3		6	2
1/yr					2	2		1	7
2/yr						4			8
3+/yr				3		1	8		
Total demographic variables = 0				Total belief variables = 4			Total location variables = 8		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Nausea/ vomit									
None		1	1			4			8
1/yr			2			4		1	7
2/yr			2			4			8
3+/yr			2			4			8
Total demographic variables = 2				Total belief variables = 4			Total location variables = 8		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Thought I Had a Problem									
None				1	1	2			8
1+/yr						4		1	7
Total demographic variables = 0				Total belief variables = 4			Total location variables = 8		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Memory Loss									
None					1	1		4	4
1/yr						2			8
2+/yr				1		1	4		4
Total demographic variables = 0				Total belief variables = 2			Total location variables = 8		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Can't Stop									
None						2		1	1
1+/yr						2			2
Total demographic variables = 0				Total belief variables = 2			Total location variables = 2		

TABLE 11—Continued

	Demographics			Perceptions			Use Locations		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Regret Behavior									
None		1	1		1	5		1	7
1/yr			2			6		1	7
2/yr			2			6			8
3+/yr	1		1	3		3	4		4
Total demographic variables = 2				Total belief variables = 6			Total location variables = 8		
Abuse Indicator	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Been Criticized									
None					1	5		1	7
1/yr						6		1	7
2/yr						6			8
3+/yr						6			8
Total demographic variables = 0				Total belief variables = 6			Total location variables = 8		
Physical Harm	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Thought About Suicide									
None			2						
1+/yr			2						
Total demographic variables = 2				Total belief variables = 0			Total location variables = 0		
Physical Harm	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Hurt/ Injured									
None						2			8
1/yr						2			8
2+/yr						2			8
Total demographic variables = 0				Total belief variables = 2			Total location variables = 8		
Physical Harm	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Argued/ Fought									
None						2			8
1/yr						2			8
2/yr						2			8
3+/yr						2			8
Total demographic variables = 0				Total belief variables = 2			Total location variables = 8		

TABLE 11—Continued

Criminally Related	Demographics			Perceptions			Use Locations		
	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Trouble Police/ College									
None					2	2		4	4
1/yr						4			8
2+/yr						4	4		4
Total demographic variables = 0				Total belief variables = 4			Total location variables = 8		
Criminally Related	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Damaged Property/ Fire Alarm									
None					1	1		3	5
1+/yr				1		1	3		5
Total demographic variables = 0				Total belief variables = 2			Total location variables = 8		
Criminally Related	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
DUI									
None					1	1	1	6	1
1/yr						2			8
2/yr						2			8
3+/yr					1	1	6		2
Total demographic variables = 0				Total perception variables = 2			Total location variables = 8		
Criminally Related	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
DUI Arrest									
None								1	1
1/yr									2
2/yr							1		1
3+/yr									
Total demographic variables = 0				Total belief variables = 0			Total location variables = 2		
Criminally Related	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Been Take Sex Adv. Of									
None						4			8
1+/yr						4			8
Total demographic variables = 0				Total belief variables = 4			Total location variables = 8		

TABLE 11—Continued

	Demographics			Perceptions			Use Locations		
Criminally Related	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Sex Adv.									
Other									
None					1	1			8
1+/yr				1		1			8
	Total demographic variables = 2			Total belief variables = 2			Total location variables = 8		
Poor Academic	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Poor Test Score									
None		1	1			4			8
1/yr			2			4			8
2+/yr			2			4			8
	Total demographic variables = 2			Total belief variables = 4			Total location variables = 8		
Poor Academic	Male	Female	Similar	Male	Female	Similar	Male	Female	Similar
Missing Class									
None		1	1			4		2	6
1/yr			2			4			8
2/yr			2			4			8
3+/yr	1		1	2		2	4		4
	Total demographic variables = 2			Total belief variables = 4			Total location variables = 8		

[a] Bold indicates largest number of independent variables per use pattern.

females were only similar experiencing one and two hangovers during the prior year. Whereas, significantly more females than males did not experience hangovers, and significantly more males than females experienced three or more hangovers during the prior year.

Chi-square analysis indicated that regardless of their demographics, perceptions, and alcohol usage location, both genders were similar experiencing (1) nausea/vomiting, (2) thinking they had a problem with alcohol, (3) memory loss, (4) unsuccessful attempt(s) at stopping alcohol use, and (5) having been criticized during the prior year. But, when the hangover frequencies were delineated by individual demographics, perceptions, and alcohol use locations, both genders were only similar in their low and moderate rates of hangovers during the previous year. Also, significantly more females than males did not experience a hangover, while significantly more males than females experienced the highest rate of hangovers during the previous year.

Physical Harm

The four physical harm variables were (1) thinking about suicide, (2) attempted suicide, (3) having been hurt/injured, and (4) having argued/fought during the prior year. Frequency analysis indicated that both genders were similar experiencing each frequency of all four physical harm variables. Because males and females rarely tried to commit suicide due alcohol usage, there were not enough students reporting they attempted suicide for chi-square analysis to be completed.

Chi-square analysis indicated that wanting alcohol on campus and alcohol

use at one of the four alcohol usage locations were significantly related to having argued/ fought and having been hurt/injured during the previous year. Having a father with an alcohol/drug problem was the only significantly related variable to thinking about suicide during the previous year.

Criminally Related Behavior

The six criminally related behavior variables were (1) trouble with police/ college, (2) damaging property/pulling a fire alarm, (3) driving under the influence of alcohol (DUI), (4) driving under the influence of alcohol (DUI) arrest, (5) sexual advantage taken of me, and (6) having taking sexual advantage of another during the previous year. Frequency analysis indicated that both genders were similar in having trouble with the police/college, driving under the influence of alcohol arrest (DUI), having been taken sexual advantage of, and having taken sexual advantage of another during the previous year.

However, both genders were not similar damaging property/pulling fire alarm and driving under the influence of alcohol (DUI). Significantly more females than males did not damage property/pulled fire alarm; and, significantly more males than females damaged property/pulled fire alarm three or more times during the prior year. Similarly, both genders were similar driving under the influence of alcohol (DUI) one and two times during the prior year. Whereas, significantly more females than males did not drive under the influence of alcohol; and, significantly more males than females drove under the influence of alcohol three or more times during the previous year.

Chi-square analysis indicated that both genders were similar in not having trouble with the police/college during the previous year when they believed (1) the campus alcohol policy was not enforced, (2) when alcohol was not wanted on campus, and (3) when alcohol was not used at the four use locations. Otherwise, significantly more males than females had trouble with the police/college. A similar pattern existed for damaging property/pulling a fire alarm.

Also, when alcohol was wanted on campus, significantly more males than females took sexual advantage of others. While, significantly more females than males did not drive under the influence of alcohol, significantly more females than males who used alcohol at a fraternity/sorority did drive under the influence of alcohol. When alcohol was used at campus events, significantly more males than females were arrested for driving under the influence of alcohol. When alcohol was not used at campus events, both genders were similar in arrests for driving under the influence of alcohol.

Overall, when the campus alcohol policy was believed enforced, and alcohol was wanted on campus and was used at one of the four alcohol use locations, both genders were similar experiencing moderate rates of criminally-related behavior. And, significantly more males than females experienced the highest rates of criminally related behavior.

Poor Academic Performance

The two poor academic performance variables were (1) receiving a poor test score and (2) missing class during the previous year. Frequency analysis

demonstrated that both genders were similar receiving a poor test score during the previous year. While both genders were similar missing class none, one, and two times during the previous year, significantly more males than females missed class three or more times during the prior year.

Chi-square analysis demonstrated that significantly more females than males did not miss class when (1) living off campus, or when (2) using alcohol at a bar/ restaurant or at campus events. Males and females were similar missing class three or more times when (1) living on campus, (2) when believing the campus alcohol policy was not enforced, (3) when not wanting alcohol on campus, and (4) when not using alcohol at a bar/restaurant or at campus events. Regardless of their demographics, perceptions, and alcohol use locations, both genders were similar missing class none, one, and two times as well as experiencing the same number of poor test scores during the prior year.

Multivariate Research Question 3

Question 3 asked: *"What are the correlations between the independent variables?"*

Listwise correlational analysis showed that there were few significantly related correlations ($p < .01$) between the independent variables (see Table 12). These few significant relationships occurred between either a negative or positive value of .30 to .40. Wanting alcohol on campus (perception) was the only variable which was significantly related to most of the other variables.

TABLE 12

INDEPENDENT VARIABLE INTERCORRELATIONS

Independent Variable	Independent Variable Having Correlation	r Value
Demographic	Demographic	
On/off campus housing	Current age	.30
Use Location	Demographic	
Residence hall	On/off campus housing	- .31
Use Location	Alcohol Belief	
Campus events	Want alcohol on campus	- .31
Residence hall	Want alcohol on campus	- .44
Fraternity/sorority	Want alcohol on campus	- .40

Note. ± .30 to ± .50 = low correlation; $p < .01$; Male $N = 185$, female $N = 345$.

Multivariate Research Questions 4 and 4a

Question 4 asked: *"Which demographics, perceptions and use locations are significantly correlated with male and female alcohol usage patterns?"*

No demographic was significantly correlated ($p < .01$) with any alcohol usage pattern (see Table 13). Wanting alcohol on campus (perception) was moderately negatively correlated with male (- .58) and female (- .63) previous year usage. Female alcohol usage at a residence hall (.52) and male alcohol usage at a bar/restaurant (.53) were moderately positive correlated with previous year usage.

Question 4a asked: *"Are predictor models for male and female usage patterns similar?"*

As the frequency of alcohol usage increased, the number of male predictors in the male models increased, but the number of female predictors in the female models remained fairly constant (see Table 14). Furthermore, fewer of

TABLE 13

ALCOHOL USAGE PATTERN CORRELATIONS WITH DEMOGRAPHICS, PERCEPTIONS, AND USE LOCATIONS

Dependent Variable	Independent Variable Having Correlation		r Value Male	r Value Female
Age of first use	Perception:	Want alcohol on campus	---	.33
"	Use Location:	Bar/restaurant	---	- .32
Previous Year Usage	Perception:	Want alcohol on campus	- .58	- .63
"	Use Location:	Campus events	.37	.37
"	"	Residence hall	.46	.52
"	"	Fraternity/sorority	.46	.45
"	"	Bar/restaurant	.53	.45
Previous Month Usage	Perception:	Want alcohol on campus	- .48	- .50
"	Use Location:	Campus events	.39	.36
"	"	Residence hall	.39	.49
"	"	Fraternity/sorority	.40	.41
"	"	Bar/restaurant	.49	.34
Weekly Usage	Perception:	Want alcohol on campus	- .45	- .50
"	Use Location:	Campus events	.39	---
"	"	Residence hall	.39	.42
"	"	Fraternity/sorority	.44	.36
"	"	Bar/restaurant	.50	---
Binge Drinking	Perception:	Want alcohol on campus	- .40	- .35
"	Use Location:	Campus events	.35	---
"	"	Residence hall	.31	.33
"	"	Fraternity/sorority	.35	---
"	"	Bar/restaurant	.43	---

Note. $\pm$ .30 to $\pm$ .50 = low correlation; $\pm$ .51 to $\pm$ .70 = moderate correlation; $p < .01$;
Male N = 185, female N = 345.

TABLE 14

SUMMARY OF MULTIPLE REGRESSION ANALYSIS OF ALCOHOL USAGE PATTERNS

Alcohol Usage Pattern	Number Of Predictors Male	Female	Percentage Of Variance Explained Male	Female	Are Male and Female Predictor Models Similar?	Predictors Shared By Both Genders
Age of First Use	2	2	18	22	Yes	Usage at bar/restaurant
Previous Year	4	3	51	54	Yes	Want alcohol on campus Usage at bar/restaurant Usage at residence hall
Previous Month	5	2	42	38	Yes	Want alcohol on campus Usage at bar/restaurant
Weekly	6	1	46	32	No	Want alcohol on campus
Binge Drinking	5	2	38	17	No	Want alcohol on campus

Note. Male N = 185, female N = 345.

the same predictors were shared by both genders as alcohol usage increased. Male predictor models explained 18-51% of the variance in the alcohol usage patterns (see Table 14). Female models explained 17-54%. Male and female predictor models explained a similar percentage of the variance for age of first alcohol usage, previous year usage, and previous month usage. However, the predictor models for weekly usage and binge drinking explained significantly more variance for the males than for the females. Likewise, the predictors in the male and female predictor models were only similar for age of first usage and previous year and monthly usage.

Multivariate Research Questions 5 and 5a

Question 5 asked: *"Which demographics, perceptions and use locations are significantly correlated with negative consequences reported by males and females?"*

Table 15 indicates the demographics, perceptions and use locations significantly correlated with male and female negative consequences. At best, these were only low correlations. The four use locations and wanting alcohol on campus (perception) were correlated with each negative consequence. The negative predictors in each corresponding male and female predictor model, or the male models had only one additional predictor. Despite this similarity in the number of predictors, the individual predictors within each male and female predictor model were usually different. Wanting alcohol on campus and alcohol usage at campus events were the only consistent predictors of the negative consequences experienced by both genders. Campus residence, the only demographic found as a predictor for any negative consequence, predicted DUI. Several perceptions and the remaining three usage locations were predictors for many of the other negative consequences.

Despite the difference in the predictors found in male and female predictor models, the percentage of the variance explained by each corresponding male and female predictor model was similar. The only exception was the percentage of variance consequences having no significant correlations were rarely occurred (see Table 16).

TABLE 15

NEGATIVE CONSEQUENCE CORRELATIONS WITH DEMOGRAPHICS, PERCEPTIONS, AND USE LOCATIONS

Abuse Indicator	Independent Variable Having Correlation		r Value Male	r Value Female
Hangover	Perception:	Want alcohol on campus	-.43	-.45
	Use Location:	Campus event	.28	.33
		Residence hall	.22	.36
		Fraternity/sorority	.35	.35
		Bar/restaurant	.34	.36
Nausea/Vomit	Perception:	Want alcohol on campus	-.34	-.32
	Use Location:	Campus events	.34	.27
	"	Fraternity/sorority	.33	.27
	"	Bar/restaurant	.40	.29
Memory Loss	Perception:	Want alcohol on campus	-.29	-.30
	Use Location:	Campus events	.30	.27
	"	Fraternity/sorority	.34	.31
	"	Bar/restaurant	.34	.21
Thought I Had a Problem		None		
Unsuccessful Attempts To Stop Using Alcohol		None		
Regret Behavior	Perception:	Want alcohol on campus	-.30	-.33
	Use Location:	Campus events	.32	.27
	"	Fraternity/sorority	.39	.24
	"	Bar/restaurant	.39	.12
Been Criticized		None		
Physical Harm				
Thought Suicide		None		
Tried Suicide		None		
Hurt/Injured		None		
Argued/Fought	Perception:	Want alcohol on campus	-.29	-.30
	Use Location:	Campus events	.31	.20
	"	Fraternity/sorority	.31	.21
	"	Bar/restaurant	.32	.17
Criminally Related Behavior				
Trouble Police/College		None		

Table 161—Continued.

Criminally Related Behavior		Independent Variable Having Correlation	r Value Male	r Value Female
Damaged Property/ Pulled Fire Alarm		None		
	Use Location:	Campus events	.32	.24
DUI	"	Bar/restaurant	.44	.23
DUI Arrest		None		
Been Taken Sexual Advantage Of		None		
Taken Sexual Advantage of Another		None		
Poor Academic Performance				
Poor Test Score		None		
Missed Class	Perception:	Want alcohol on campus	- .31	- .34
	Use Location:	Campus events	.32	.27
	"	Residence hall	.35	.25
	"	Fraternity/sorority	.39	.29
	"	Bar/restaurant	.42	.20

Note. $\pm$ .30 to $\pm$ .50 = low correlation; $\pm$ .51 to $\pm$ .70 = moderate correlation; $p < .01$; Male N = 185, female N = 345.

TABLE 16

NEGATIVE CONSEQUENCES HAVING NO SIGNIFICANT CORRELATION WITH ANY DEMOGRAPHIC, PERCEPTION, OR USE LOCATION BECAUSE OF LACK OF OCCURENCE

Negative Consequences	% not reporting the consequence Male	Female
Abuse Indicator		
Recognized a problem with alcohol	85%	91%
Unsuccessful attempt(s) to stop using alcohol	92%	96%
Physical Harm		
Thought suicide	96%	94%
Attempted suicide	98%	97%
Been Hurt/injured	81%	86%
Criminally Related Behavior		
Trouble with police/college	78%	90%
Drove under the influence of alcohol (DUI)	-----[a]	74%
Drove under the influence of alcohol (DUI) arrest	97%	99%
Damaged property/pulled fire alarm	96%	99%
Sexual advantage taken upon me	87%	84%
Sexual advantage taken upon another	86%	96%
Poor Academic Performance		
Poor test score	76%	82%

Note. [a] Has a significant correlation with either a demographic, belief, or use location. Male N = 185, female N = 345; $p < .01$

Question 5a asked: *"Are predictor models for each consequence similar for each gender?"*

As shown in Table 17, except for predicting hangovers, memory loss, DUI, and having been taken sexual advantage of, there were either the same number of (18%) explained for males damaging property/pulling fire alarm, while there was no variance explained for females.

TABLE 17

GENDER SIMILARITY OF NEGATIVE CONSEQUENCE PREDICTORS

Negative Consequences	Number Of Predictors Male	Female	Percentage Of Variance Explained Male	Female	Male & Female Predictor Models Similar?	Predictors Shared By Both Genders
Abuse Indicators						
Hangover	2	4	29	30	Yes	Want alcohol on campus Use at bar/restaurant
Nausea/vomit	4	3	22	22	Yes	Want alcohol on campus Use at bar/restaurant Use at residence hall
Memory loss	2	3	15	16	Yes	Want alcohol on campus Use at fraternity/sorority
Had a problem	3	2	13	6	Yes	Use at campus events
Can't stop using	0	0	0	0	Yes	
Regretted behavior	3	2	24	14	Yes	Use at campus events
Been criticized	1	2	5	11	Yes	
Physical Harm						
Thought suicide	0	0	0	0	Yes	
Tried suicide	0	0	0	0	Yes	
Hurt/injured	1	0	6	0	Yes	
Argued/fought	3	2	18	12	Yes	Want alcohol on campus Use at campus events
Criminal Behavior						
Trouble with police	4	1	0	0	Yes	Use at campus events
Damaged property	2	0	18	0	No	
DUI	2	4	4	2	Yes	Use at campus events
DUI arrest	1	0	3	0	Yes	
Been taken sex adv. of	1	2	3	9	Yes	Want alcohol on campus
Taken sex adv. Another	2	1	10	2	Yes	
Poor Academic Behavior						
Poor test score	2	2	9	8	Yes	
Missing class	3	3	23	18	Yes	Use at campus events Use at fraternity/sorority

Note. Male N = 185, female N = 345.

Discussion

This study confirmed alcohol as the undergraduate drug of choice. Eighty-nine percent of male undergraduates and 88% of female undergraduates had used alcohol during the previous year. The combined and cumulative use of other drugs (excluding caffeine and nicotine) was negligible when compared to alcohol usage.

However, this study's theoretical model was not fully supported as a viable hypothesis for measuring the magnitude of female undergraduate alcohol usage and the negative consequences suffered from usage. This model stated that when female undergraduates, ages 17-24, shared similar demographics, perceptions, and alcohol use locations as male undergraduates, they shared similar alcohol usage patterns and negative consequences.

Therefore, based upon the results of this study, the following revised theoretical model is posited: When male and female undergraduates, ages 17-24, share similar demographics, perceptions, and alcohol use locations, both genders are similar in their age of first alcohol usage, and are similar abstaining from alcohol and moderately using alcohol during the previous year and month. Also, females are more likely to be low rate users of alcohol and males more likely to be heavy users of alcohol during the previous year and month. Furthermore, both genders are similar in low and moderate average drinks each week and in binge drinking during the prior two weeks. But, females are more likely to abstain from alcohol while males are more likely to be heavy users of alcohol each week and in binge

drinking during the prior two weeks. Yet, despite this difference, females share completely with males most (15 out of 19) of the same negative consequences from alcohol use (see Figure 1).

Several results from this study disagreed with the literature. For example, several researchers (e.g., Bentler & Huba, 1980; Carey, 1993; Dull, 1992; Elkind & Weiner, 1978; Kandel et al., 1992) had shown perceived peer alcohol usage to be a good predictor of young adult and undergraduate alcohol usage and the suffering of negative consequences from usage. But surprisingly, in this study, perceived peer usage was not correlated ($p < .01$) with any alcohol usage pattern and only a few negative consequences. Nor was perceived peer usage a predictor in any male or female predictor model for either alcohol usage or the negative consequences.

Other researchers (e.g., Kandel et al., 1992; Liljestrand, 1993; Parker, 1993a; Saltz & Elandt, 1986;Wechsler et al., 1994) have indicated that demographics, individual perceptions, and alcohol use locations were significantly related to alcohol usage patterns and alcohol-related problems. In this study, however, there were only a few moderate and low correlations between the alcohol usage patterns and the negative consequences with the seven demographics, seven individual perceptions, and four alcohol use locations used in this study. For females, in particular, there were at best only a few low correlations.

This suggests that alcohol usage as measured in this study was related to items other than their demographics and individual perceptions (with the exception of wanting alcohol on campus). Because undergraduate alcohol usage

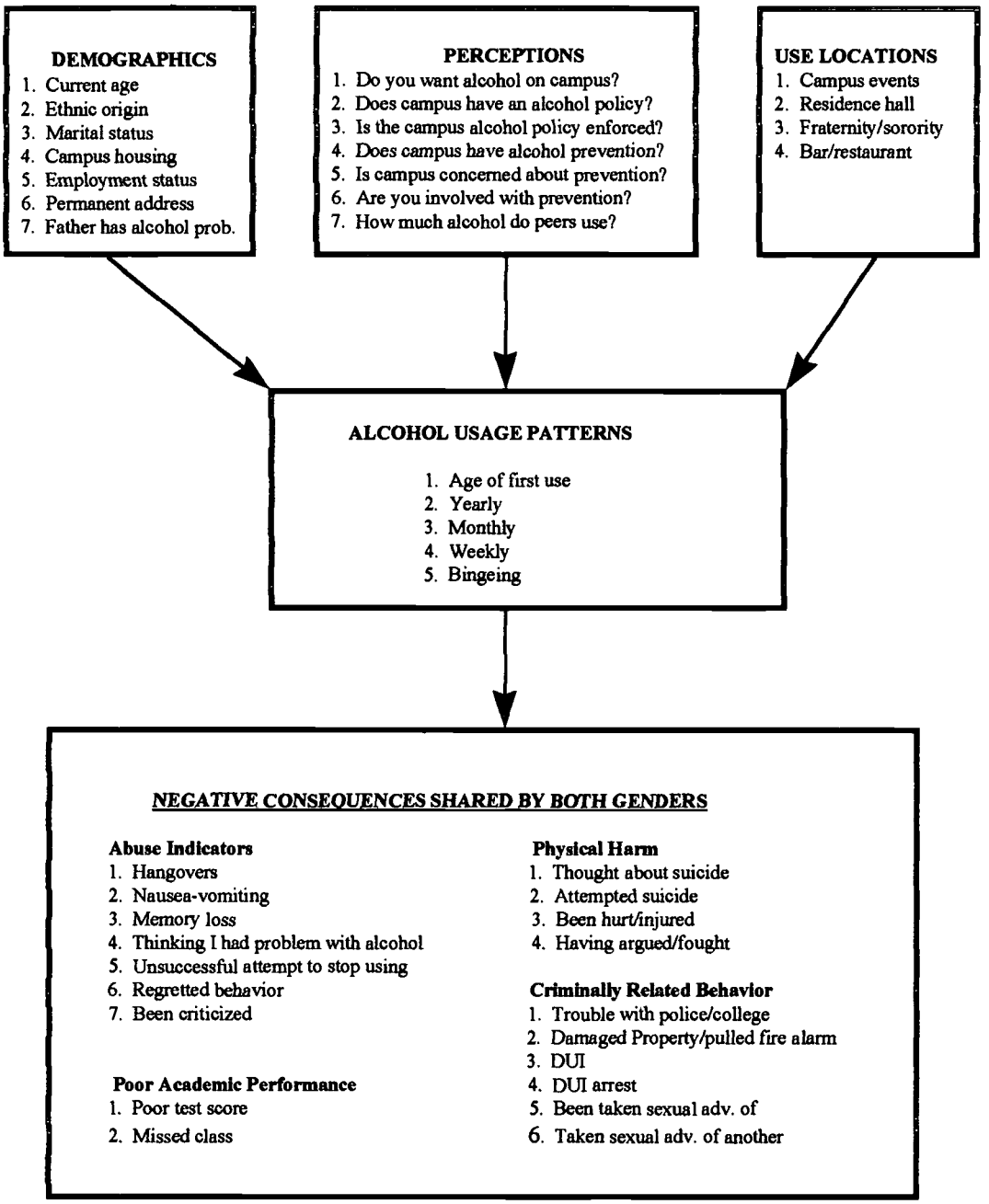

Figure 1. Theoretical model for this study.

Female undergraduates, ages 17-24, who share similar demograhics, perceptions, and alcohol use locations with male undergraduates, also share similar alcohol usage patterns and negative consequences from alcohol usage.

must be a complex behavior, involving many variables, this single study could not have possibly explained 100% of the variance for each dependent variable.

Nevertheless, wanting alcohol on campus and alcohol usage at the four alcohol use locations explained large percentages of the alcohol usage variance, as well as, moderate to small percentages of the negative consequence variance. Therefore, it follows, that wanting alcohol on campus and alcohol usage at the four alcohol use locations were reliable predictors for each alcohol usage pattern and the resultant negative consequences from alcohol usage.

However, because other variables outside the scope of this study are probably good predictors, further research is needed regarding undergraduate alcohol usage and the resultant negative consequences. Other variables, such as freedom of choice, personal ethics, and maturity, are probably related to alcohol usage and the negative consequences. However, since these variables change over time as an individual grows older, it is probably questionable, if not impossible, to reliably explain 100% of the variance in either the undergraduate alcohol usage patterns or the negative consequences.

Also, there are exceptions to any behavior. For example, some students wanting alcohol on campus may seldom use alcohol. Other students not wanting alcohol on campus might become drunk off campus and suffer a wide range of negative consequences. Notwithstanding, a general profile did emerge in this study: Students who wanted alcohol on campus and who used alcohol at one of the four alcohol use locations were the heaviest drinkers and sufferers of negative consequences.

The Core Survey used in this study was not designed to measure or control every possible variable involved with undergraduate alcohol usage. For example, certain survey categories, such as age of first use, might have measured only onetime usage, and not the start of a lifelong usage pattern. Furthermore, the Core Survey did not break down the type of alcohol used. Hard liquor, wine coolers, beer, etc., were simply lumped together and called "alcohol." There was no way to determine from the Core Survey if males and females preferred different forms (e.g., wine coolers versus beer) of alcohol.

Another concern is that undergraduates may not understand or recognize every factor related to their alcohol usage. For example, students might not be able to differentiate between drinking for escape from poor grades versus the drinking causing the poor grades in the first place.

And finally, this study demonstrated that undergraduate alcohol usage and the resultant negative consequences need to be delineated more than just "yearly, monthly, weekly, and binge drinking." Within each alcohol usage category (e.g., yearly usage) males and females are different regarding their abstaining from alcohol as well as their low, moderate and heavy usage of alcohol.

Implications of My Research for Educational Practice

I will provide these findings to the wellness counseling centers located on the two college campuses, which were used as the research populations for this study, for incorporation into their alcohol education, prevention, and intervention programs. I will present these results at state and national conferences (e.g.,

Michigan Consortium on Substance Abuse Education) which focus upon alcohol usage on college campuses. I will submit the data and conclusions as journal articles for publication in recognized scholarly publications (e.g., *Journal of Studies of Alcohol*).

The findings will be given to substance abuse commissions and advisory counsels as a rationale for earmarking educational, intervention, and prevention program funds for female college undergraduates. As a criminal justice instructor I will incorporate the findings into the criminal justice and substance abuse curriculum.

Implications for Practice by College Administrators and Counselors

Notwithstanding the need for further research, this study was important because it provides college administrators and counselors with empirical baseline data for developing appropriate alcohol prevention and intervention programs for undergraduates, especially females. The data generated from this study are crucial if administrators are to prevent, delay, or reduce inappropriate drinking and the negative consequences related to such usage.

Understandably, in the past, college prevention and intervention programs have focused primarily upon the largest volume users, who were likely to be male. This selective attention occurred because the heavy drinkers were expected to experience the most serious and prolonged consequences from alcohol usage. This study, however, has shown that moderate drinkers, especially females, suffer

most of the same negative consequences encountered by males who are heavy drinkers.

Most of the male and female undergraduates in this study had used alcohol before age 16, many before age 14. This strongly suggests that both genders enter college with well-established and defined patterns of alcohol usage and negative consequences. If this is true, then prevention programming for these students, even as freshmen, would have little, if any, positive outcome. Instead, intensive intervention programs would be more appropriate.

As part of college admission, freshmen and students transferring in should be screened and assessed regarding their alcohol usage and suffering of negative consequences. For example, age of first alcohol usage should be determined. The younger the age of first use, the greater the usage and experiencing of problems as a young adult (Kandel & Yamaguchi, 1984a; Kandel et al., 1992).

Also, since heavy alcohol usage is occurring in junior and senior high school, colleges should be developing collaborative alcohol abuse prevention programs with their surrounding K-12 school systems. At the other end of the spectrum, may be college seniors who are in need of intensive intervention programs to counteract potentially longer histories of usage and negative consequences. And notwithstanding, because most undergraduates use alcohol, colleges need to guide students into exploring their own individual alcohol usage patterns and potential for suffering problems. If this is done, students may be less likely to abuse alcohol and experience the negative consequences from usage.

Two very important findings were highlighted in this study. First, nearly all male and female undergraduates wanted alcohol on campus. Second, most males and female students used alcohol on campus. Therefore, colleges must investigate into why students want alcohol on campus, and why students use alcohol on campus. These two findings are significant since (1) most undergraduates are younger than the legal drinking age of 21, (2) college policies prohibit underage drinking, and (3) the colleges disallow open use of alcohol on campus and at campus events. Yet, undergraduates are most likely to consume alcohol at campus-sponsored events, within a residence hall, or fraternity/sorority. These locations are under the domain and control of college administrators, which suggests that colleges need to address the consumption occurring on campus.

While significantly more males (59%) binge drank, it is significant that almost a third (33%) of female undergraduates did also. And, as a result, significant numbers of both genders suffer negative consequences. Therefore, college administrators need to also address both male and female binge drinking.

Finally, this study has demonstrated that undergraduate alcohol usage is a complex behavior. Therefore, a multi-faceted strategy of prevention and intervention must be used by college administrators.

Recommendations for Research

The following are recommendations for further research.

1. Determine how college alcohol policies and practices affect student

alcohol abuse and the suffering of negative consequences from alcohol usage.

2. Determine why female undergraduates experience similar negative consequences as males, despite not drinking as much alcohol as males.

3. Explain why female undergraduates have fewer predictors than males for alcohol usage and the negative consequences generated from alcohol usage; while the predictor models for both genders explain similar percentages of the variance for alcohol usage and the negative consequences.

4. Compare male and female undergraduate alcohol usage and the negative consequence patterns over a 5- and 10-year period.

5. Examine alcohol usage after a negative consequence(s) starts occurring.

6. Measure the influence of psycho-social, personality traits, mental, biological, environmental, and cultural events (not researched in this study) upon alcohol usage and the negative consequences suffered from usage.

7. Assess the predisposing and enabling factors associated with alcohol usage and the negative consequences from usage.

8. Ask what, if any, influence licit drugs (e.g., tobacco) and illicit drugs (e.g., marijuana) have on alcohol use and the problems generated from use.

9. Research the relationship between experimentation, habitual party usage, and addictive usage of alcohol and the resulting alcohol-related problems.

10. Further test the reliability of the CORE Survey questions using appropriate internal consistency and test-retest measures.

11. Further test the Core Survey construct validity.

12. Research whether alcohol leads into harder drug usage.

13. Cross validate the Core Survey with other surveys developed for measuring undergraduate alcohol usage.

14. Evaluate which educational media and formats are best for educating undergraduates about alcohol abuse and the negative consequences suffered from use.

15. Evaluate undergraduate responses to alcohol education.

16. Replicate and improve the methodologies used in this study.

17. Determine if males and females prefer a different form (e.g., wine cooler versus beer) of alcohol?

18. Research other private and public liberal arts colleges and universities to determine if other undergraduates experience similar alcohol usage patterns and negative consequences as the population used in this study.

19. Assess the rationales and reasons undergraduates give for using alcohol.

20. Evaluate the impact campus policies and state laws have upon alcohol usage and the negative consequences experienced from usage.

21. Evaluate the impact of alcohol availability, price, and outlet stores selling alcohol upon alcohol usage and the negative consequences suffered from usage.

22. Examine the relationship between declared undergraduate major or curriculum with alcohol usage and the suffering of negative consequences from usage.

23. Determine how the information and knowledge about alcohol use impact student alcohol usage and the resultant negative consequences from usage.

24. Determine if undergraduate alcohol usage is a rite of passage or becomes a permanent lifestyle for undergraduates.

25. Analyze if students understand the campus alcohol policy.

26. Research the difference in alcohol usage and the resultant negative consequences between students preoccupied with alcohol and those who are not.

27. Research the difference in alcohol usage and the resultant negative consequences between students believing bingeing is acceptable and those who do not.

28. Analyze the role of family upbringing upon undergraduate alcohol usage.

29. Determine if undergraduates believe alcohol is a forbidden fruit and if this belief creates a greater desire to have alcohol.

30. Determine the role of alcohol in delaying maturity and social development.

31. Evaluate what role unrealistic expectations, dissatisfaction with life, and poor academics have upon alcohol usage and the resultant negative consequences.

Recommendations for Prevention and Intervention Programs

The following are recommendations for the development of male and female undergraduate alcohol abuse prevention and intervention programs.

1. Evaluate whether total abstinence is realistic and obtainable.

2. Analyze whether alcohol abuse prevention programs stop or postpone alcohol usage.

3. Analyze if alcohol usage and the negative consequences from usage change over time, starting with the freshmen year.

4. Assess the impact of community prevention and intervention resources upon undergraduate alcohol usage and the suffering of negative consequences from alcohol usage.

5. Evaluate what constitutes the "responsible use of alcohol."

6. Assess how students accept responsibility for their alcohol usage.

7. Determine the undergraduate dropout rate from alcohol usage.

8. Determine the undergraduate accident rate from alcohol usage.

9. Determine the relationship between self-esteem, self concept, and feelings of isolation with alcohol usage.

10. Determine if and when alcohol users evaluate the negative consequences they are experiencing from alcohol usage.

11. Conduct future studies using this study as a baseline.

12. Use this study to develop gender appropriate alcohol abuse prevention and intervention programs.

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