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Applying intellectual development theory to college student drinking

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APPLYING INTELLECTUAL DEVELOPMENT THEORY
TO COLLEGE STUDENT DRINKING

A Dissertation

**Submitted To The Graduate Faculty of
the Louisiana State University and
Agricultural and Mechanical College
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in

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ABSTRACT

This study evaluates the presence of a relationship between a student's level of Intellectual Development, as measured by Moore's Learning Environment Preferences (LEP) test, and harmful drinking behavior in college students. An online survey instrument was sent to a random sample of 3,000 undergraduate students at a large public research-intensive four-year college in the South via student email accounts. The survey instrument included items about student drinking behavior, perception of peer student drinking behavior, and the Learning Environment Preferences Test. The results showed that there is a statistically significant relationship (inverse) between intellectual development and binge drinking behavior, after controlling for perception of peer binge-drinking behavior, but no relationship between intellectual development and drinking in general. A finding that increasing intellectual development levels may result in reduced negative drinking behavior has implications for curriculum development.

CHAPTER 1: INTRODUCTION

College Student Drinking

College student drinking has been researched extensively since the landmark

Straus & Bacon study in 1953, *Drinking in College*. Although anything but a new

phenomenon, student drinking has fallen under increasing scrutiny as the country has

shifted from a legal drinking age of 18 up to 21, and the majority of college students have

thereby been categorized as illegal drinkers (Chaloupka & Weschler, 1996).   Despite

decades of study into the causes and correlates of harmful college student drinking

behavior and the myriad of student development programs designed to address the

problem, college student drinking patterns are generally unchanged today from those

described by researchers more than a half century ago. Studies of problematic alcohol

consumption among college students continue to show that although the majority of

students do not engage in problematic drinking, and that they do not drink more heavily

than their non-college peers, those students who are heavy drinkers are at much higher

risk of alcohol-related problems than are than other students (Johnston et. al., 2000).

Based on the findings of the three largest national surveys of college student drinking

patterns, and upon numerous smaller-level (single institution, i.e.) studies that provide

corroboration for these findings across a variety of communities, schools and students,

the "typical" college student binge drinker can be described as a white male under age 24

who has some level of Greek affiliation, resides off campus or in Greek housing, and has

a lower grade point average. (Engs (1977), Engs and Hanson (1985) and Engs, Hanson

and Diebold (1997), Presley, Meilman, Leichliter and Harrold, (1998a) Wechsler,

Davenport, Dowdall, Moeykens and Castillo (1994)).

Patterns of Alcohol Use

Three national studies have shown that the percentage of college students reporting some use of alcohol is relatively consistent over time, in about the 75% to 85% range. What is not so clear is the extent to which binge drinking or heavy drinking has increased (or decreased) over the past twenty years. There are at least two schools of thought – one that says binge drinking is not on the rise and another that says it is. Which school one belongs to depends largely on how binge drinking is defined and how the level of binge drinking is calculated. Keeling (1998) noted that the politics surrounding college student drinking research, scholarship and prevention efforts has resulted in ineffective programs and a confused public. "To say that there are multiple, conflicting agendas is the gentlest of understatements" (p.51). To highlight these issues, the definitions and results from each of the three studies with respect to quantity/ frequency (QF) measures is presented.

Core Alcohol and Drug Survey (CORE). The Core Institute's Alcohol and Drug Survey is an annual national survey of college students from two- and four-year colleges dating back to 1989. Presley, Meilman, Leichliter and Harrold, (1998) conduct the survey under a grant from the U.S. Department of Education under the Drug Prevention in Higher Education Program, Fund for the Improvement of Postsecondary Education (FIPSE). Students are randomly selected within each institution participating in the survey. The survey is designed to assist colleges and universities obtain a common "core" of baseline data about college student alcohol and other drug use. Students are asked to report quantity/frequency (QF) measures on a range of drugs (tobacco, alcohol, marijuana, cocaine, steroids, etc.) in two categories: using at least once in the previous

year and using at least once within 30 days prior to completing the survey. They are also asked to give an estimate of the average number of drinks per week they normally consume and to indicate the number of times they engaged in binge drinking activity, defined as five or more drinks in one sitting, within the past two weeks. The number of students reporting they engaged in binge drinking at least once during the past two weeks rose from 41.8% in 1989 to 46.8% in 1999, and to 49.8% in 2003.

Harvard School of Public Health College Alcohol Study (CAS). Wechsler, Davenport, Dowdall, Moeykens and Castillo (1994) published the first of the College Alcohol Studies defining binge drinking as five or more drinks in a row for men and four or more drinks **in a row** for women at least **once during the two weeks prior to the survey**. Frequent/heavy binge drinking was defined as binge drinking three or more times in the two weeks prior to the survey.

In all four years that the study has been conducted to date, students were selected randomly from each participating institution. Consistent findings in all four studies showed that binge drinkers (both occasional and frequent) comprised approximately 44% of all respondents, with one in five defining themselves as frequent binge drinkers.

The survey was first administered in 1993 to 15,403 students at 140 colleges and universities. Approximately 84.6% of the students indicated that they had consumed alcohol during the past year and 24.7% reported binge drinking. They also found that 19.8% of all the students reported heavy binge drinking. In 1997, only 116 of the original 140 schools were resurveyed (including 39 states) because several of the original schools chose not to participate in the second study. The results showed that of 14,724 students surveyed, 81.1% indicated consuming alcohol within the past year, 22.7% were binge drinkers. They also found that 20.9% of all students were frequent binge drinkers.

In 1999, Wechsler et. al. (2003) resurveyed surveyed 119 of the original 140 schools (including 38 states and the District of Columbia). Of the 14, 138 students surveyed, 80.8% indicated consuming alcohol within the past year, 21.4% were binge drinkers, and 22.7% were heavy binge drinkers. And finally, Wechsler et. al. (2002)'s survey from 2001 shows remarkably little difference from the findings of the earlier CAS studies.

These studies have been criticized for intentionally not specifying the time of duration of each episode, and critics suggest that an "occasion" can have a time frame of an entire day. Another criticism is that the definition can categorize people as binge drinkers whose drinking would be considered normal, or at least not problematic otherwise (Hanson, 2003). Wechsler and Kuo (2003a) defended the measurements:

> The five-four measure is not intended to diagnose students on college campuses as alcoholics, nor to determine if they are legally intoxicated at the time. It is not linked to the time elapsed while drinking, the weight of the drinker, or food eaten during the drinking episode. The measure is designed to track how many students on college campuses nationwide are drinking at levels high enough to significantly increase the risk of problems for themselves and for those around them (p.12).

Wechsler and Kuo (2003b) further defended the definition, indicating that when college students were surveyed and asked to define binge drinking, they essentially mirrored his own definition (especially the abstainers). However this study was conducted after many years' exposure of Wechsler's work, including his definitions, in student media.

Student Alcohol Questionnaire (SAQ). Engs (1977), Engs and Hanson (1985) and Engs, Hanson and Diebold (1997) conducted national studies on drinking patterns of 1,126 college students in 1974, 6,115 students in 1983, and 12,000 students in 1994. Their QF measure contained six categories of increasing alcohol use: abstainer, infrequent drinker, light drinker, moderate drinker, heavier drinker and heavy drinker.

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They defined heavy drinking as six or more drinks **at any one sitting more than once a week** during the two earlier studies. By 1994, Engs, et. al. reduced the categories to three: abstainers, light to moderate drinkers, and heavy drinkers. The definition of heavy drinker was altered to include the lower threshold defined in the two earlier studies as heavier drinker, or those who consume 5 drinks or more **at any one sitting at least once per week**. Their definitions of heavy drinking are far stricter than either binge drinking measure used in the CORE or CAS studies. The SAR requires sustained, repeated episodes of what others refer to as binge drinking. The number of students having reported drinking alcohol at least once a year was 79.4% in 1974, 81.9% in 1983, and 72% in 1994. Heavy drinking was reported by 20.2% of students in 1983 and by 20.6% in 1994.

This series of studies included students in sociology and health, physical education and recreation departments from 112 four-year colleges and universities representing all 50 states. While the findings of these studies are consistent with other national measures of the prevalence of alcohol use, they have been criticized as not including a nationally representative sample of college drinking (Wechsler, et. al., 1994). Engs, et. al. (1997) defend their samples, indicating that the institutions were selected to form a "quota sample" intending to be representative of all four-year higher education institutions across measures such as institution size and sources of financial support. The following section will address the findings of these studies with respect to the characteristics of the students and the schools they attend.

Drinking Patterns by Student and School Characteristics

Students who use alcohol differ significantly in many ways from students who do not. The work of Engs and that of Wechsler provide national data on measurements of drinking regarding characteristics of the students and of the schools they attend. This information is considered invaluable for prevention and intervention programming on college campuses. The following information on characteristics is taken from Engs, et. al. (1997) and Wechsler, et. al. (2003a).

Gender. Engs found that more female students than male students tended to be abstainers. They also found that among the drinkers, women consumed significantly fewer drinks than men overall, and women were less likely to be heavy drinkers. Wechsler found that approximately 50% of males and 40% of females were binge drinkers in 1993, 1997 and 1999. The percentage of abstainers was increasing for both males and females from 1993 through 1999. However, they also found that the number of heavy binge drinkers was also increasing among both genders, even though the overall rate of binge drinking did not change between those years. They refer to this as "drinking style" and note that it is significantly increasing in intensity.

Age/ Class Standing. Engs reports that older students drank significantly less in 1994 than younger students, even though older students reported experiencing slightly more alcohol-related problems. Among drinkers, they found that a significantly higher percentage of underage students were heavy drinkers compared to students over 21. There was no difference in the mean number of drinks per week between underage and legal age drinkers. Wechsler found that approximately 47% of drinkers under age 24 and only 28% of drinkers aged 24 and over were binge drinkers.

Engs found no significant difference in the mean percent of drinks consumed per week from the first to the fourth years of college, but there was a gradual decrease in the percent of heavy drinkers over those same four years. Wechsler found little difference in the percentages of binge drinkers by class standing.

Ethnicity. Engs found that significantly more whites were heavy drinkers, and significantly more non-whites were abstainers. Among all drinkers, twice as many whites were heavy drinkers and whites consumed more than twice as many drinks per week than non-whites. Wechsler found that there was a significant increase in abstention among Hispanic, African American, and Asian students from 1993 to 1999. They also found that nearly 50% of whites were binge drinkers compared to African American (15.5%), Hispanic (39.5%), and Asian (23.1%) students.

Religion. Engs found that abstainers and moderate drinkers were more likely to consider religion important, while heavy drinkers were more likely to not consider religion important. They also found that few Catholic and Jewish students were abstainers, and only about half the students whose religion forbids drinking were abstainers. Among all drinkers, Catholics had the highest percentage of heavy drinkers, consuming the highest mean number of drinks per week.

GPA. Engs found that abstainers and light to moderate drinkers tended to have higher grade point averages (GPA's) than heavy drinkers. "Those students with 4.0 GPA's consumed a third of the number of drinks compared to those with GPA's under 2.0" (p. 21).

Memberships and Affiliations. Engs found that a higher percentage of Greeks were drinkers as compared to non-Greeks, and a higher percentage of Greeks were heavy

drinkers. Greeks consumed twice as many drinks per week than non-Greeks. Wechsler found that the percentage of fraternity and sorority members who were binge drinkers decreased from 1993 (67.4%) to 1999 (64.7%), however, their levels are much higher than for the student body as a whole. Cashin et. al. (1998) studied more than 25,000 students from 61 institutions and found that students affiliated with the Greek system reported greater quantity and frequency of drinking than their non-Greek counterparts. They also found that the leadership within Greek organizations drank more than the average membership, suggesting that the Greek leaders may set heavy drinking norms.

Research also suggests that membership in college athletics is associated with higher frequency than other students (Presley, 1998a). Leichliter et al. (1998) also found that male leaders of athletic teams drank at a higher rate than other team members. The findings are not quite so conclusive about membership in service organizations.

Residence. Wechsler found that binge drinking decreased among dormitory residents and increased among students living off campus between 1993 and 1999. Even though there was decrease in the percentage of binge drinkers in Greek housing during those same years, from 83.1% to 78.9%, the percentages were still significantly higher than for dormitory residence halls (44.5%) and off-campus housing (43.7%) in 1999. Valliant & Scanlan (1996) found that students living at home with their parents tend to drink less than students in other college living environments.

School Type. Engs found that publicly funded schools had a higher percentage of drinkers than private schools, however, among drinkers, a higher percentage of private school students were heavy drinkers than public schools. They found no difference in the mean amount of drinks consumed per week by school type. Wechsler found that the

prevalence of binge drinking did not change at most types of colleges between 1993 and 1999. There was an increase in both abstention and frequent binge drinking in most college subgroups, however, the percentage of binge drinkers was slightly higher at public schools than at private schools. The differences found in Engs' heavy drinkers and Wechsler's binge drinkers may be attributable to how each defines the drinker category. Wechsler also found that the percentage of binge drinkers was higher at coed schools than at women only schools and higher at non-commuter schools than at commuter schools. At schools with religious affiliation, 42.9% of the students were binge drinkers compared to 44.6% of students at schools with no religious affiliation.

School Size/School Location. Engs found no difference in the number of drinkers by school size, but Wechsler found that the percentage of binge drinkers at small schools (less than 5,000 enrollment) was lower than at larger schools. Again, the differences may be attributable to how the categories are defined. Engs found that among drinkers, schools in smaller communities had more heavy drinkers. Wechsler found that rural, small town schools had fewer binge drinkers. Again, the differences could be attributable to how the categories are defined.

Even though the previous research is still inconclusive as to the consumption patterns related to specific characteristics of student drinkers, the evidence overwhelmingly suggests that student drinking patterns in general have not changed significantly over time despite massive efforts on the part of higher education institutions to develop and implement programming to alter those patterns. The fact is that, unless checked, harmful drinking behavior may continue to occur at existing rates or may even increase in intensity at some future point. Higher education institutions are therefore

obligated to address this smaller population of students who do engage in problematic drinking for three critical reasons: the primary and secondary effects of heavy drinking on the student population, and the liability of the institution for alcohol-related personal and property damage caused by intoxicated students.

The Primary and Secondary Effects of Student Drinking

One of the most important reasons to attempt to understand and change harmful alcohol use patterns is because of the alcohol-related problems experienced by drinkers. Students who drink report higher levels of physical illness, missing classes and exams, performing poorly, fighting, damaging property, engaging in risky behavior such as drunk driving, having trouble with the law, and more (Engs, 1997; Presley, 1998b; Wechsler & Kuo, 2003a). Nationally, more than 500,000 full-time four-year college students were unintentionally injured under the influence of alcohol and over 600,000 were hit or assaulted (Hingson et. al., 2002). The most devastating primary effects for students are personal injury and death. A recent study estimates that the number of 18-24 year old college students who died in 1998 from alcohol-related unintentional injuries, including motor vehicle crashes, was more than 1,400 (Hingson et. al., 2002). The number is compelling because it represents approximately 8% of the 18,726 deaths reported for the year for all persons between the ages of 16 and 24, including non-college persons across the age group in the United States (NHTSA, 1997; NTSHA, 2003).

Increasing emphasis has also been placed on reducing alcohol-related problems experienced by non-drinkers, known as secondhand effects. More than two thirds of non-binge drinkers and abstainers who live on campus in either dormitories or Greek residences report experiencing at least one secondhand effect (Wechsler & Kuo, 2003b).

These range from being interrupted while studying, being awakened at night, having to take care of a drunken fellow student, being insulted or humiliated by a drunk student, and being assaulted by a drunk student. Nationally, more than 70,000 college students were sexually assaulted by another student who had been drinking (Hingson, et. al., 2002).

These personal health, academic / social, and legal problems not only impact the learning environment and have serious implications for student retention, they also have serious implications for potential institutional liability.

Potential Liability of Higher Education Institutions

Over and above behavioral concerns with alcohol use, higher education administrators must confront issues of legal responsibility and institutional liability. "Regarding alcohol, the university's legal responsibility is relevant as well as perplexing" (Sourcebook, 1995). The federal government and most states have invested 18 year olds with rights and responsibilities to marry, vote, become parents, contract with institutions, operate sophisticated military weapons systems, and so on. At the same time, legislation universally bans the obtaining, consuming and possession of alcoholic beverages under age 21 (the majority of undergraduate college students).

> College administrators are caught between legal and sub-cultural realities.
> The trade-off to banning alcohol on campus, for example, is the increased
> probability of alcohol-related crashes and trauma from forays off-campus.
> Further, accommodating policies differentially to similar students (those
> just under 21 and those just over 21) creates additional challenges for
> campus administrators (Sourcebook, 1995, p.2).

The total cost to higher education institutions caused by student alcohol consumption is difficult to calculate. In terms of damage to property, Gadaleto and Anderson (1986)

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found that alcohol usage was reported as being involved in 61% of residence hall damages and 53% of damages to other campus property. The direct cost to repair property damage drains dollars from the classroom, the number one job of an educational institution. However, direct cost for property damage is not the only factor institutions have to consider.

Other negative consequences of student alcohol abuse mirror similar social and health effects in the wider society: vandalism, accidental death, suicide, injuries, assaults, and impaired cognitive ability. Other economic effects are also evident; for example, Eigen (1991) found that the typical drinking student spends more money for alcoholic beverages than for textbooks. Less quantifiable is the "damaged or unmet human potential, the very raw material of the university" (Sanford, 1962).

"With little progress being made in changing student drinking patterns, college and university administrators are under pressure to lower high-risk drinking among their students. A key source of pressure has been emerging case law regarding legal liability" (DeJong & Langford, 2002). In fact, and possibly due to this increased legal threat, university presidents cite student alcohol misuse as one of their top three areas of concern, (Carnegie, 1990).

Liability suits from injured students and their families are becoming more commonplace, and compensation is more frequently sought for alcohol-related injuries as the legal landscape is beginning to change. (Reisberg, 1999). Increasingly, U.S. courts are ruling that colleges and universities cannot ignore high-risk alcohol consumption, but instead have an obligation to take reasonable measures to create a safe environment by reducing foreseeable risks (Bickel & Lake, 1999). In 1997, student deaths by alcohol

poisoning at Louisiana State University and the Massachusetts Institute of Technology put the issue of student drinking on the national agenda (DeJong & Langford, 2002)

Although courts have been generally unwilling to hold colleges liable for student injuries related to alcohol absent some overt behavior showing negligence, there has been an increasing trend in litigation to name any person or entity that has liability coverage as defendants (Roberts & Fossey, 2002). Experts in the field of higher education law and institutional liability warn that the recent alcohol related deaths on college campuses and the renewed efforts of colleges to modify the social environment to reduce alcohol abuse indicates a ripeness for court decisions holding colleges legally liable for alcohol-related student injuries (Roberts & Fossey, 2002). "Most analysts agree that colleges and universities are increasingly in danger of being sued for property damage or injuries that result from student drinking" (Upcraft & Welty, 1990). The courts have been increasingly willing to impose civil penalties not only for actions related to alcohol-related student injuries, but for failure to act (such as failing in the duty to enforce drinking rules) as well. At a minimum, institutions of higher education can increasingly expect to accumulate legal fees for nothing more than excluding themselves from liability, and at a maximum they can be held legally responsible for the injury.

Early court cases involving alcohol-related injuries to intoxicated students were generally attributed to the students' wrongdoing as the cause of their own injuries. Bradshaw v. Rawlings, (1979) is a leading case in this area. In overturning a lower court decision, a federal Court of Appeals ruled that colleges lack the practical ability and the legal authority necessary to control student conduct and that the opportunity for college students to assume and exercise responsibility for their own behavior is an important

aspect of college education (American Council on Education, 1992). The battle between viewing the student as victim or perpetrator of their own alcohol-related injury appeared to be an insurmountable hurdle as courts in cases like University of Denver v. Whitlock, (1987), Hartman v. Bethany College, (1992) and Booker v. Lehigh University (1993), have all ruled against the appellants who were intoxicated at the time of their injury. Even when the intoxicated student had been attacked suddenly by other students as in Tanya H v. Regents of the University of California (1991) and L.W. v. Western Gulf Association (1997), the courts have ruled against the victims absent some foreseeability on the part of the school (Roberts & Fossey, 2002). However, more recent cases have put more onus upon the school to take steps to protect even intoxicated students from injury.

In 1999, the Nebraska Supreme Court ruled in Knoll v. Board of Regents of the University of Nebraska that the university had a duty to protect a fraternity pledge who was severely injured while trying to escape a hazing incident. This case is important for two reasons; first, the court found that the university was obligated to take reasonable steps to protect against foreseeable acts and that the harm can naturally flow from the university's failure to act, and secondly, because it opens the door for tort liability based on a university's failure to protect a student from alcohol-related injuries (Roberts & Fossey, 2002).

Finally, even the threat of a lawsuit for an alcohol-related injury can cost an institution, as evidenced by a recent $6 million settlement paid by the Massachussets Institute of Technology (MIT) for the alcohol-related death of 18-year old fraternity pledge Scott Kruegar, a case that never even made it to trial (Higher Education Center, 2000).

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The repercussions of harmful student drinking behavior suggest that higher education institutions are have too much at stake to ignore the problem, and have much to gain by identifying real solutions to the problem. "Accordingly, school officials will want to explore the structure of their institution and the basic premises of their educational program to see how they affect alcohol and other drug use. New arrangements might help students become better integrated into the intellectual life of the school, change student norms away from alcohol and other drug use, or make it easier to identify students in trouble with substance use" (Wilson, 1995 p.45).

Prevention Efforts

Prevention efforts have come full-circle in attempting to impact student drinking behavior. Institutions of higher education have historically focused on prevention strategies aimed at individual students (DeJong, Vince-Whitman, Colthurst, Cretella, Gilbreath, Rosati and Zweig, 1998) in an attempt to correct human weaknesses. "Typical campus prevention efforts include general awareness programs during freshman orientation, awareness weeks and other special events, and peer education programs" (p.2). Some faculty have begun "curriculum infusion" by incorporating prevention lessons into their courses. These prevention strategies are based on the assumption that individual students are ignorant about laws and the dangers of substance use. However, most practitioners agree that alcohol education alone is not enough. Most (four out of five) students indicate they have been exposed to some alcohol education effort, but the heaviest drinkers tend to ignore the information because they don't see their drinking as a problem (Wechsler & Kuo, 2003b).

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Recent prevention efforts in the public health field in general have "been guided by a social ecological framework that recognizes that health-related behavior can be affected through multiple levels of influence: intrapersonal factors, interpersonal processes, institutional factors, community factors, and public policy" (DeJong, et. al., 1998, p. 9) but the emphasis has been placed on the first two. The final three, taken together, constitute the environmental management. They suggest building prevention efforts in higher education upon this base of theory and knowledge that has guided programming in public health behavior (U.S. Department of Education, 2002).

Programs that focus on intrapersonal factors include increasing awareness of alcohol-related problems and consequences, changes in attitudes and beliefs, and promoting avoidance of binge drinking behavior. Programs that focus on interpersonal factors include peer-to-peer communication to change student social norms about alcohol. Programs that focus on environmental factors are those that address such things as alcohol pricing, stricter enforcement of alcohol laws, harm reduction, and increasing social opportunities that do not include alcohol. Most schools utilize harm reduction initiatives such as designated driver/safe rides programs and recently have begun to increase "alcohol free" events available to students. Many environmental change programs are also in use today on college campuses. However, these, like most other past prevention efforts, have had little impact on the patterns of student alcohol use. Despite the increases in the number and types of prevention and intervention programming, college student drinking patterns have changed little. "Traditional strategies have not changed behavior one percent," says H. Wesley Perkins, a sociology professor at William and Mary and a long-time researcher of college student drinking behaviors. (Branch, 2001).

Other researchers (Williams, Thomaz, Buboltz & McKinney, 2002) question the ability of any of these brief, generalized intervention models targeting specific behaviors to be successful. Even if the appropriate goal for brief interventions is to correct the normative and attitudinal misperceptions that support alcohol abuse among college students, they suggest that successful interventions would need to identify and target for change the *specific* normative attitudes and beliefs associated with binge drinking. Since past behavioral and normative research has shown that many heavy drinkers find alcohol use benign, believe that everyone else drinks, and that drinking will not harm them are more likely to drink than others with different perceptions, it is critical to target those specific perceptions and move the drinkers to think about the reasons they hold these attitudes. In other words, the pendulum is beginning to swing back, and the focus for prevention is again being placed on the individual student. But rather than viewing student drinking as internal flaw, it is viewed as a developmental milestone to be passed through along the (student) developmental continuum.

CHAPTER II: THEORETICAL FRAMEWORK

Review of the Literature

In the most general sense, student development can be understood as the "changes in growth and development that are likely to occur across the life span, and how educational environments can either inhibit or enhance that process" (Creamer, 1990, p.14). In a review of research on cognitive development in late adolescence and beyond, Morrill, Hurst and Oetting (1980) suggest that development is anything but dormant during late adolescence and early adulthood, with the college years being times of developmental expansiveness in which students can be seen "attempting to order the diversity and complexity encountered in college life" (p. 14). However, theory-based approaches to impacting harmful college student drinking have been few. Programs continue to develop on the basis of judgments not supported in the research literature due to the lack of viable theoretical models regarding campus-based prevention efforts. "Alcohol and other drug abuse prevention programs on the college campus, have generally developed in an atheoretical manner" (U.S. Department of Education, 1994, p.47). Accordingly, appropriate theoretical and research models are needed to determine useful combinations of interventions and the most productive mix of emphases for specific populations. "It cannot be assumed that generic program models will be equally effective with different populations" (U.S. Department of Education, 1994, p. 47). This study attempts to address that criticism.

Developmental approaches to substance use stress the importance of critical transition periods when use may increase dramatically (Zucker & Noll 1982). In the college environment, a number of studies have documented dramatic increases in alcohol

and other drug use during the first year of college (Perkins & Berkowitz 1986; Newcomb & Bentler 1987).

Ichiyama and Kruse (1998) suggest "developmental theory and research views binge drinking among young adults as normative behavior that shows different patterns of progression over time" (p. 20) along a development continuum. Further, binge drinking behavior during the transition to adulthood is seen as heavily influenced by social factors related to the development of expectancies and beliefs about heavy drinking, fueled by the perceptions of their peers. They suggest that based on the research with peer acceptance and alcohol consumption, binge drinking can be seen as purposeful action that is directed toward meeting developmentally normative goals.

Pace & McGrath (2002) compared drinking behaviors of students in Greek organizations with those of students active in campus volunteer organizations. Although they expected to find that students active in volunteer organizations would drink less and experience fewer drinking-related side effects, they found that there were no significant differences in alcohol consumption between the two groups, and that volunteers shared several of the same behavioral problems as Greeks. They concluded that alcohol consumption appears to be a normative experience among students who are active on campus, and that individual behavior is highly influenced by groups.

In their study of the relative contribution of social cognitive and psychological factors predicting self-reported alcohol consumption for 206 college students, Kuther and Timoshin (2003) concluded that alcohol use may be a reasoned decision by college students. They found that factors such as positive alcohol related outcomes expectancies, positive alcohol-related self efficacy and social (mostly peer) norms accounted for 76% of the variance in self-reported alcohol consumption. In the first examination of the

relationship between college student demographics and diversity, and their role in moderating binge drinking among college students, Wechsler & Kuo (2003b) report that drinking rates among higher-risk drinkers (white, male, underage) are "significantly lower on college campuses with larger proportions of minority, female, and older students" (p.1). Additionally, the study showed that non-binge drinking high school students tended not to binge drink upon arrival at colleges with higher enrollments of minority and older students, and that even binge drinking high school students on these campuses tended not to continue drinking that way. Wechsler and Kuo conclude that their findings might shed light on why fraternities, sororities and freshman dorms have particularly high binge-drinking rates and account for a disproportionate share of alcohol problems on campuses. "These social and living arrangements tend to group higher-risk drinkers together, with little change of their intermingling with those who drink less heavy" (p.1). Even in the classroom, there are far too few opportunities for interaction between freshman and upperclassmen, minority educators and non-minority students, etc.

Social norms theorists "have long argued that several factors conspire to move individuals to perceive their world as the group does, to adopt peer group attitudes, and to act in accordance with peers expectations and behaviors" (Perkins, 1997, p. 178). They assert that individuals move toward the group norm in beliefs and behaviors, and feel pressure to view the world as their peers do. They have also shown that college students typically overestimate the quantity and frequency of alcohol consumption of their peers (Berkowitz and Perkins, 1986). And they have demonstrated that students with higher perceptions of peer alcohol consumption tend to drink more (Clapp & McDonnell, 2000; Durkin et. al., 1999). Therefore, when the student is making decisions about alcohol

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consumption in order to move to or remain in the "norm," they may be basing this decision on erroneous information. They contend that correcting any erroneous information is the first step to impacting student drinking. Ten years after implementing a social norms approach at Northern Illinois University (NIU), self reports of heavy episodic alcohol consumption have shown a 44% decrease (Haines, 1998). Hanson (2003) highlights several other social norms marketing projects that have demonstrated effectiveness. Hobart and William Smith Colleges experienced a 32% reduction over four years, Rowan University experienced a 25% reduction over three years, and the University of Arizona experienced a 27% reduction over three years (Ziemelis, et. al., 2002).

The perceived or actual use patterns of peers, especially close friends, has been repeatedly demonstrated to have more impact on young adults than personality and environmental influences and other demographic and background factors such as ethnicity, religious background, parental use patterns, and gender (Brennan, et. al., 1986; Gonzalez ,1989; Jessor & Jessor, 1977; Oetting & Beauvais, 1986). Also, of the two most powerful influences of substance use on students, family and peers, peer influence is the strongest (Brennan, et. al., 1986; Oetting & Beauvais, 1986).

But there may be some point along the development continuum where perceptions of peer consumption, whether accurate or not, and other peer-related "pressure" become less important to the student in making personal choices about quantity and frequency of drinking. It is this critical point that should be identified to move toward the second step; namely, finding a developmental point toward which a student can be steered where personal choices about quantity and frequency of drinking are lower than the peer-influenced norm levels.

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Student Development Theory

Contemporary college student development theory grew out of formalized theory constructed in the study of human development. Human development theories have historically focused on the first decade of life as the most critical developmental period, although they all acknowledge that development continues throughout the lifespan. Due to an increasing interest in growth and development during the adolescent and adult years, theories with special application to the college years have evolved.

Originating with psychological and sociological theories of human behavior, the work of theorists such as Sigmund Freud, Carl Jung, and B.F. Skinner in the early part of the twentieth century marked a shift away from long standing theological views of Christian morality and holistic development. Early ideas about human cognition and how human beings learn were explored primarily by psychologists from the behaviorist-associationist approach. The classical conditioning study by Pavlov and his salivating dog constituted a ground-breaking attempt to understand even the most simple learned behavior. However, the cognitive approach has been more useful the study of how people learn.

Psychologist Jean Piaget proposed a structural theory of normal childhood development in which he described the mechanism by which the mind processes new information. Paiget's theory, first presented in his 1929 work, *The Child's Conception of the World*, included four distinct developmental stages (or schemata) of cognitive development (Cavanaugh, 1998). The Sensorimotor stage (birth to 2 years) is marked by a shift from basic motor reflexes to generalizing that limited behavior to a wider range of situations. In the PreOperational Thought stage (2 to 6/7 years) cognition becomes more intuitive in nature, but children are still quite self-oriented and can only view the world

from their own perspective. In the Concrete Operations stage (8 to 11 years) children are able to account for other points of view simultaneously with their own, but they require concrete references and cannot yet perform on an abstract level. It is in the Formal Operations stage (12 to adult) that the child becomes capable of thinking logically and abstractly and to reason theoretically. Piaget considered this stage the ultimate stage of development; that revisions to the knowledge base would continue, but the way of thinking is as powerful as it will get.

In a review of research on cognitive development in late adolescence and beyond, Morrill, Hurst and Oetting (1980) suggest that development is anything but dormant during late adolescence and early adulthood, with the college years being times of developmental expansiveness in which students can be seen "attempting to order the diversity and complexity encountered in college life" (p. 14). They list several representative developmental tasks faced by students highlighted by past research: (1) exploring new ways of thinking, (2) engaging in novel activities, (3) shifting attitudes, values, and beliefs, (4) employing new standards of conscience, (5) forming a changed sense of self, (6) setting career directions, (7) becoming more tolerant of individual differences, and (8) making other types of adaptations. Requisite mastery of complicated tasks during the college years underscored the need for further research into development of the student in the higher institution setting.

Evans, Forney and Di-Brito (1998) give an excellent historical review of the foundational theory and research of student development. Student development theory originated in the 1960's with the work of Sanford, Douglas Heath, Roy Heath, and Feldman and Newcomb who studied development relative to the college student. Sanford is credited as being one of the first psychologists to look at student development

in the college years. He identified two concepts relative to development in late adolescence and early adulthood: 1) differentiation and integration, which occurs when students learn about their own personality characteristics and attempt to understand how these characteristics shape their identities, and 2) support and challenge, which occurs when students utilize available environmental support to reduce tension created by the collegiate environment.   Douglas Heath looked at the growth dimensions upon which maturation occurs: intellect, values, self-concept and interpersonal relationships. The student matures along a continuum from self- to other-centered. Roy Heath proposed that development must be viewed two-dimensionally, from the perspectives of 1) ego functioning, or how the self interacts with the world and 2) individual style, or how the individual regulates internal and external tensions. Feldman and Newcomb were interested in the impact of the college experience on students. They outlined the impact of peer group influence on the students. Peers become important sources of support for students in achieving independence and meeting needs not provided by the institution.

As student development became increasingly scientifically tested and understood there was also a major shift in the view of the appropriate role of the higher education institution with respect to its duty toward the student. The role of the institution as acting *in loco parentis* (literally, in place of the parent) was replaced by the role of intentional promotion of development through educational activities (Creamer, 1990).

In the mid-1970's, Knefelkamf, Widick and Parker first suggested the concept of intentional student development through developmental instruction as a way of relating theory about student development to the problems faced by educators and student affairs practitioners in higher education institutions. "Our goal was to understand the underlying characteristics of the student-as-learner so that we could design instructional

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environments that were characterized by a balance of intellectual challenges and supports" (Knefelkamp, 1998). Their ultimate goal was finding ways to facilitate student learning and intellectual development. It is from the intentional student development approach that theory is allowed to move into practice in the form of programs, curricula and interventions in the higher education institution. "Development, by its very nature implies change, movement, and direction. Programs of intentional student development, therefore, represent deliberate attempts to facilitate the developmental process…" (Miller, 1980, p. 7).

Knefelkamp's Developmental Instruction (DI) Model, based on the Perry scheme (discussed in detail later), consists of four key variables: 1) structure, or the degree of direction provided for learners; 2) diversity, or the number and complexity of perspectives or alternatives offered; 3) experiential learning, or the degree of active, personal involvement in learning; and 4) personalism, or the degree to which the class offers a safe forum for cooperation, risk-taking, and critical and evaluative discussion (Hill, 1999). "By drawing on these four challenge and support variables, both faculty and student affairs practitioners can create learning activities and environments that can connect with where students are in the cognitive development process and also support their potential to develop further" (Evans, et. al, 1998). Developed primarily for the classroom, the DI has important implications for intentional development efforts outside the classroom.

Contemporary College Student Development Theory

Contemporary college student development theory is generally understood within a broad theoretical framework divided into four categories: (1) cognitive-structural, (2) psychosocial, (3) typological, and (4) person-environment. In their comprehensive

review of the study of college student development theory Evans, Forney and Guido-DiBrito (1998) give an overview of the focus of each of the four categories presented below.

Cognitive-structural theories focus not on *what* people think, but rather on the cognitive-structural changes that occur which influence the *way* people think (Baxter Magolda, et. al. (1085). Concepts of intellectual development and moral development have evolved within this category. Important theorists include Perry (intellectual and ethical development), Kohlberg (moral reasoning), Belenky, Clinchy, Goldberger, and Tarule (women's ways of knowing/ women's intellectual development), Gilligan (women's moral development), and Baxter-Magolda (gender related patterns in intellectual development).

Psychosocial theories focus on developmental maturity, resulting from repeated age-specific crisis resolutions, which occur sequentially throughout the life span. Crises arise when individual must reconcile internal biological and psychological changes with environmental demands, such as social norms. Resolution of a crisis represents a developmental advancement for the individual. In contrast to cognitive-structural theories, psychosocial theories "typically attempt to describe the *types* of developmental tasks students are addressing, such as gaining intellectual competence, becoming more independent from parents, or deciding on a major…" (King, 1990, p.83); they focus on the content of development. The concept of identity development has evolved within this category. Important theorists include Erikson , Chickering , and Chickering and Reese.

Erikson proposed that development occurs across the lifespan in a series of sequential age-specific stages. At each stage, developmental tasks must be mastered (identity crises must be resolved) in order to proceed to the next stage.

Chickering (and later Chickering and Reese) building upon the work of Erikson, proposed seven vectors, or tasks, that students face during the college years. These developmental projects are accomplished over time, although they are not age-specific. The seven vectors are: 1) Developing Competence, 2) Managing Emotions, 3) Developing Autonomy, 4) Establishing Identity, 5) Freeing Interpersonal Relationships, 6) Developing Purpose, and 7) Establishing Integrity. He proposed that several educational environment factors influence student development: the institutional objectives, institutional size, student-faculty relationships, curriculum, teaching, friendships and student communities, student development programs and services.

In the center of Chickering's development continuum is identity – his revision of the theory includes differences in identity development based on gender, ethnicity and sexual orientation. Identity is regarded as one's comfort with body and appearance, a clear self-concept, and comfort with one's roles and lifestyles in light of feedback from significant others (such as peers), and self-acceptance.

Typological theories focus on individual differences in *how* people view the world and relate to that world. Typological theorists hold that innate differences exist within individuals that effect mental processing, and in turn influence development in other areas. Concepts of personality type, learning style, and vocational interests have evolved within this category. Major theorists include Jung, Meyers, Holland, and Kolb.

Person-environment interaction models focus on the interaction of the student with the environment. The aim is to have the higher education institution provide the appropriate environment to allow the student to progress developmentally. Lewin's behavioral formula $B = f(P \times E)$, which states that behavior (B) is a function of the

interaction of person (P) and environment (E), is the cornerstone of modern understanding of student development.

Intellectual Development

Of all the constructs of student development theory, intellectual development stands alone as the premier measure of the level of peer influence on ways of learning and knowing, especially in the college years. "It is one of the few developmental schemes … that has been proved by voluminous replication" (Kloss, 1994). Intellectual development theorists assert that individuals move from dualistic to relativistic ways of thinking and knowing as they progress along the intellectual development continuum. Intellectual development is not a measure of intelligence; rather, it is a measure of the complexity of thinking and knowing and the sources of authority referenced when making behavioral decisions. In Perry's (1999) scheme, the strongest influence of peers occurs at a position along the continuum where the student still views the world from a largely dualistic perspective. At this stage, peers are viewed as important authorities on social interaction. Moving along the continuum to more relativistic thinking makes the student question all authority, including peers, to answer their own questions and have their own opinions. At the relativistic positions, peer norms are less likely to influence the student's behavior.

And finally, despite a natural tendency to believe that age may be the most important factor in the placement of an individual along the intellectual development continuum, six out of seven studies (Wilson, 1996) showed that age is not significantly correlated to intellectual development level. Age and education have repeatedly been tested separately by comparing traditional- and nontraditional-aged groups of students with similar levels of formal education, and only education shows a significant

correlation with intellectual development level. In other words, exposure to information, ideas, and viewpoints is more important than merely the capacity to learn.

Measuring Intellectual Development and College Student Drinking

Cognitive-structural human development theories are rooted in the work of Piaget in the early 1950's who was concerned with the process of intellectual development in children. Based on Piaget's work, the work of cognitive-structural theorist William G. Perry, Jr. is still used today in college student development research. Perry conducted a longitudinal study involving extensive interviews with students from Radcliff and Harvard during the 1950's and 1960's during the 1950's and 1960's in an attempt to describe the cognitive development of students across their four years of college. His final product was based almost exclusively on the males from Harvard. What resulted was a scheme of static *positions*, or points of view from which the student views the world, along a continuum of development. In Perry's view, development occurs in the transition from one position to another, not within the position itself. In Perry's words:

> In its full range the scheme begins with those simplistic forms in which a person construes his world in unqualified polar terms of absolute right-wrong, good-bad; it ends with those complex forms through which he undertakes to affirm his own commitments in a world of contingent knowledge and relative value. The intervening forms and transitions in the scheme outline the major steps through which the person … appears to extend his power to make meaning in successive confrontations with diversity (Perry, 1968, p.3).

Perry's scheme includes nine positions, four of which are generally considered most applicable to the college years (positions 2-5). While individuals predominantly view the world from one of the positions, they are likely to have views in more than one position at any given time. Love and Guthrie (1999) present a synopsis of Perry's scheme, which is included in Appendix A.

Perry initially utilized extensive open-ended interviews in a longitudinal study in order to develop the constructs of intellectual and moral development. Based on an initial qualitative assessment of the answers, a manual for rating by independent judges was developed. Perry's work was a critical step in theory development, but it proved to be a cumbersome and expensive methodology to replicate. Several researchers attempted to develop easier ways to measure the Perry positions.

Widick and Knefelkamp (1975) devised the Measure of Intellectual Development (MID) as a more refined measurement of Perry's first five positions. It consists of three essays that are subsequently evaluated by two independent raters who assign a rating that ultimately coincides with a Perry position. The MID's validity has been proven over several studies, but it also is cumbersome and expensive for the average researcher.

Erwin (1983) created the stage-based Scale of Intellectual Development (SID) that utilizes 119 recognition tasks measured on four-point Likert scale of dualism, relativism, commitment, and empathy. This measure has high internal consistency but has been criticized with respect to its validity in measuring Perry's scheme (there is no true multiplicity measure). DeMars and Erwin (2003) revisited the SID with a sophisticated unfolding model which they theorized would be able to better distinguish stage-based instruments by taking into consideration that the respondent will agree with a statement when approaching the stage, and disagree with the statement when progressing beyond that stage. What they actually accomplished was a conversion of stage scores, where a responded is assigned to a category, to a scoring continuum where a respondent is given an actual score within the category. However, the measure was not adjusted to include the multiplicity stages.

Moore's (1989) Learning Environment Preferences Measure (LEP) is another

Perry measure utilizing recognition format. The LEP consists of five sentence stems

followed by a series of statements. Each statement has to be rated on a four-point Likert

scale as to its significance to the ideal learning environment. It also includes a ranking

feature for the items on each stem. Both Erwin and Moore's measures present less

cumbersome and less costly alternatives to open-ended assessment tools, but Moore's is

more suited to measuring the intellectual development of college students because it does

include the multiplicity measures, which represent three of the five levels most

commonly associated with traditional college student years (Perry, 1968).

Few studies have been conducted that actually attempt to directly correlate

intellectual development and college student drinking patterns. In their study of

personality and self-reported substance use, Austin et. al. (2003) found a significant

inverse relationship between the personality trait of intellectance and college student

drinking. The personality measure intellectance was defined as a "tendency to display

active imagination, aesthetic sensitivity, intellectual curiosity, and independent

judgment," (p.3). Hensley (1997) tested moral, identity, and intellectual domains of

college student development and alcohol consumption patterns. She found a significant

effect for the Commitment subscale of Erwin's stage-based Scale of Intellectual

Development by four alcohol consumption category categories: abstainers, drinkers,

bingers and frequent bingers. Non-bingers had higher scores on the Commitment

subscale than bingers. Discriminant analysis further showed Commitment score and

Greek membership were the strongest predictor variables. In a follow-up to the original

study by Gintner and Hensley-Choate (2003) applied an unfolding model to the data after

Erwin published a revision in the measurement of his scale to better distinguish those

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responses that approach a stage from those beginning to progress beyond the stage (DeMars & Erwin, 2003), converting the stage-based score to a continuous score.

Impacting Student Intellectual Development Level

Isakson et. al. (1987) identify the college years as a time of profound developmental change where new ways of thinking, knowing, and learning are discovered, explored, adopted and internalized. In their review of curriculum options purporting to foster student development was a comprehensive look at all developmental theory curriculum applications, they identified several courses in which instructors directly applied human development theory in their curriculum development. For example, Widick et al. (1975) designed a course at the University of Minnesota entitled *Themes in Human Identity* "designed around literacy selections such as Miller's Death of a Salesman, which were used to prompt cognitive conflict and ultimately force students to alter their cognitive structures" (p. 72). Developmental change was measured by a MID-like instrument. They found that of the students (32%) manifesting dualistic thinking on the pre-assessment only 3% remained at that level at the end of the course. They also found an increase in the percentage of students (20%) manifesting relativistic thinking at pre-assessment to 68% at course end. This study was replicated with similar results by Stephenson & Hunt in 1977; and since that time, examples exist in nearly every field offered to college students where human development theory has been infused into the curriculum.

Advancing intellectual development to impact negative alcohol abuse patterns has several implications for intervention programming. "According to the research, those students who progress to higher developmental levels are those who choose activities and experiences in which they are exposed to multiple world views, diversity, and models of

higher order processing…" (Hensley, 1997). From a programming standpoint, it is possible to address intellectual development in the higher education environment, both inside and outside the classroom, by providing multiple opportunities for students to experience such diversity. It may be possible to reduce negative alcohol abuse patterns through intentional student development. Further research is needed to question whether students with higher intellectual development report less negative alcohol abuse (such as binge drinking) because of they have more accurate perceptions of peer norms, or whether, despite misperceptions of peer norms they still report less negative alcohol abuse. This study will attempt to address those questions.

Statement of the Problem

The problem is that harmful student drinking threatens student academic success, health, safety and overall well-being, and it places institutions at risk of legal and financial responsibility for the ensuing consequences. It is clear that something must be done to address the problem. The harm reported as a result of heavy college student alcohol consumption to the student drinkers themselves, to other students in the form of secondary effects, and to higher education institutions in the form of liability, requires the higher education community to find ways to reduce that level of harm. Researchers have empirically identified one successful long-term prevention technique which is based on the student's acceptance of peer behavior as the model for their own, because of a reliance on peers as valid, and in many ways, the only, sources of authority for what constitutes appropriate behavior. That technique, known as social norms marketing, by its actual design can only be successful in moving behavior toward an actual (or perceived) norm. In order for it to be successful, the student must be viewing the world

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dualistically, where the desire to be in the norm is strongest. In order to move beyond the norm, the next step is to determine the point along the developmental continuum where quantity and frequency of alcohol consumption naturally begin to drop off. Why would this information be important to institutions of higher education? It may be possible to developmentally move students to a position of reduced levels of alcohol consumption. As one university teacher learning center advises its teachers, "[f]aculty can gently challenge students to nurture their growth through these stages" (UC Bakersfield, 2005).

Purpose of the Study

The purpose of this study is to determine if the quantity and frequency of drinking is lower at a relativistic developmental level than at a dualistic developmental level. The following research objectives were the focus of this study:

1. Describe students in the study for socio demographic variables (age, gender, race, marital status, student status, work status, living arrangements, grades, Greek membership, athletic membership, and service membership)
2. Determine if personal consumption level (number of days alcohol consumed in the past 30 days) is higher when drinker perception of peer consumption level is higher.
3. Determine if personal occurrence of binge drinking (consumption of 5 or more alcoholic drinks in a row) is higher when drinker perceptions of peer binge drinking is higher.
4. Determine if perceptions of peer consumption differ at different levels of intellectual development.
5. Determine if perceptions of peer binge drinking differs at different levels of intellectual development.
6. Determine if there is relationship between personal consumption level and level of intellectual development (regardless of perceptions of peer consumption behavior).
7. Determine if there is relationship between personal binge drinking and level of intellectual development (regardless of perceptions of peer consumption behavior).

Definition of Terms

This section provides the definitions of terms used in the study that may be unfamiliar to the reader. Each definition has a citation grounding it in the literature.

Personal consumption level – "The number of days over the past 30 days the student consumed alcohol" (Presley et. al., 1998a).
Binge drinking – "The number of days the student consumed 5 or more alcoholic drinks in a row within the past 30 days" (Presley et. al., 1998a).
Perception of peer consumption level – "The number of days out of the past 30 days the student believes a typical student at their school consumed alcohol" (Presley, et. al., 1998a).
Perception of peer binge drinking – "The number days the student believes a typical student at their school consumed 5 or more alcoholic drinks in a row within the past 30 days" (Presley, et. al., 1998a).
Intellectual development level – The student's overall score the Moore Learning Environment Preferences (LEP) Cognitive Complexity Index (CCI) measuring Perry's Scale of Intellectual Development (Moore, 1989).

CHAPTER III: METHODOLOGY

Sampling

A URL link to an online survey was sent to student email accounts of 3,000 randomly selected undergraduate students at a public four-year research-intensive university in the South. The sample was stratified by class status to accurately reflect the student population and maintain large enough sub-samples in each class category. Data was captured electronically as students completed the online survey, ensuring complete anonymity of the respondents. Initially, students were asked to verify that they were at least 18 years of age in order to continue with the survey. A brief description of the purpose of the research and general information about the study was provided before the survey began. Two follow-up emails were sent at two-week intervals asking students to complete the survey if they had not yet done so.

The survey instrument is a combination of items from three existing survey instruments: the Core Alcohol and Drug Survey, the Campus Survey of Alcohol and Other Drug Norms, and the Learning Environment Preferences test. The entire LEP was used in order to obtain a total score placing respondents at a particular point along the intellectual development continuum. Only the demographic and alcohol-related questions from the alcohol and drug surveys were included in order to keep the current questionnaire from being overly cumbersome. The elimination of "other drug" questions from the two surveys posed no threat to the integrity of the alcohol-related questions.

Reliability and Validity

In this study it was imperative that any questionnaire used was originally intended to be administered to postsecondary students in a postsecondary environment. Also, it should be well-tested (valid) to measure what it intends to measure and should yield

consistent (reliable) results over time. According to Presley et. al. (1998b), "… an instrument intended to measure patterns of alcohol use on a college campus would need to include items covering at least three areas: the proportion of students who drink, how frequently they drink, and how much they drink" (p.5). They warn that "[i]f a measure addressed only one of these aspects of college student alcohol consumption, experts would consider it to have poor content validity" (p.5).

Core Alcohol and Drug Survey. The Core Alcohol and Drug Survey is one of the most rigorously tested survey instruments for college populations in the postsecondary setting. Presley et. al. (1998b) explain that the instrument is not only easy to administer, but it also has a substantial body of validity and reliability data to support using it in with postsecondary populations.

> To establish content validity, existing instruments and literature were reviewed to ensure that important aspects and consequences of alcohol and other drug use were adequately covered. A panel of experts then reviewed the items to assess whether they sampled the domain of interest. The level of agreement for item inclusion among the experts was very high (interrater reliability was .90). Test-retest reliability was estimated using Pearson product-moment correlation coefficients. For items on AOD use and consequences of use, test-retest reliability was high, with the majority of item correlations falling above .80. Items on campus AOD norms showed moderate test-retest reliability, with most correlations falling between .30 and .80. Item-to-total correlations were calculated to assess the internal consistency of the survey. Correlations for the majority of items on AOD use, consequences, and campus norms fell between .30 and .70, as recommended by Henryssen. (pp. 8-9).

The researcher can feel safe that the Core Alcohol and Drug Survey will yield reliable, valid results regarding student alcohol use patterns.

Campus Survey of Alcohol and Other Drug Norms. The Campus Survey of Alcohol and Other Drug Norms contains 17 behavioral, perceptual, and attitudinal questions and nine demographic questions, and takes approximately 12 minutes to

complete. The questionnaire allows for the assessment of students' perceptions of alcohol use on their own campus and to compare these perceptions with the reality of its use. It was "developed in response to the almost universal finding that students overestimate alcohol and drug use by their peers" (Presley, et. al., 1998b, p. 9).   It was originally developed for use in pre-college school settings and was not used on college campuses until 1997. However, since that time the instrument has been used extensively in developing social norms marketing strategies. It was developed using theoretical constructs gleaned from alcohol and other drug research. "The survey has a strong basis in theory, and many of its items have been tested in earlier research studies. In addition, results were found to be stable over a four-week test-retest period" (p. 9).   Content validity was assessed based on the level of agreement among a panel of experts for item content. "There was unanimous agreement among the experts on the choice of items. Many of the items have been evaluated for use in other instruments" (p. 12). At the college level, it was piloted at two schools, a small private university (n=100) and a large public university (n=150). The Core Institute determined that the comparisons sufficiently demonstrated the relative stability of survey items across different groups.

Moore's Learning Environment Preferences (LEP). The LEP is designed to measure preferences in the learning environment and is "designed to be used with student populations, primarily in colleges and universities" (Moore, 1990, p. 7). The survey takes approximately 30 to 45 minutes. In Moore's (1990) survey instrument manual he discusses the reliability and validity of the LEP. "Over the past 10 years, the LEP has proven to be a solid research instrument, and has been used fairly widely throughout the U.S. and Canada at a variety of educational institutions" (p.3). The LEP focuses exclusively on the primarily intellectual portion of the Perry scheme from positions one

through five and was developed using the theoretical constructs of the Measure of

Intellectual Development (MID) and the Defining Issues Test (DIT). "The LEP and the

MID narrow their focus to thinking about learning as a way of defining more clearly the

rating criteria and/or salient cognitive issues involved" (Moore, 1990, p. 5). Moore's first

step in construction the instrument involved "an analysis of the most frequently-used

cues, based on raters' evaluations and ratings over several years of research" (p. 6) and

actual essays collected over the previous few years on the MID instrument. An original

item pool of 134 statements was defined, and individual items were independently

assigned to specific Perry positions two through five by trained Perry raters. Any items

rated further apart than one position were eliminated (6% of the item pool) and further

refinement resulted in a pilot version of 80 items (four on each position per domain). A

series of pilot tests were conducted which captured empirical item performance and

student comments. The resulting instrument includes 60 items. As a safety measure, to

provide "a check on whether or not respondents are choosing preferences simply because

they sound complex" (Moore, 1990, p. 6) five additional items, one per domain, were

added that are actually meaningless items. As Moore explains, the sequence of items is

specifically intended to identify the Perry stage (two through five):

> The LEP consists of the five separate domains, and within each domain
> there is a lit of items or major aspects related to that particular area. The
> items are stage prototypic items…they begin with the least complex,
> followed by a mixture of the more complex items. Rest's assumption [in
> the DIT instrument] was that this sequence would help insure that less
> complex thinkers found their preferences and stayed with them, while the
> more complex thinkers would go through the whole list to find the 'best
> fit" (p. 7).

Moore (1990) points out that the psychometric reliability was assessed by internal

consistency and test=retest. "Chronbach's coefficient alpha, the single most important

measure of internal consistency for an instrument of this type, was computed….ranging from .63 to .84" (p. 10).

The LEP was derived from extensive qualitative research data collected specifically on the Perry scheme and is linked directly to the theoretical evolution of the Perry model; therefore, it does not suffer from the problems of other instruments, such as Erwin's Scale of Intellectual Development, that are base on a "loose theoretical understanding of the model" (Moore, 1990, p.12) and are weaker in distinguishing the multiplicity stages.

Limitations Related to Sampling

The current study will include students from a single four-year research-intensive university in the South. Because of the limits of the sample, the results may not be reliable for generalizing to students at other school types or in other regions of the country. Therefore, replication of the study in other geographical locations and at other institution types is needed to determine if results are consistent across schools and locations.

Limitations Related to Self-Reports

According to Dowall & Wechsler (2002) "Much research about college alcohol-related issues has relied on self-reports about a student's substance use and other behavior. A substantial body of empirical research suggests that self-reports by adolescents about alcohol, tobacco and illicit drug use can, under the right circumstances, (for example, when confidentiality is assured) yield valid and reliable measures." (p.16). However, it is also clear that self-reports of behavior, especially illicit behavior, can be inaccurate for a number of reasons, largely related to the retrospective nature of the reporting and to the sensitivity of the subject matter.

There are some advantages to using self-report measures. According to Richter et. al. (2001), including relative ease of administration to large samples, the potential for simultaneous administration in multiple locations, the easily quantifiable and analyzable nature of the responses, and their flexibility in allowing researchers to question respondents on many different issues, the relatively low cost to produce and administer, and the ability for self-report instruments to be administered in multiple ways, including interviews, mail, and the Internet. There are also several disadvantages to using self-report measures with regard to validity and reliability.

Demand Characteristics. Since under most circumstances respondents wish to present themselves in a socially desirable way, they may be tempted to alter their true responses to appear more "normal" or acceptable. The alternative is also true; respondents wishing to present themselves more negatively (perhaps for amusement) may modify their true responses to reflect more a more negative appearance. Either way, respondents may modify their true responses to an item because of "demand characteristics," of the research instrument or the research environment that "demand" the respondent behave in a particular way.

Underestimates of Sensitive Behavior. Tourangeau & Smith (1996) indicate that a sensitive question, or one that "raises concerns about disapproval or other consequences (such as legal sanctions) for reporting truthfully or if the question itself is seen as an invasion of privace" (p. 276). Sensitive questions may be underestimated and impact the accuracy of self-report responses, even moreso than self-reports of most human behavior.

Although the current study is not without limitations, it should be considered a reliable and valid empirical study of the relationship between intellectual development and alcohol consumption patterns among college students.

Data Analysis

The online survey link was emailed out to 3,000 students. After the original and two follow-up emails, a total of 1,017 surveys were completed for a response rate of 34%. Five of the cases had to be excluded because respondents indicated they were graduate students. Another 23 cases had to be excluded because the respondents indicated they were under the age of 18, which left the balance of their surveys blank.

Measures of central tendency were used to describe the students in the study for socio demographic variables (age, gender, race, marital status, student status, work status, living arrangements, grades, Greek membership, athletic membership and service membership) and for variables related to the drinking behaviors of the students in the sample.

Total LEP scores were computed using a scoring key (Appendix B) provided by Moore. The process required converting item numbers for the top three choices across all domains to keyed Perry positions. Total points were then calculated for each Perry position using a pre-set weighted scale. These position points were then converted to proportions based on the total number of points possible. The proportions were then converted to percentages (and rounded to integers) reflecting "position sub-scores." Finally, the individual sub-scores were entered into a formula and weighing factor based on position numbers. This final step calculates the overall Cognitive Complexity Index (CCI) which is a specific numerical score on a continuous scale of 200-500, comparable to position 2 through position 5 (Moore, 2005).

Block hierarchical ordinary least squares regression was utilized to determine the the relationship between intellectual development scores and student drinking behaviors (dependent variables). The assumptions of ordinary least squares regression are that there is a linear relationship and no outliers to disturb the linear relationship. However, finding that there is not a true linear relationship or that there are outliers do not necessitate throwing out the model. "It should be noted that no assumptions about the shape of the distribution of X and the total distribution of Y per se are necessary, and that, of course, the assumptions are made about the population and not the sample" (Cohen et.al., 2003).

"The two key sources of interpretation of multiple correlation analysis are the beta weights and the square of the multiple correlation coefficient, R^2," (Kachigan, 1986, p.229). The beta weights are computed using the analysis of variance (anova) output from the multiple regression analysis. A block of variables can simultaneously be entered into a hierarchical regression analysis and tested as to whether as a whole they significantly increase R^2, given the variables already entered into the regression equation. The degrees of freedom for the R^2 change test corresponds to the number of variables entered in the block of variables. This approach has been successfully used and is a preferred method for evaluating the relationship between a set of independent variables and the dependent variable, controlling for or taking into account the impact of a different set of independent variables on the dependent variable (Luke, 2004).

In block regression the null hypothesis for the addition of each block of variables to the analysis is that the change in R^2 (contribution to the explanation of the variance in the dependent variable) is zero. Any change in R^2 results in the rejection of the null hypothesis, and indicates that variables in subsequent blocks had a relationship to the

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dependent variable, after controlling for the relationship of the previous block's variables to the dependent variables.

The regression analysis shows the total explanatory power of the independent variables combined and the anova output will indicate the relationship of each individual variable in the regression equation. In other words, analysis of variance tests hypotheses about the *presence* of relationships between the predictor and criterion variables, regression analysis describes the *nature* of the relationships, and R^2 measures the *strength* of the relationships (Kachigan, 1986).

Because categorical predictor variables cannot be entered directly into a regression model and be meaningfully interpreted, all categorical variables were dummy coded to create dichotomous variables (Kachigan, 1986). Two separate regression models were run for (1) personal consumption level and (2) binge drinking behavior, using the same predictor variables age, race, gender, GPA, class standing (dummy coded), student status, living arrangements, marital status, Greek membership, athletic membership, service membership, and perception of peer behavior. All tests of significances were run at the .05 significance (95% confidence) level and all missing data were set to the mean.

Finally, a bivariate correlation analysis was run to test the relationship, if any, between perceptions of peer behavior and intellectual development level.

CHAPTER IV: FINDINGS

The respondents consisted of 21.7% freshmen, 22.3% sophomores, 24.5% juniors and 31.5% seniors (including 5th year seniors). The median reported GPA was 2.97 on a 4.0 scale. Nearly 84% were between the ages of 18 and 22, with the oldest at age 61. More than 83% were white, 62% were female, and nearly 95% were single. Approximately 93% indicated they attended school full time.

One third reported that they were not working at all, while the remaining reported working at least part-time. Twenty five percent indicated they lived on campus. More than 41% indicated they lived off campus with friends, and 22.5% reported they lived with family and other relatives. When asked about their extra-curricular memberships, 17% indicated belonging to a Greek social organization, 3% indicated belonging to a campus-sponsored athletic team, and 40.3% indicated belonging to a campus academic or service organization. Table 1 below provides a breakdown of selected characteristics of the respondents by class standing.

When asked about their alcohol consumption patterns, more than half (55%) indicated drinking four or less alcoholic beverages in the past 30 days; in fact, 23% indicated not drinking any alcohol at all during the same time frame. Also, more than half (51.6%) reported they did not consume five drinks in a row within the past 30 days. Another 40% reported consuming five drinks in a row between one and five times in the past 30 days, and the remaining 8% reported doing so more than five times.

Interestingly, when asked to define "binge drinking" in their own words (prior to seeing the term defined during the survey) the majority defined it as drinking behavior leading to physical illness or passing out, drinking excessive amounts every day or regularly,

Table 1. Characteristics of Students, by Class Standing

	Freshman	Sophomore	Junior	Senior	Total
Age					
18-20	194	194	142	8	538
21-24	3	15	74	248	340
25+	7	1	15	41	64
TOTAL	204	210	231	297	942
Gender					
Female	125	133	147	184	589
Male	81	81	85	112	359
TOTAL	206	214	232	296	948
Race					
White	175	177	201	243	796
Black	21	17	13	28	79
Other	12	22	20	26	80
TOTAL	208	216	234	297	955
Marital Status					
Single	206	208	223	280	917
Married	2	6	10	16	34
TOTAL	208	214	233	296	951
Student Status					
Full-Time	195	210	223	269	897
Part-Time	13	6	11	27	57
TOTAL	208	216	234	296	954
Work Status					
Part-Time	102	119	139	196	556
Full-Time	7	5	14	25	51
Not Working	99	92	78	76	345
TOTAL	208	216	231	297	952
Living Arrangements					
Off-Campus	97	150	199	270	716
On-Campus	111	66	33	27	237
TOTAL	208	216	232	297	953
Grades (Average)					
A	26	63	57	44	190
B	55	86	103	139	383
C	36	58	66	105	265
D or Below	6	5	7	8	26
TOTAL	123	212	233	296	864
Greek Membership					
No	174	180	202	234	790
Yes	34	35	32	62	163
TOTAL	208	215	234	296	953
Athletic Membership					
No	200	209	227	288	924
Yes	8	7	7	7	29
TOTAL	208	216	234	295	953
Service Membership					
No	147	106	145	162	560
Yes	58	104	87	135	384
TOTAL	205	210	232	297	944

uncontrolled indulgence, drinking to the point of alcohol poisoning, and so on. Only

20% defined the behavior the way it is typically defined in the research. This suggests

that behavior traditionally defined in the literature by the term "binge drinking" is not one

that the student drinkers themselves define as a condition where the student drinker is

substantially impaired.

Table 2: Mean Age of Students by Class Standing

Class Standing	Mean	N	Min	Max	Std. Deviation	Under 21
Freshman	18.56	204	18	37	1.917	95.6%
Sophomore	19.51	210	18	43	1.844	92.4%
Junior	21.25	231	19	44	3.318	61.5%
Senior	23.04	297	19	61	4.252	2.7%
Total	20.85	942	18	61	3.609	100%

To determine consumption levels in the sample, students were divided into three categories: those who abstained completely, those who drank within the past 30 days but did not binge drink, and those heavy users who binge drank at least one day in the past 30 days. The mean number of days a student drank in the past 30 days and the mean number of days a student drank five in a row in the past 30 days for each group are shown on Table 3 below.

Table 3: Comparison of Drinking Behaviors, by Level of Consumption

	Number of days I drank in the past 30 days	N	Std. Dev.	Number of days I drank 5 in a row in the past 30 days	N	Std. Dev.
Abstain	0	199	.000	0	198	.000
Moderate	3.27	237	2.466	0	232	.000
Heavy	8.99	405	6.016	3.29	405	2.767
TOTAL		841			836	

As Table 3 shows, the students in this study do not follow the trends reported by Johnston (2000), Wechsler (2002) and others indicating that most students do not engage in harmful drinking behavior. Here, nearly half (48.2%) reported binge drinking at least once in the past 30 days, averaging approximately 9 total days of drinking and 3 days of binge drinking per heavy drinking student. The heavy drinkers do, however, follow the reported trend which suggests binge drinkers drink more often and consume more alcohol overall than their peers.

Students here did follow the trends reported by Haines (1998) and others that students tend to overestimate the consumption levels and patterns of their peers. Table 4

shows the means for student actual drinking behavior and their perceptions of peer

drinking behavior. In all classes, and as a group, students estimated their peers drinking

behaviors to be much higher than their own.

Table 4: Actual versus Perceived Drinking Behavior, by Class Standing

Class Standing		Number of Days I Drank	Number of Days I Drank Five	Number of Days Typical Student Drank	Number of Days Typical Student Drank Five
Freshman	Mean	4.29	1.1971	11.11	3.94
	N	171	208	186	186
	Std. Deviation	5.583	2.34152	6.288	2.702
Sophomore	Mean	4.68	1.1713	10.02	3.34
	N	190	216	203	201
	Std. Deviation	4.717	2.18947	5.455	2.336
Junior	Mean	5.44	1.4060	10.43	3.60
	N	209	234	222	221
	Std. Deviation	5.862	2.29987	5.610	2.547
Senior	Mean	6.20	1.6229	10.53	3.50
	N	258	297	280	280
	Std. Deviation	6.351	2.66595	5.749	2.430
Total	Mean	5.27	1.3749	10.51	3.58
	N	828	955	891	888
	Std. Deviation	5.764	2.40888	5.769	2.502

Hierarchical Regression Models

Hierarchical regression was selected to determine whether intellectual

development scores on Moore's LEP explained any of the variance in the drinking

behaviors of the students in the sample. As in all studies where regression is used as the

method of data analysis, there are several potential threats in this study. Those potential

threats must be identified, and the data should be reviewed to determine their level of

impact on the findings. Most notably, linear regression is potentially affected by

violations of any of the critical assumptions: independence, homoscedasticity, linearity,

normality, and model specification (Kachigan, 1986). Whereas independence and

homoscedasticity are serious violations in time series regression models, linearity,

normality and model specification must be considered in this study. Likewise, beyond

simple model assumption violations there are two additional factors, attrition and

multicollinearity, which must also be considered as they can also create problems for

interpreting the results. The results of these tests are included on pages 54 and 55 below.

Two separate regression models were run, one for the dependent variable related

to personal consumption and another for the variable related to personal binge drinking.

The independent variables were divided into three blocks for socio-demographics, peer

conception, and intellectual development levels. Based on the body of research

identifying differences in drinking behaviors between gender, age, race, school

performance, living arrangements, and the like, these demographic variables were added

in the first block.

Because of the body of research showing a relationship between perception of

peer behavior and resulting personal behavior, perception of peer consumption was added

in the second block; and because Intellectual Development Level is the true variable of

interest, the CCI score was added in the final block.

In order to reject the null hypothesis that there is no linear relationship between

the variables in the analysis, the variability estimate based on the regression mean square

should be larger than the variability estimate based on the residuals (what's left over or

not explained by the model). With a significant F ratio between the mean square for the

regression to the mean square of the residual, we can reject the null hypothesis that there

is no linear relationship between the variables.

Finally, obtaining a valid score on Moore's LEP requires that any case where

there are less than 13 (of 15) keyed responses, the entire score is suspect for analysis and

should be eliminated (Moore, 2005).

Personal Consumption Regression Model.   There were 316 cases that met the

LEP requirement for having at least 13 of the 15 scored items completed, and were

therefore included in the regression analysis. Hierarchical multiple regression requires

that the minimum ratio of valid cases to independent variables be at least 5 to 1 and that

no more than 15 independent variables be used in any model (Kachigan, 1986). The ratio

of valid cases (316) to number of independent variables (15) was 21.1 to 1, which was

greater than the minimum ratio. The requirements for both a minimum ratio of cases to

independent variables and a maximum number of independent variables were satisfied.

When testing for a linear relationship between the variables, the mean squares of

the regression were larger than the mean squares of the residuals in all blocks and the F

statistic was significant at the .05 level for all blocks (Table 6), so the null hypothesis is

rejected and a linear relationship exists.

As shown in Table 5 below, the squared multiple correlations indicated that 8.0%

of the observed variance in personal consumption is explained by the socio-demographic

Table 5: Block Regression Results for Personal Consumption Regression Model
(Number of days I drank in the past 30 days)

	At Step		
Variables	1 beta (sig.)	2 beta (sig.)	3 beta (sig.)
Age	-.024	-.061	-.059
Race	.205 (.000)	.196 (.000)	.202 (.000)
Gender	.021	-.001	-.007
GPA	-.042	-.041	-.039
DV Freshman	-.155 (.033)	-.194 (.007)	-.201 (.005)
DV Sophomore	-.087	-.097	-.102
DV Junior	-.069	-.078	-.087
Student Status	.054	.068	.066
Living Arrangements	.029	.039	.039
Marital Status	-.087	-.065	-.058
Greek Membership	.085	.080	.081
Athletic Membership	-.075	-.042	-.043
Service Membership	-.035	-.047	-.041
Days A Typical Student Drank		.248 (.000)	.245 (.000)
CCI Score			-.063
R^2	.080	.138	.141

variables. The squared multiple correlations indicated that 13.8% of the observed variance in personal consumption is explained by the combined variables of the first and second block. Collectively, the independent variables in the three blocks explained 14.1% of the variance in personal consumption. As expected, the block of variables in each step in the model contributed more explanatory power for the behavior in question.

Race and freshman class status in block one and perception of peer behavior in block two are significant. With race positively correlated (white = 1, non-white = 0) it suggests that white students tended to drink more days in the past 30 days than non-white students. With freshman class standing negatively correlated (yes = 0, no = 1) it suggests that upper classmen tended to drink more days in the past 30 days than freshman.

Table 6: Anova Results for Personal Consumption Regression Model
(Number of days I drank in the past 30 days)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	870.701	13	66.977	2.010	.020(a)
	Residual	10061.185	302	33.315		
	Total	10931.886	315			
2	Regression	1505.640	14	107.546	3.434	.000(b)
	Residual	9426.245	301	31.316		
	Total	10931.886	315			
3	Regression	1546.061	15	103.071	3.294	.000(c)
	Residual	9385.824	300	31.286		
	Total	10931.886	315			

a Predictors: (Constant), Athlete, Greek, Age, Race, dummyjr, Gender, Grade, OnCampus, Service, dummys, FTStatus, Married, dummyf
b Predictors: (Constant), Athlete, Greek, Age, Race, dummyjr, Gender, Grade, OnCampus, Service, dummys, FTStatus, Married, dummyf, Number of Days Typical Student Drank
c Predictors: (Constant), Athlete, Greek, Age, Race, dummyjr, Gender, Grade, OnCampus, Service, dummys, FTStatus, Married, dummyf, Number of Days Typical Student Drank, CCI
d Dependent Variable: Number of Days I Drank

Because the median age of the freshman in the sample is 18.56 years (95% of them are under age 20), the lower number of drinking days may be attributed to their underage status and inability to obtain alcohol regularly. Also highly correlated with a positive value to the number of days the student drank in the past 30 days is the perception variable. This suggests that the more days the student perceives that a typical student at

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their school drank in the past 30 days the more days they tended to drink. This finding supports the social norms approach research conducted by Haines and others.

With a beta of -.063, intellectual development level (CCI score) was found to be not statistically significant in explaining personal consumption. This suggests that intellectual development is not a factor in deciding generally whether or not to drink alcohol. However, universities and society in general are not focused on eliminating responsible, legal alcohol consumption. The push, rather, is to reduce the incidence of harmful drinking behaviors. Therefore, the model could still be useful in addressing heavier, more problematic drinking behavior if it proves to have any explanatory value for binge drinking behavior.

Binge Drinking Regression Model. In order to determine if a relationship exists between intellectual development level and more harmful drinking behavior, a second regression model was run using the dependent variable measuring the number of days the student drank five or more drinks in a row in the past 30 days. This model used the same independent variables in the same block order as those for the personal consumption model with one exception. The perception of peer behavior variable was switched from that measuring the number of days a typical student drank in the past 30 days to that measuring the number of days a typical student drank five or more drinks in a row in the past 30 days. This was done to align peer behavior perceptions to the specific behavior being measured.

Of those meeting the minimum LEP requirement, there were 156 students who indicated they had engaged in drinking five or more drinks in a row in the past 30 days. The minimum cases to variables ratio was met (10.4 to 1) and a linear relationship between the independent and criterion variables was confirmed (Table 8).

As shown in Table 7 below, the squared multiple correlations indicated that 8.6% of the observed variance in binge drinking is explained by the socio-demographic variables. The squared multiple correlations indicated that 18.3% of the observed variance in binge drinking is explained by the combined variables of the first and second block. Collectively, the independent variables in the three blocks explained 20.8% of the variance in binge drinking. Again, as expected, the block of variables in each step in the model contributed more explanatory power for the behavior in question.

Where the CCI variable was not statistically significant at the .05 level in the personal consumption model, it is statistically significant in the binge drinking model.

Table 7: Block Regression Results for Binge Drinking Regression Model
(Number of days I drank 5 in a row in the past 30 days)

Variables	At Step		
	1	2	3
	beta (sig.)	beta (sig.)	beta (sig.)
Age	-.027	-.029	-.016
Race	.109	.117	.135
Gender	-.137	-.130	-.154
GPA	.050	.092	.096
DV Freshman	-.105	-.141	-.183
DV Sophomore	.115	.112	.105
DV Junior	-.077	-.043	-.059
Student Status	.043	.041	.034
Living Arrangements	.143	.171	.191
Marital Status	-.080	-.041	-.027
Greek Membership	.004	-.028	-.029
Athletic Membership	-.115	-.067	-.057
Service Membership	-.065	-.037	-.022
Days A Typical Student Drank 5		.325 (.000)	.322 (.000)
CCI Score			-.168 (.035)
R^2	.086	.183	.208

With the direction of the beta negative, this indicates that lower CCI scores are associated with higher rates of binge drinking.

It is also interesting to note that although the perception and CCI blocks have a significant F statistic in the binge drinking model, the socio-demographic variable block does not (as it did in the personal consumption model). Specifically, in the personal

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consumption model, race and freshman class standing were both statistically significant

but in the binge drinking model they are not. This suggests that the socio-demographic

factors related to decisions to drink generally are not related to decisions about binge

drinking behavior. Whereas the decision of whether to drink at all or how many times to

drink are related to race (non-whites drink less often) and ability to obtain alcohol

(freshmen drink less often), the decision to binge drink does not differ by race or class

standing. Possibly those underage drinkers reporting binge drinking have greater access

to alcohol than their freshman peers.

Table 8: Anova Results for Binge Drinking Regression Model
(Number of days I drank 5 in a row in the past 30 days)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108.014	13	8.309	1.022	.434(a)
	Residual	1154.672	142	8.131		
	Total	1262.686	155			
2	Regression	230.540	14	16.467	2.250	.009(b)
	Residual	1032.146	141	7.320		
	Total	1262.686	155			
3	Regression	262.774	15	17.518	2.453	.003(c)
	Residual	999.912	140	7.142		
	Total	1262.686	155			

a Predictors: (Constant), Athlete, Grade, Married, Greek, Race, OnCampus, FTStatus, dummys, Gender, dummyjr, Service, dummyf, Age
b Predictors: (Constant), Athlete, Grade, Married, Greek, Race, OnCampus, FTStatus, dummys, Gender, dummyjr, Service, dummyf, Age, Number of Days Typical Student Drank Five
c Predictors: (Constant), Athlete, Grade, Married, Greek, Race, OnCampus, FTStatus, dummys, Gender, dummyjr, Service, dummyf, Age, Number of Days Typical Student Drank Five, CCI
d Dependent Variable: Number of Days I Drank Five

Further Testing of The Critical Assumptions

As in all studies where regression is used as the method of data analysis, there are

several potential threats in this study. Those potential threats must be identified, and the

data should be reviewed to determine their level of impact on the findings. Most notably,

linear regression is potentially affected by violations of any of the critical assumptions:

independence, homoscedasticity, linearity, normality, and model specification (Kachigan,

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1986). Whereas independence and homoscedasticity are serious violations in time series

regression models, linearity, normality and model specification must be considered in this

study. Likewise, beyond simple model assumption violations there are two additional

factors, attrition and multicollinearity, which must also be considered as they can also

create problems for interpreting the results.

Nonlinearity is most evident in a plot of the observed versus predicted values. A

scatterplot revealed a linear relationship, but also revealed a few points far away from the

regression line (See Figure 1). Outliers are observations with large residuals or unusually

large distances from the regression line that could potentially exert undue influence on

the regression. Because the presence of outliers could be impacting the regression

coefficients in the binge drinking model, the standardized residuals were examined. The

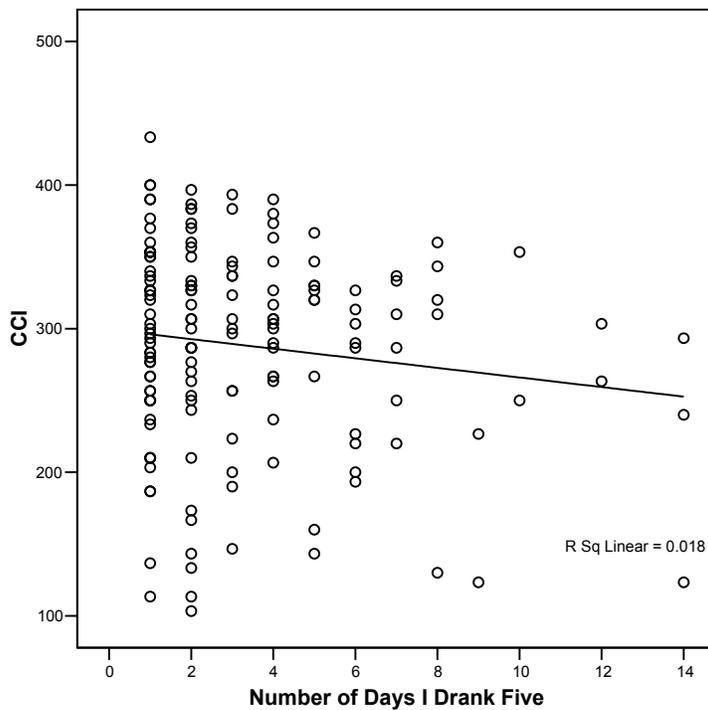procedure identified eight outliers

Figure 1: Scatterplot Revealing Outliers in the Linear Relationship

which could potentially impact the results. These cases were removed and the block

regression analysis was repeated. The results of the analyses with the outliers removed

are shown on Tables 9 and 10.

The most notable difference between the original model and the model with the

outliers removed is the amount of additional variance explained by the CCI block. In the

first model it explained an additional 2.5% of the variance after controlling for all other

independent variables. In the model with the outliers removed, CCI explains an

additional 4.2% of the variance. However, the total explanatory value of the two models

differs by less than .02%, with the difference largely falling in the second block, where

peer perception was added. This suggests that the outliers appeared to have been causing

some unexplained interaction between peer perception and personal binge drinking

behavior, which removing the outliers eliminated. Finally, without the interaction

interference, race and gender reach significance in the model with the outliers removed.

Table 9:   Block Regression Results for Binge Drinking Model with Outliers Removed
(Number of days I drank 5 in a row in the past 30 days)

Variables	At Step		
	1	2	3
	beta (sig.)	beta (sig.)	beta (sig.)
Age	-.062	-.040	-.020
Race	.172 (.050)	.148	.175 (.035)
Gender	-.130	-.123	-.162 (.055)
GPA	-.004	.032	.041
DV Freshman	.062	.020	-.039
DV Sophomore	.186	.175	.169
DV Junior	.099	.047	.024
Student Status	.093	.084	.076
Living Arrangements	.046	.070	.099
Marital Status	-.089	-.061	-.043
Greek Membership	-.010	-.026	-.025
Athletic Membership	.064	.076	.085
Service Membership	.089	-.062	-.043
Days A Typical Student Drank 5		.285 (.001)	.290 (.001)
CCI Score			-.220 (.009)
R^2	.093	.168	.210

This tends to support the literature which shows that white males tend to drink more (and

more often) than their female and non-white counterparts.

The accompanying anova output shows the dramatic change in the residuals which the outliers kept high in the original block analysis. However, although the residuals are drastically reduced without the noise of the outliers, and although the R^2's actually increase slightly from the original model, the results are not significantly different from the analysis with the outliers present. Here again, just as in the original model, the perception and CCI blocks have significant F statistics and significant beta coefficients. Where the original model combined to explain 20.8% of the variance, the model with the outliers removed combine to explain 21%. The model without the outliers still supports Haines and others findings about the relationship between drinking behavior

Table 10: Anova Results for Binge Drinking Model with Outliers Removed
(Number of days I drank 5 in a row in the past 30 days)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	49.478	13	3.806	1.045	.413(a)
	Residual	480.858	132	3.643		
	Total	530.336	145			
2	Regression	89.125	14	6.366	1.890	.033(b)
	Residual	441.210	131	3.368		
	Total	530.336	145			
3	Regression	111.613	15	7.441	2.310	.006(c)
	Residual	418.723	130	3.221		
	Total	530.336	145			

a Predictors: (Constant), Athlete, Grade, Married, Race, dummyjr, FTStatus, Greek, OnCampus, Gender, dummys, Service, dummyf, Age
b Predictors: (Constant), Athlete, Grade, Married, Race, dummyjr, FTStatus, Greek, OnCampus, Gender, dummys, Service, dummyf, Age, Number of Days Typical Student Drank Five
c Predictors: (Constant), Athlete, Grade, Married, Race, dummyjr, FTStatus, Greek, OnCampus, Gender, dummys, Service, dummyf, Age, Number of Days Typical Student Drank Five, CCI
d Dependent Variable: Number of Days I Drank Five

and peer perception and still shows an inverse relationship between binge drinking and CCI.

Occasionally the error distribution can be skewed by the presence of a few large outliers, resulting in a violation of normality (Kachigan, 1986). The removal of the

outliers identified in the SPSS regression procedure correcting linearity also corrected for normality.

Errors of model specification can occur when relevant variables are omitted from the model or irrelevant variables are included (Kachigan, 1986). The way to test for model specification errors is to determine if the predicted value of the dependent variable and the predicted value squared are actually good predictors of the dependent variable. The predicted variable should be significant because it is the value predicted by SPSS for the model in the regression procedure. However, the predicted value squared should not be a significant predictor unless the model is misspecified. The results of the predicted value and the predicted value squared are contained in Table 11 below. Note that the

Table 11: Model Specification Analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.009	1.350		2.969	.004
Unstandardized Predicted Value	-1.559	.786	-.680	-1.982	.049
Predicted Value Squared	.357	.107	1.144	3.332	.021

a Dependent Variable: Number of Days I Drank Five

predicted value is significant (as expected), but that the predicted value squared is also significant. This suggests that there are other variables related to binge drinking that are not included in the model. While this does not mean that perception and CCI have no relationship to binge drinking behavior, it does mean that the strength of that relationship would undoubtedly change should additional relevant variables be added to the model. This should be in no way surprising, since a myriad of factors combine to contribute to such a complex social behavior as binge drinking.

The two final items requiring attention in the analysis are attrition and milticollinearity. Attrition bias is a potential threat to reliability in this study due to the

fact that out of a sample of 3,000 there were only slightly more than 300 with valid CCI

scores (Cohen et.al., 2003) an attrition analysis was completed to determine if the cases

excluded from the analysis occurred randomly. If cases were lost in a non-random

fashion (such as most females or most freshman didn't have valid CCI scores) attrition

would make the findings suspect. For the analysis, a dichotomous dummy variable was

created for attrition. The included cases with valid CCI scores were set to 1 and the cases

excluded due to invalid CCI scores set to 0. With the new attrition variable set as the

dependent variable, the list of independent variables was added into a regression analysis.

Table 12 shows the regression output from the attrition analysis. Note that none of the

independent variables are significantly related to the attrition variable except for CCI,

which is perfectly correlated because it was used as the basis of determining the attrition

variable.

Table 12: Attrition Regression Analysis for Relationships - All Independent Variables
And Personal Binge Drinking

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.141	.123		-1.144	.253
Class Standing	-.001	.013	-.003	-.116	.908
Age	.001	.004	.008	.273	.785
Gender	.008	.026	.008	.307	.759
Race	.001	.016	.002	.084	.933
GPA	.074	.055	.036	1.348	.178
Greek Membership	-.026	.033	-.020	-.788	.431
Athletic Membership	.000	.070	.000	-.005	.996
Number of Days Typical Student Drank Five	.008	.005	.044	1.709	.088
Number of Days I Drank Five	.001	.005	.004	.131	.896
CCI	.002	.000	.664	25.535	.000

a Dependent Variable: attrition

The results of the attrition analysis show that the participants who were lost due to invalid

CCI scores did not differ significantly from those who were included. This suggests that

the loss of participants did occur in a random manner and that attrition is not as serious a

threat to the model as it could be if the loss was non-random.

Selection bias was then examined for the entire sample by utilizing Independent

Samples T-Test procedure. The procedure compares means for two groups of cases to

determine if they are significantly different from one group to another. Cases in the

Table 13: Independent Samples T-Test Results for All Respondents

	Grp.	N	Mean	Std. Deviation	Std. Error Mean	Equal Variances Assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means			
							F	Sig.	t	Sig.(2-tailed)	95% Conf. Interval Lower	95% Conf. Interval Upper
Age	**.00**	**644**	**20.81**	**3.497**	**.138**	**Yes**	**1.993**	**.158**	**-1.846**	**.065**	**-.997**	**.030**
	1.00	313	21.29	4.355	.246	No			-1.713	.087	-1.038	.071
Race	.00	654	.8135	.38984	.01524	Yes	21.240	.000	-2.221	.027	-.10699	-.00660
	1.00	**316**	**.8703**	**.33656**	**.01893**	**No**			**-2.337**	**.020**	**-.10452**	**-.00908**
Gender	**.00**	**649**	**.62**	**.486**	**.019**	**Yes**	**.009**	**.923**	**-.048**	**.962**	**-.067**	**.064**
	1.00	314	.62	.486	.027	No			-.048	.962	-.067	.064
GPA	**.00**	**593**	**2.9866**	**.68991**	**.02833**	**Yes**	**1.248**	**.264**	**.975**	**.330**	**-.05014**	**.14903**
	1.00	284	2.9371	.72998	.04332	No			.955	.340	-.05223	.15112
DV Freshman	**.00**	**645**	**.2248**	**.41778**	**.01645**	**Yes**	**2.350**	**.126**	**.756**	**.450**	**-.03444**	**.07760**
	1.00	310	.2032	.40305	.02289	No			.766	.444	-.03378	.07694
DV Sophomore	.00	645	.2450	.43040	.01695	Yes	17.413	.000	2.003	.045	.00118	.11454
	1.00	**310**	**.1871**	**.39062**	**.02219**	**No**			**2.073**	**.039**	**.00305**	**.11268**
DV Junior	.00	645	.2341	.42377	.01669	Yes	4.890	.027	-1.131	.258	-.09199	.02472
	1.00	**310**	**.2677**	**.44350**	**.02519**	**No**			**-1.113**	**.266**	**-.09298**	**.02571**
Student Status	**.00**	**653**	**.0704**	**.25609**	**.01002**	**Yes**	**2.540**	**.111**	**.792**	**.429**	**-.01994**	**.04691**
	1.00	316	.0570	.23214	.01306	No			.819	.413	-.01884	.04580
Living Arrangement	.00	653	.2649	.44163	.01728	Yes	15.229	.000	1.875	.061	-.00260	.11341
	1.00	**315**	**.2095**	**.40762**	**.02297**	**No**			**1.928**	**.054**	**-.00103**	**.11184**
Marital Status	.00	651	.0369	.18858	.00739	Yes	4.118	.043	-1.018	.309	-.04078	.01292
	1.00	**315**	**.0508**	**.21993**	**.01239**	**No**			**-.965**	**.335**	**-.04227**	**.01441**
Greek Membership	**.00**	**652**	**.17**	**.379**	**.015**	**Yes**	**.869**	**.351**	**.463**	**.643**	**-.039**	**.062**
	1.00	316	.16	.368	.021	No			.468	.640	-.038	.062
Service Membership	.00	643	.38	.486	.019	Yes	12.092	.001	-2.077	.038	-.136	-.004
	1.00	**316**	**.45**	**.498**	**.028**	**No**			**-2.059**	**.040**	**-.137**	**-.003**
Athletic Membership	.00	652	.04	.185	.007	Yes	7.929	.005	1.394	.164	-.007	.039
	1.00	**316**	**.02**	**.137**	**.008**	**No**			**1.543**	**.123**	**-.004**	**.037**
Number of Days Typical Student Drank	**.00**	**589**	**10.46**	**5.746**	**.237**	**Yes**	**.118**	**.731**	**-.477**	**.634**	**-.981**	**.597**
	1.00	316	10.65	5.806	.327	No			-.475	.635	-.984	.600
Number of Days I Drank	**.00**	**526**	**5.13**	**5.718**	**.249**	**Yes**	**.515**	**.473**	**-.772**	**.440**	**-1.128**	**.491**
	1.00	315	5.45	5.900	.332	No			-.766	.444	-1.134	.498
Number of Days Typical Student Drank Five	**.00**	**586**	**3.56**	**2.464**	**.102**	**Yes**	**.416**	**.519**	**-.383**	**.701**	**-.409**	**.275**
	1.00	316	3.63	2.561	.144	No			-.379	.705	-.413	.280
Number of Days I Drank Five	.00	654	1.2294	2.29374	.08969	Yes	7.180	.007	-2.660	.008	-.76173	-.11500
	1.00	**316**	**1.6677**	**2.62111**	**.14745**	**No**			**-2.540**	**.011**	**-.77737**	**-.09936**

sample without a valid CCI were set to 0 and cases in the sample with a valid CCI were set to 1. The data were grouped on the CCI variable and run against the remaining criterion and predictor variables. The significance of the F statistic determines which t-test significance level to utilize. If the significance of F is > .05, the data to interpret is where equal variances are assumed. The opposite is also true; if the significance of F is < .05, the data to interpret is where equal variances are not assumed. The appropriate lines of data to interpret in this study are bolded in Table 13. The results show that several of the variables in this study were significantly different based on the group to which the respondent belonged. Those variables are race, sophomore class standing, service and number of days I drank five. This suggests that the differences between the two groups on these variables did not differ by chance, but rather by selection. This finding suggests that further caution be used in interpreting the results.

As a final precautionary measure, a multicollinearity assessment revealed that none of the variables had a tolerance value below .19 or a VIF above 5.3 (Hair, Tatham, Anderson & Black, 1998). Also, the highest correlation between any two variables in any of the block regression models was $r = .538$, well below the danger zone $r = .80$ (Studenmund, 2001) for an indication of multicollinearity. Therefore, multicollinearity does not appear to account for any of the explanatory power of any of the block regression models.

Pearson's Correlations

In order to test the potential relationship between perception and intellectual development we look to the Pearson's correlations. The results of the correlation analysis showed that there was little to no relationship between students' perception of peer drinking behavior and intellectual development level. This procedure computes the

pairwise associations between variables and indicates strength and direction of the linear relationship. As noted by the data in Tables 13 and 14 below, there is no significant correlation between CCI with either perceptions of peer personal consumption or perception of peer binge drinking.

Table 14: Correlation Analysis of Perceptions of Peer Personal Consumption, by CCI Score

		Number of Days Typical Student Drank	CCI
Number of Days Typical Student Drank	Pearson Correlation	1	-.050
	Sig. (2-tailed)	.	.375
	N	316	316
CCI	Pearson Correlation	-.050	1
	Sig. (2-tailed)	.375	.
	N	316	316

Table 15: Correlation Analysis of Perceptions of Peer Binge Drinking, by CCI Score

		Number of Days Typical Student Drank Five	CCI
Number of Days Typical Student Drank Five	Pearson Correlation	1	-.026
	Sig. (2-tailed)	.	.755
	N	148	148
CCI	Pearson Correlation	-.026	1
	Sig. (2-tailed)	.755	.
	N	148	148

In a final summary of the decision on the part of students to engage in binge drinking behavior, the results in this study indicate that while perceptions of peer binge drinking behavior remain high among binge drinkers, binge-drinking students at higher intellectual development levels tend to binge drink at lower rates (their behavior is not as heavily impacted by peer behavior or perception of peer behavior) than their lower intellectual development level binge-drinking counterparts. This suggests that the effect of CCI level on personal binge drinking behavior is independent of perception of peer

behavior. That finding has implications for higher education institutions to consider in

addressing harmful student drinking behavior.

CHAPTER V: DISCUSSION AND RECOMMENDATIONS

The research objectives in this study and the location of results for each are

presented in Table 16 below.

Table 16: Research Objectives – Results Matrix

Research Objective	Analysis Method	Applicable Data Table(s)	Applicable Discussion Page(s)
Describe students in the study for socio demographic variables (age, gender, race, marital status, student status, work status, living arrangements, grades, Greek membership, athletic membership, and service membership).	Measures of Central Tendency	Tables 1, 2 & 3	Pages 45-47
Determine if personal consumption level (number of days alcohol consumed in the past 30 days) is higher when drinker perception of peer consumption level is higher.	Measures of Central Tendency	Table 4	Pages 47-48
Determine if personal occurrence of binge drinking (consumption of 5 or more alcoholic drinks in a row) is higher when drinker perceptions of peer binge drinking is higher.	Measures of Central Tendency	Table 4	Pages 47-48
Determine if perceptions of peer consumption differ at different levels of intellectual development.	Heirarchical Ordinary Least Squares Regression / ANOVA	Tables 5 & 6	Pages 48-52
Determine if perceptions of peer binge drinking differs at different levels of intellectual development.	Heirarchical Ordinary Least Squares Regression / ANOVA	Tables 7 & 8	Pages 52-54
Determine if there is relationship between personal consumption level and level of intellectual development (regardless of perceptions of peer consumption behavior).	Pearson's Correlations	Table 14	Pages 61-63
Determine if there is relationship between personal binge drinking and level of intellectual development (regardless of perceptions of peer consumption behavior).	Pearson's Correlations	Table 15	Pages 61-63

Both regression models supported the findings in previous research into college

student drinking behavior by suggesting that white males tend to drink more and more

often than their peers. The heaviest drinkers in this study also follow the reported trend

which suggests binge drinkers drink more often and consume more alcohol overall than

their peers. The models also supported the social norms research of Haines (1998) and

others who found dramatic reductions in consumption levels among students after they

were exposed to data showing that the true consumption levels of their peers was much

lower than they perceived them to be. In true social norms "fashion" the actual

consumption levels began to drop after some students realized they might be consuming

alcohol at levels above the norm. While this is certainly a step in the right direction for universities, it is limiting in that the norm is the point of success for this approach. Moving students below the norm will take a different approach. This study attempted to show whether moving a student along the intellectual development continuum might provide that new approach.

It is important to note that the current study does not appear to support previous findings relative to the remaining sociodemographic characteristics (age, GPA, living arrangements, or affiliations/memberships such as Greeks or athletes) because none of these independent variables showed any significant relationship to drinking behavior in any of the models.

There are four studies in the literature measuring some form of intellectual development and college student drinking. Austin et. al. (2003) studied a convenience sample of 155 college student substance use and various personality correlates such as extroversion, conscientiousness, and intellectance. Intellectance was defined as a "tendency to display active imagination, aesthetic sensitivity, intellectual curiosity, and independent judgment," (p.3) and was measured using the Mini Marker's Scale (a 40-item self-report inventory measuring basic personality dimensions). Correlational analysis showed a significant inverse relationship between intellectance and alcohol use ($r= .18$, $p,<.01$). They surmised that this was likely due to the fact that low intellectance participants did not identify with positions on alcohol use adopted by teachers and other authority figures, but identified more strongly with peers who reinforce substance use. This study did not support their findings relative to alcohol use in general, but it did support their findings relative to binge drinking behavior.

Gintner and Choate (2003) studied the relationship between epistemological development level and college student drinking. They measured, among other things, intellectual development in 114 college students at a small liberal arts college using Erwin's Scale of Intellectual Development. The Commitment subscale loosely measures Perry's intellectual development level at the relativistic positions. Analysis of variance indicated significantly higher Commitment scores for abstainers compared with frequent binge drinkers. This study supports the Choate's findings that intellectual development level is inversely related to binge drinking.

Araujo and Wong (2005) examined the relationship between high risk drinking and college students' self-perceptions, including their perceptions of their own "Intellectual Ability." Approximately 200 college students' self-perceptions were measured with four subscales from the Neemann-Harter Self-perception Profile for College Students. Students' perceptions of Intellectual Ability did not differ significantly between the alcohol consumption groups (abstainers, non-problem drinkers, high-risk drinkers). This study does not support Araugo and Wong's findings, although the intellectual measure was self-selected rather than measured by scale.

Finally, Zeigler et. al. (2005) in a review of the literature found that among young binge drinkers, alcohol-induced brain damage occurs with extensive shrinkage in the cortex of the frontal lobe. This area of the brain is the location of higher intellectual functions and it continues to develop until approximately age 25. They conclude, "Underage alcohol use is associated with brain damage and neurocognitive deficits, with implications for learning and intellectual development. Impaired intellectual development may continue to affect individuals into adulthood" (p.23). What they suggest is that the binge drinking occurs first, and intellectual development stalls as a result. This study

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supports their ultimate conclusion that binge drinking and intellectual development are related, but cannot distinguish the chronology of the relationship in terms of which may have occurred first.

In both regression models the R^2's were on the low side, suggesting that only a small proportion of the variance was explained by the model. With significant F-statistics and significant coefficients the correlations are significant. However, there are obviously other variables related to drinking behavior besides sociodemographics, peer perception and intellectual development level. (Cohen, et. al., 2003). While this model would not be good at predicting the behaviors of drinkers outside of this study, it is still useful in explaining the presence of a relationship between intellectual development and binge drinking in this study.

The low R's were not surprising in either model because of the homogeneity of the respondents – the socio-demographic variables should have accounted for more of the variance, but the respondents tended to be too "alike" demographically. For example, 84% were between 18 and 22 years old, 83% were white, 95% were single, etc. This is likely to be a challenge in replicating this study at any single institution. A substantial body of research related to demographic factors and student drinking has been conducted at the national level by a small number of groups with the resources to sample nationwide and include various institution types, historically black colleges and universities, residential and commuter campuses, and the like (for example, refer to the discussion of student demographics in Chapter I relative to Wechsler, Engs and Presley.) The respondents in these multi-institution samples are more demographically "different" than students tend to be at a single institution.

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In the current study intellectual development level added modestly to the explanatory value of the model measuring binge drinking behavior but not for the model measuring personal consumption. Universities are not attempting to eliminate drinking on the part of their students; rather, they are attempting to reduce harmful alcohol consumption behavior such as binge drinking. Harmful drinking behaviors put the student drinkers themselves at a much higher risk for experiencing negative primary effects and put their student peers at a much higher risk for experiencing negative secondary effects. Since there appears to be inverse relationship between higher intellectual development level and harmful drinking behavior among the students in this study, the relationship has implications for curriculum development aimed at increasing intellectual development with these students.

But to what extent should practitioners focus on increasing intellectual development in addition to, or to the exclusion of other prevention efforts? In this study, neither the students as a whole nor the group of binge drinkers differed in perceptions of peer drinking behavior by intellectual development level. This suggests that these students continue to think their peers engage in more and heavier drinking than they do themselves, and that they may not have been exposed to a social norms advertising campaign. Changing internalized sources of authority and ways of learning / knowing does not appear to impact perceptions of the behavior of others. However, despite their perceptions, when the impact of perception was already accounted for, these students showed a statistically significant inverse relationship between binge drinking and intellectual development – suggesting that this additional variance explained by the relationship is independent of peer perceptions. In this instance it may be helpful to implement a social norms advertising strategy in conjunction with an intellectual

development-based curriculum infusion to potentially impact both perception and behavior for students who are at different levels of intellectual development. This study should be replicated in different settings with different student populations to determine if the findings here hold true elsewhere, especially before embarking on any curriculum development. In fact, a longitudinal study would add greatly to an understanding of the true nature of the relationship between harmful drinking and intellectual development.

This study focused on a single institution and therefore the findings cannot readily be generalized to other student populations. The response rate was somewhat low, especially for the proportion of students who completed at least 13 of 15 keyed elements on the LEP portion of the survey. The survey was long, but future researchers could reduce the length of the survey substantially by including only the 15 keyed elements rather than the entire LEP. Attrition was a factor in the study overall, relative to those with and without valid intellectual development scores. However, an attrition analysis of only binge drinkers showed that the relationship of the attrition factor to any of the independent variables was not statistically significant, suggesting that attrition was indeed random in the binge drinking regression model. Even so, the findings should be viewed with caution because the results are obviously limited by the measures used in the analyses. There is no way of knowing whether nonrandom attrition occurred with respect to other variables that were not measured in this study.

Finally, it should be noted that multiple regression can be used for more than one purpose. Using it for prediction is to use a sample to create a regression equation that would optimally predict a particular phenomenon within a particular population, or to predict the outcomes of individuals *not* in the sample included in the analysis (Osborne,

2000). In a hypothetical example of using regression to predict 12th grade achievement

test scores from 8th grade performance factors:

> The goal is not to understand why students achieve at a certain level, but
> to create the best equation so that, for example, guidance counselors could
> predict future achievement scores for their students, and (hopefully)
> intervene with those students identified as at risk for poor performance, or
> to select students into programs based on their projected scores. And while
> theory is useful for identifying what variables should be in a prediction
> equation, the variables do not necessarily need to make conceptual sense.
> If the single greatest predictor of future achievement scores was the
> number of hamburgers a student eats, it should be in the prediction
> equation regardless of whether it makes sense (although this sort of
> finding might spur some explanatory research….) (Osborne, 2000, p.1)

Using regression analysis for explanatory purposes means exploring relationships

between multiple variables in a sample to shed light on a phenomenon, with a goal of

generalizing this new understanding to a population. As a predictor, the included

variables are selected in a manner so that all factors potentially related to the dependent

variable are identified to reduce confounding. As an explanatory tool the included

variables are selected specifically to determine their relationships, or lack thereof, to the

phenomenon being studied. It was the intention of this study to do the latter.

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APPENDIX A

PERRY'S SCHEME OF INTELLECTUAL AND MORAL DEVELOPMENT

1) *Basic Duality*. In the basic duality position the world is viewed dichotomously. Learning is essentially an exchange of information from the teacher to the student. The underlying belief is that knowledge is quantitative (consists of facts), there is a correct answer for everything, and authorities (people, books, etc.) possess and dispense these correct answers. Perry himself indicates that very few college students still predominantly view the world from such innocence.

2) *Multiplicity Prelegitimate*. Multiplicity refers to a pluralism of answers and points of view. Students move to this point through cognitive dissonance - when faced with opposing viewpoints from "experts" and a diversity of views. It is considered prelegitimate because the student recognizes, but does not buy into the pluralism.   It is at this position that "peers become more legitimate sources of knowledge" (Evans, et. al., p. 131).

3) *Multiplicity Legitimate but Subordinate*. Transition into this position can occur when trusted authorities do not have the correct answers. In this stage the student recognizes that there is room for human uncertainty but that this uncertainty is temporary. In other words, there may not be a correct answer now, but there will usually be one eventually. Here, the student can tolerate a small amount of uncertainty where everyone is entitled to their own opinions.

4a) *Multiplicity Coordinate*. Transition into this position occurs when students realize that uncertainty is widespread and unavoidable. In this position the student views the world as falling into one of two categories: there are still authorities in possess the answers, but there is also some uncertainty (double duality). In this position, the student believes that when the authorities do not know the answer any answer is as good as another.

4b) *Relativism Subordinate*. Transition into this position occurs when students not only demand that authorities justify themselves but are required to justify their own opinions as well. Here, the student is beginning to establish a domain that is separate and apart, but equal to that of the authorities. What is critical in this position is that the student is able to distinguish between an opinion and a supported opinion. Multiplicity and diversity exist here, but they are coupled by viewing knowledge as contingent and contextual. This is where the student begins to see ideas as better or worse rather than right or wrong. Here, the student has added to the double dualism of position 4a – critical thinking.

5) *Relativism*. Perry described this position as the pivotal stage that divides the positions between dualistic and contextual. Movement to this position requires a new way of thinking completely outside the worldview of the previous positions. Here, the student is introduced to meta-cognition, the capacity to consider and evaluate one's own thinking. In this position the authority is groping along with the student for answers, albeit with a different set of experiences.

6-9) *Commitments in Relativism*. The final positions in Perry's scheme are concerned with the student's ability to develop commitments based on an understanding that knowledge is contextual and relativistic.

APPENDIX B

ONLINE SURVEY CONSENT FORM

Please read this consent form and select the appropriate answer below.

This study is being conducted to better understand the relationship between human development and drinking patterns. This research is being conducted in partial fulfillment of a dissertation for a doctoral program.

The survey includes questions about your drinking habits, the drinking habits of your peers, your experience with first-hand or second-hand effects of alcohol, and about your preferred learning environment.

The majority of questions are multiple-choice questions where you need only select one of the provided answers. There are five questions where you will be asked to rank items in order of their importance to you, and there is one short-answer question. It should take you no more than 20 minutes to complete the survey.

The link to this survey is being sent out to the student email accounts of 3,000 randomly selected LSU undergraduate students.

Anonymity is guaranteed to everyone who completes the survey.

While completing the survey you will not be asked to enter any personal data such as your name, family name, phone number, e-mail address, home address, city or state. You will not be asked to provide any identifying number such as social security, driver license, or date of birth.

I commit myself to use these records for statistical and research purposes only, and I guarantee that no person completing this survey will be identifiable either by description or statistics.

Participation in this survey is completely voluntary. Survey participants may quit completing the survey at any time by closing the survey.

This online survey is intended only for participants 18 years of age and older. By clicking CONTINUE, you agree with the terms of this consent form and you confirm that you are at least 18 years old. Otherwise select QUIT.

If you have any questions, please contact:

Doctoral Student Researcher:
Linda Regira
Louisiana State University
Phone: 225-776-6573

You may also contact my Advisor:
Dr. Jerry Willis
Professor, Educational Leadership, Research and Counseling
Louisiana State University

CONTINUE - I AGREE AND WISH TO CONTINUE. I VERIFY THAT I AM 18 OR OLDER.
QUIT - I QUIT BECAUSE I DO NOT AGREE OR BECAUSE I AM NOT 18 OR OLDER.

LEARNING ENVIRONMENT PREFERENCES SCORING KEY
William S. Moore, Center for the Study of Intellectual Development

DOMAIN: ITEM #:	CC/VL	RI	R ST/P	CL AT	EVAL
1-3	2*	2	2	2	2
4	3	4	5	3	3
5	4	3	4	5	5
6	5	5	3	4	4
7	4	--**	--	4	3
8	3	5	5	3	--
9	--	4	4	--	5
10	5	3	4	5	3
11	4	4	3	4	4
12	5	3	5	5	5
13	3	5	3	3	4

* Numbers in domain columns represent keyed Perry positions
** represents unkeyed ("meaningless") items

VITA

At the time of the dissertation defense Linda Marie Regira was a candidate for the degree of Doctor of Philosophy in higher education administration from Louisiana State University. She completed her undergraduate work at Louisiana State University in 1984, receiving a Bachelor of Arts degree in journalism. She received her master's degree in criminal justice from Louisiana State University in 1989.

During her studies she held positions in policy, planning and research for the State of Louisiana, first at the Louisiana Commission on Law Enforcement, then at the Office of Alcohol and Tobacco Control, followed by the State Budget Office, to her current position as Director of Policy, Planning & Research at the Louisiana Department of Economic Development.

She has one son, Derek Michael Stevens, and one granddaughter, Alexa Elizabeth Stevens, and lives in Donaldsonville, Louisiana.