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**PREDICTION OF ALCOHOL USE AND NEGATIVE DRINKING-RELATED  
CONSEQUENCES AMONG UNIVERSITY UNDERGRADUATES**

**BY**

**BRENTON D. CROWHURST**

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**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE MASTER'S OF SCIENCE DEGREE IN CLINICAL  
PSYCHOLOGY**

**DEPARTMENT OF PSYCHOLOGY, SAINT MARY'S UNIVERSITY**

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## **ABSTRACT**

Current alcohol research tends to be atheoretical and concerned almost exclusively with etiology. In their attempts to explain why individuals drink, researchers have progressed from simple correlational studies identifying related variables to examinations of multiple factors using multiple regression and causal modeling methodologies. The present study contributes to the understanding of alcohol use and problem drinking by college students.

Three hundred undergraduates from two Nova Scotia universities comprised the sample. Pearson Product Moment correlation coefficients identified significant relationships between the Quantity-Frequency Index of alcohol use (Q-F) and peer drinking, gender, age, the Alcohol Expectancy Questionnaire (AEQ), the number of observed college sporting events, and the number of college social functions attended. The Straus-Bacon Problem Drinking Scale (S-BPDS) was significantly related to the AEQ, gender, peer drinking, the Hassles Scale, percentage of times having drunk alcohol with people living nearby, and the number of participant sporting events attended. Stepwise multiple regression

analysis revealed only gender, peer drinking, and AEQ contributed significant unique variance to the prediction of alcohol Q-F. Separate regression analysis by gender revealed only peer drinking significantly predicted Q-F for males, while for females AEQ and age predicted Q-F. Stepwise multiple regression results revealed AEQ, gender, peer drinking, and the Hassles Scale predicted S-BPDS. Separate regression analysis by gender showed AEQ, peer drinking, and Hassles predicted male S-BPDS, while only AEQ predicted female S-BPDS.

The present correlational findings corroborate previous research indentifying these variables to be related to alcohol use and to problem drinking. The multiple regression findings contribute to previous research in suggesting different reasons why young men and women drink and experience negative drinking related consequences.



## INTRODUCTION

Alcohol use among young adults has long been a subject of social concern, and one of considerable research interest as well (Perkins & Berkowitz, 1986). Concern for this group is warranted because of their tendency toward high rates of use. Results from repeated cross sectional epidemiological studies, and longitudinal studies suggest alcohol use peaks between ages 18 and 21 (Kandel, 1980). Abelson, Fishburne and Cisin (1977; cited in Kandel, 1980), for example, reported the use of alcohol as well as other psychoactives to be most prevalent among individuals aged 18 to 25. These authors presented further cause for concern with data suggesting the percentage of "users" in this age group is increasing rapidly, compared with only slight increases in the rest of the population. Another disturbing trend is a declining age of onset of alcohol use (Jonston, Bachman & O'Mally, 1979; in Kandel, 1980) and first intoxication (Fromme and Samson, 1983).

Some researchers might seek to allay our concerns with findings suggesting that "early alcohol involvement...is only slightly predictive of later life

involvement," and that "involv(ment) with alcohol at fairly heavy levels of consumption early in life...tends to be temporary and does not continue into adulthood" (Temple & Fillmore, 1986, p.614). However, other research disputes these findings. Ziomkowski, Mulder and Williams (1975), for example, reported that heavy alcohol use during adolescence predicts even heavier use during adulthood. Also, Blume (1975) found that many alcoholics who entered treatment in their thirties admitted alcohol dependence since their early teens.

Among college students, problem drinkers were more likely than nonproblem drinkers to have drinking problems 6 years later (Donovan, Jessor & Jessor, 1983). And further, as many as 50% of the adults who were problem drinkers at six year follow-up were problem drinkers when in college. In a twenty year follow-up study, Fillmore (1974) reported that half of the problem drinkers had been problem drinkers twenty years earlier in college.

Since the early 1970's the focus of research interest has shifted away from extreme forms of dependence to include the varied observable patterns of use (Kandel, 1980). Current alcohol research tends to

be atheoretical, mainly descriptive, and concerned almost exclusively with etiology. Focusing mainly on the adolescent, the question they attempt to answer is why do individuals drink?

The earliest studies typically examined very few factors in simple correlational designs in order to identify variables involved in adolescent alcohol use. Since the late 1970's, researchers have attempted to develop theoretical models usually using adolescents identified as problem drinkers. These procedures, commonly referred to as causal modeling techniques, employ multiple variables in order to identify the relative predictive power of, and causal links between factors related to alcohol use. The most common causal modeling technique has been the cross-lagged correlation. In view of inadequacies inherent in this method (see Stone, 1986), recent efforts have begun to turn to path analytic methodologies.

The research to be described here focuses on the question of why individuals within the age group 18-25 drink. The variables found to be most reliably associated with alcohol use among young adults will be examined. These include peer influences, positive outcome expectancies, psychological

environment/contextual factors, and stress.

### **Peer Influences**

"Peer pressure" is a term often used both in the professional literature (e.g. Sheppard, Wright & Goodstadt, 1985) and in common parlance. Within the research literature however the operational definition of peer pressure varies. Here "peer pressure" will be used to describe a general category including peer modeling and peer approval.

### **Peer Modeling**

In an early report, Gusfield (1961) found drinking among university students was predicted by the number of drinking friends one had. Britt and Campbell (1977) later replicated these same findings in a college freshman sample.

Other studies have replicated these findings on younger adolescents. Alexander and Campbell (1967), for example, found the number of drinking friends predicted the frequency of drinking among high school seniors. Additionally they reported that among non-drinkers, as the number of drinking friends increased,

so did the likelihood of having tasted alcohol. Similarly, McLaughlin, Baer, Burnside, and Pokorny (1984) recently found alcohol use by seventh and tenth graders was strongly predicted by peer alcohol use for males and females.

An important issue with respect to the relationship between peer modeling and alcohol use concerns the direction of causation. Does peer use cause alcohol use, or does alcohol use "cause" peer use indirectly, whereby the individual who drinks or wishes to; seeks out the company of those who do? Correlational methodologies are limited in their ability to determine these relationships. In a review of a series of controlled experimental studies of modeling alcohol use to college students, Collins and Marlatt (1981) concluded that participants were influenced to match the heavy drinking rate modeled by a confederate. While this evidence does not rule out the possibility of the opposite causal relationship (alcohol use influencing peer selection), it does support the direct influence of modeling on alcohol use.

#### Peer Approval

Other research has investigated the relationship

between peer norms, or approval, and drinking. Rooney (1982), for example, found that perceived peer norms were highly correlated with alcohol use among high school students. In fact, when compared with perceived family, community, and religious norms perceived peer norms were most influential. Jessor and Jessor (1975), in contrast, found parental norms more influential than peer norms among seventh, eighth, and ninth grade adolescents. Kilty (1978), on the other hand, found that college students' own norms and preferences were more highly correlated with alcohol use than either peer or family norms. The solution to these apparently discrepant findings may perhaps be found in the research of Biddle, Bank and Marlin (1980) who compared parental and peer norms across different age groups within adolescence. Younger adolescents (mean age, 12.9) were effected by parental norms; adolescents in their mid-teens (mean age, 15.2) were effected by peer norms but not parental norms; and older teens (mean age, 18.4) were influenced by the norms both of parents and peers in their current drinking. However, regarding their intended level of future drinking older adolescents were influenced by parental norms.

Biddle et al.'s (1980) latter finding for older

adolescents expands upon the earlier work of Kandel and her colleagues, who concluded that while peer effects are greater for issues related to immediate adolescent life style, parental effects have greater impact on future life plans (Kandel, 1973, 1974; Kandel, Kessler & Marguiles, 1978; Davies & Kandel, 1979; in Kandel, 1980).

### Summary

Specific peer influences on drinking including modeling and approval of alcohol use have been discussed. Many of the studies of these peer effects on drinking have focussed on adolescents. However, significant predictors of alcohol use among high school aged adolescents will not necessarily be significant for young adults in the markedly different social environment of university. According to Biddle et al.'s (1980) findings the significance of specific factors varies among adolescents of different ages.

One problem in this literature that has not been previously addressed is the confounding of norms and modeling. Those who drink will inevitably approve of alcohol use. Those who disapprove of alcohol use likely will not drink. Because it is unlikely one will

encounter many individuals who drink but subscribe to non-drinking norms, or conversely, do not drink but subscribe to norms encouraging drinking, it is not possible to measure the influence of either modeling or approval of alcohol use independently. Thus, the present study will examine the effects of peer modeling on alcohol use among university students, and omit approval of alcohol use from measurement as a redundant variable.

### Parental Influences

There are three types of parental factors which have previously been studied and found to influence alcohol use. These are parental modeling (e.g. see Gusfield, 1961; Haer, 1955; Kandel, Kessler & Marguiles, 1978; McDermott, 1984; Straus & Bacon, 1953) parental attitudes toward alcohol use (norms) (e.g. see Alexander & Campbell, 1967; Biddle et al., 1980; Calahan, 1969; Kane & Patterson, 1972; McDermott, 1984; Thompson & Wilsnack, 1987), and aspects of the parent-child interactions (e.g. see Pendergast & Schaeffer, 1974; Potvin & Lee, 1980; Svobodny, 1982; Thompson & Wilsnack, 1987; Wechsler & Thum, 1973).



While these factors have been important in understanding adolescent alcohol use, these variables may, perhaps, be less relevant than others as determinants of current drinking among university students who, living away from home, are no longer directly exposed to their influence. Thus, these variables will not be addressed in the current study.

### Contextual Factors

Contextual factors are those variables which make up the social setting (Kandel, 1980). They include psychosocial/environmental settings such as school, church, living environment, social activities, commitment to personal values and interpersonal networks which create a context within which a behavior occurs (e.g. Igra & Moos, 1979; Jessor & Jessor, 1975). The person-environment interaction, encompassing many separate variables is more predictive of a phenomenon than any variable taken in isolation. Many of the person-environment interaction--"ecological"--studies in this area have been longitudinal.

Jessor and Jessor (1975) have suggested that knowledge of factors related to the transition from

abstinence to non-abstinence in adolescence is sparse, and research very limited. They undertook a four-year longitudinal study of several personality, environmental, and behavioral factors believed to be indicative of a predisposition to begin drinking. The Jessors' findings at Time One revealed differences between abstainers who remained abstinent and those who began to drink during the following four year period. These included a higher value placed on achievement, higher expectations of achievement, higher intolerance of deviance, higher religiosity, and more personal reasons against drinking. Lower values of these variables were associated with a tendency toward quicker transition to non-abstinence. Also, greater parental and peer approval of alcohol use, and higher levels of general deviance by the participant in the year preceding the data collection were related to alcohol use at Time One, and to earlier transition to alcohol use by those abstinent at Time One.

In a similar longitudinal study, Moos, Moos, and Kulik (1977) found that college students who were drinking at the beginning of the study tended to be more expressive, impulsive and extroverted, and have rebellious personality characteristics. In addition, a

number of behavioral and self-concept factors predicted drinking pattern changes one year later. Abstainers who became drinkers exhibited less religious concern (Bible reading and church attendance), more impulsive-deviant behavior (rule breaking, class skipping, and card/dice playing), and less cautiousness than abstainers who remained abstinent. Further, heavy drinkers who decreased their drinking in year two differed from those who continued to drink heavily. The latter engaged in less frequent supportive interaction, less traditional social interaction, and less student body involvement. These findings replicate those of Jessor and Jessor (1975) and extend them to an older, university population.

In another longitudinal study, Igra and Moos (1979) examined five variables in relation to alcohol use among college dormitory residents: (1) dormitory drinking orientation (average level of drinking, and degree of cohesiveness in the unit); (2) formal activity involvement (membership in school organizations, e.g. clubs); (3) informal activity involvement (social activities, e.g. dating, playing games, concert and museum going); (4) commitment to conventional (religious and academic) values; and (5)

anxiety and stress.

Over a six month period between fall and spring, overall level of alcohol consumption among freshmen increased. The strongest predictor of drinking at Time Two was drinking at Time One. In addition, all five variables were significantly related to drinking at Time Two. Stress and formal involvement, however, produced small correlations ( $r < .20$ ), and when Time Two drinking was regressed on Time One variables, neither was found to contribute significant independent variance. Peer context (dormitory), degree of informal social involvement, and lack of commitment to conventional values were most important in influencing drinking behavior.

Among these findings, two important gender differences emerged when Time One drinking was controlled for: females were slightly more likely to drink than males, and the dormitory context effect applied only to females. A discussion of specific contextual factors follows.

#### Formal Versus Informal Involvement

In an effort to more precisely define the specific nature of peer affiliations typologies describing group

affiliations such as the formal versus informal group dichotomy have been developed (Selnow and Crano, 1986).

Consistent with the earlier work by Igra and Moos (1979), Selnow and Crano define formal groups as those "in which participants meet, generally at planned times, to accomplish specified objectives: (p.48). Informal groups, on the other hand, are "ad hoc...peer affiliations, where participants assemble, generally for enjoyment, to engage in non-goal directed activities" (p.48).

Selnow and Crano (1986) found formal group involvement was associated with less alcohol and drug use while informal group affiliation was associated with more substance use among adolescents. Further, the degree of involvement for both formal and informal groups was related to differences in substance use. Greater involvement in formal groups predicted less substance use, while greater levels of informal involvement predicted more substance use.

Selnow and Crano's positive findings for informal groups are consistent with the findings of Igra and Moos (1979), and extend them to a younger adolescent population. Their findings for formal groups, however, contrast those of Igra and Moos who found formal

activities positively related to substance use. This discrepancy requires explanation.

Selnow and Crano intended to describe the "specific character" of peer affiliations in order to learn how peer pressure is related to alcohol use. Clearly their "precise" definition of "formal group" fails to explain why an individual's drinking behavior should be influenced by involvement in this kind of activity. Indeed, the discrepancy between the findings of these two studies demonstrates the inability of the formal/informal group context to explain peer pressure effects.

Johnson (1980) offered a suggestion regarding the influence of formal groups on alcohol use. He suggested that

... "group dynamics bring about for members not only the respect for superior skills, but for peers and for self. In organized groups...the adolescent develops a sense of goal orientation and concomitantly grows to appreciate the benefits of mutual cooperation which entails a host of lessons in leadership and in followership. All of this...contributes to character development and to a kind of moral

strength that helps the adolescent resist peer pressures to engage in the socially dysfunctional behaviors of alcohol and drug misuse" (Selnow & Crano, 1986, p. 51).

This explanation proposes no less than nine variables which are linked to decreased use of alcohol. Eight are not immediately observable, and are only indirectly related to alcohol use through their "relationship" to peer pressure (through providing resistance). Johnson has presented an amalgamation of numerous concepts, but without justification. There is no empirical evidence to support his theory.

Alternatively, one can explain the relationship between formal group membership and alcohol use in terms of group norms, and conformity of its members to those norms (Selnow and Crano, 1986). There is abundant evidence of the influence of reference group norms on substance use. Indeed, this explanation has the advantage of accounting for the differential influences of formal and informal groups in terms of differing group norms. The discrepant formal group findings in the Igra and Moos (1979) and Selnow and Crano studies may be explained similarly. While substance use is

explicitly proscribed by typical adolescent formal groups such as Boy Scouts, Girl Scouts, and 4-H, formal groups at the university level are more likely to condone, if not encourage alcohol use as an acceptable and normal activity associated with the group's functioning.

Supporting Igra and Moos' (1979) and Selnow and Crano's (1986) hypothesis about formal involvement, Ginsberg and Greenley (1978) found involvement in "conventional" activities, including university course work, campus organizations, and employment, negatively related to marijuana use. Although it is questionable to equate illegal with legal drug use, these findings, based on a comparable university population, are consistent with the direction of the Igra and Moos (1979) study. But unlike Igra and Moos, and similar to the Selnow and Crano (1986) report, the effect for such formal, or conventional group involvement was highly significant.

Perhaps the most influential group affiliation is the one we live in. Hence, attention will now be turned to the living environment.

### Living Environment



Igra and Moos' (1979) findings that higher levels of drinking on the living unit and greater cohesiveness among members predicted higher individual alcohol use parallel the earlier study by Gusfield (1961). He reported alcohol use among college students to be predicted by fraternity residence--the operative assumption being that "fraternity culture places a positive premium on drinking..." (p. 436). Further, the more strongly attached, or committed to the fraternity, operationalized as the number of friends in the fraternity, the higher the use of alcohol. This is, perhaps, comparable with Igra and Moos' concept of living unit "cohesion," measured by a series of items on the University Residence Environment Scale (URES).

This concept of attachment, or cohesion is a key issue that has not been well developed in the alcohol literature. However, it might explain why some students are affected by the norms of groups and why others are not. Igra and Moos (1979) argued that it is assumed (e.g. Thompson, Petersen & Zingraff, 1975) that the student subculture leads to positive attitudes regarding substance use. Many studies examining reference group influence on alcohol or drug use simply ask respondents to describe their own substance

use, or attitudes towards use, and whether their friends approve of use (e.g. Thompson et al., 1975; Ginsberg & Greenley, 1978; Jessor & Jessor, 1977). They are not asked about their attachment to the groups, which might be assessed in terms of the student's sense of community in their living environment.

### Psychological Sense of Community

Psychological sense of community was originally defined as "the feeling that one is part of a larger dependable and stable structure..." (Sarason, 1974, p.157). This was conceptualized as involving "the perception of similarity to others, an acknowledged interdependence with others, [and] a willingness to maintain this interdependence by giving to or doing for others what one expects from them" (p.157).

McMillan and Chavis (1986) have recently re-defined sense of community in terms of four specific factors: membership, influence, intergration and fulfillment of needs, and shared emotional connection. It is these factors on which the Sense of Community Index is based (Chavis, Hoqge, McMillan & Wandersman, 1986).

Sense of community has not previously been linked to alcohol use. However, the factors which comprise sense of community hold promise on logical grounds, as there appear to be conceptual overlap between some of these factors and other variables that have been examined in the literature reviewed previously. For example, Igra and Moos (1979) included in their measure of dormitory influence a measure of living unit cohesion based on the University Residence Environment Scale. "Cohesion," in terms of sense of community, may be viewed as comparable to membership. Similarly, Gusfield (1961) measured fraternity "attachment" by the number of friends who are also members of the fraternity. This may also be seen as an aspect of membership.

In the Selnow and Crano (1986) study, conformity with group norms regarding alcohol use was found to vary with degree of participation in that group. In terms of dimensions of sense of community, conformity to group norms is comparable to influence, and degree of participation comparable to membership.

### Summary

While psychological sense of community has not

previously been investigated in the context of alcohol use, it has been suggested that there is conceptual overlap between psychological sense of community, and several variables previously associated with alcohol use by university students. Living unit cohesion, fraternity attachment and group conformity are included among these. The current study will specifically investigate the relationship of sense of community to university student alcohol use.

#### Critique of Longitudinal Studies

Longitudinal (cross lag) studies have become a popular research methodology in the alcohol literature in the last decade. They appear to represent a logical step in conducting research, having expanded upon earlier simple correlational studies examining multiple predictors. In doing so, these studies have attempted, first, to clarify the comparative strength of different variables known to be associated with alcohol use, and, second, to make causal inferences.

As a means of causal modeling, the cross-lag method, used in many of the studies cited, has been harshly criticized. Based on the research of James, Mulaik and Brett (1978) and Rogosa (1980; in Stone,

1986), Stone (1986) argued that cross-lag correlations are neither valid as a means of inferring causal precedence, nor for ruling out possible spuriousness, and may be misleading in this respect. Rogosa (1980; in Stone, 1986) concluded that cross-lag correlations are useless in analysing longitudinal data. The most that can be inferred from these studies is that the independent variables and dependent variables are related. When the goal is substantiation of causal arguments and one is restricted to correlational data, James et al. (1978) recommend using structural equation models instead of cross-lag correlations. In recent years alcohol researchers have begun to prefer these methodologies (e.g. Cronkite & Moos, 1980; Huba & Bentler, 1982; Huba, Wingard & Bentler, 1981; Hansen, Graham, Sobel, Shelton, Flay & Johnson, 1987; Kline, Canter & Robin, 1987) to cross lagged correlational methods.

### **Psychological Distress**

Consistent with the literature investigating the relation between illicit drug use and distress (e.g. Hochman, 1972; Ginsberg & Greenley, 1978; Robbins

Robbins, Frosh & Stern, 1970; and Cross & Davis, 1972), Jessor, Carman and Grossman (1968) have suggested that heavy alcohol use by college students represents a "learned way of coping." In this context it is coping with either real or anticipated failure. They believe drinking is "essentially adaptive," where alcohol facilitates "cop[ing] with failure or its anticipation through forgetting or through inhibiting or interfering with the relevant thought processes" (p. 103). Consistent with this theory, their research findings demonstrated a relation between low expectation of realizing an internalized goal and high alcohol involvement.

Further evidence of alcohol use as a means of coping with distress comes from Williams (1966) who found problem drinkers experienced some relief from anxiety and depression when they were moderately intoxicated. Braucht, Brakarsh, Follingstad and Berry (1973), however, criticized Williams' study because, while it demonstrated a relation between distress and moderate alcohol intoxication, the same relationship did not hold for severe intoxication. Braucht et al. (1973) concluded that "while [Williams'] results...can explain why an anxious and depressed person might drink

moderately and frequently, they do not help to explain why an anxious and depressed individual would become a problem drinker" (p.95).

Braucht et al.'s criticism is perhaps misdirected, as he has misunderstood the facts of Williams (1966) study. He did not find that anxious and depressed people drank moderately; he found that heavy drinkers experiences relief of anxiety and depression when moderately intoxicated. Implicit in Braucht et al.'s conclusion is the assumption that heavy intoxication is a necessary condition for problem drinking, and that frequent moderate intoxication does not constitute problem drinking. Problem drinking need not be defined so narrowly. Daily moderate intoxication is more likely to lead to problem consequences than heavy intoxication once a year. If intoxication is to be used as a criterion of problem drinking, it is argued here that the frequency as well as the degree of intoxication must be considered.

In a subsequent study, Williams (1968) found a significant relation between frequent heavy drinking and anxiety. He stated that "through drinking, high PDS (problem drinkers) attain a state in which they can 'be themselves' without being so subject to criticism

or accountability" (p.362). Further, he suggested

"this benefit which high PDS receive from drinking would seem to be an appreciable one, and is likely to induce them to drink heavily and frequently. It may have contributed to their becoming high PDS and may eventually lead to their becoming alcoholics (p. 362).

A more recent paper by Cowan (1983) examined the escape hypothesis in a controlled laboratory study of adult normal drinkers. He found commonly used dosages of alcohol (4 or 5 drinks) neither impaired verbal nor pictorial memory. It did, however, impair memory for feelings without altering current feelings. The theoretical implications of this result are important. The research above has tended to find correlations between alcohol use and distress, using a variety of operational definitions. First, while it has widely been assumed that distress precedes alcohol use, correlational research has been unable to substantiate this assumption. Second, on the basis of this first assumption, it has been further hypothesized that alcohol somehow enables the individual to cope with their distress. While Williams (1966; 1968) demonstrated a relationship between alcohol use



and relief of distress, Cowan's findings directly demonstrate a process by which alcohol may enable one to "escape" the affective component of distress.

Lundin and Sawyer (1965) found a weak positive relationship between anxiety and frequency of alcohol use and intoxication. Igra and Moos (1979) found a weak but significant relationship between stress and alcohol use at Time-One and Time-Two in a cross lag study. Ratliff and Burkhart (1984) found more health problems in heavier drinking college students. Contrary to the usual pattern of findings, however, they found students with high alcohol quantity/frequency scores less anxious than lighter drinkers. This finding corroborated an earlier study by Schwarz, Burkhart, and Green (1982).

Brooks, Walfish, Stenmark and Canger (1981) found extremely high trait anxiety positively related to negative social consequences resulting from drinking. Orford, Waller, and Peto (1974) found a positive relationship between high neuroticism on the Eysenck Personality Inventory (Eysenck & Eysenck, 1964) and negative social drinking consequences. Parker (1975; in Brennan et al., 1986) found higher levels of neuroticism related to problem drinking in women

college students.

### Summary

There would seem to be a well established connection between stress and alcohol use. Reports on the specific nature of that relationship, however, remain somewhat contentious. Scores on indices of problem drinking appear to be consistently predicted by different measures of anxiety and stress. "Heavy drinking" assessed by alcohol quantity measures, however, are not consistent with this relationship. This suggests that "heavy drinking" is not necessarily indicative of "problem drinking."

The present study will examine the relationship of stress not only to alcohol use, but to the number of drinking related negative consequences, which are indicative of problem drinking. Stress will be measured by two different scales, both specifically designed to measure stress in college aged normal individuals.

### **Alcohol Outcome Expectancy**

Expectation of positive benefits from alcohol use

is a recent variable to emerge in the alcohol literature. Research suggests that alcohol outcome expectancy is a potent mediator of alcohol use as well as other alcohol related behaviors.

Marlatt and Rohsenow (1980) found that expectancies were more powerful than the pharmacological effects of alcohol in determining consumptive as well as social behaviors. The magnitude of the effect of alcohol outcome expectancy was demonstrated in a study by Rohsenow (1983). He found the belief that alcohol had been consumed resulted in a sense of loss of control and alcohol craving in addition to changes in social anxiety, aggression, sexual arousal and levity among alcoholics. This effect was independent of actual alcohol consumption. In an earlier laboratory study, Marlatt, Demming and Reid (1973) found that the estimated alcohol content of beverages administered to non-abstinent alcoholics and social drinkers depended on "set" (the induced belief that they had consumed either alcohol or tonic). Additionally, it was noted that subjective reports of intoxication followed the belief that alcohol had been ingested. As an additional control, participant blood-alcohol content was measured to ensure there was

sufficient alcohol in the blood to be above accepted threshold for obtaining pharmacological effects. There was no interaction between set and actual beverage consumed.

Alcohol expectancies have also been compared with other known potent predictors of alcohol use. Christiansen and Goldman (1983) compared alcohol outcome expectancy with age, parental drinking and religiosity in predicting alcohol use among adolescents aged 12-19. They found that alcohol outcome expectancy predicted frequency of drinking as well as problem drinking better than a combination of these other variables. Extending these findings, Brown (1985a) found alcohol outcome expectancy was a better predictor of drinking and problem drinking than gender, age, ethnicity, marital status, socio-economic status, religiosity and family history of alcohol problems among college students.

Other research on the expectations of positive benefits from alcohol use have serious implications for the development of problem drinking. Christiansen and Goldman (1983) found adolescents aged 12 to 14 already had alcohol expectancies paralleling those of adult drinkers. Further, they found expectancies remained

remarkably consistent irrespective of increasing age or substantial experience with alcohol use. On this basis, they argue that alcohol expectancies develop independently of actual alcohol use.

The long reaching implications for problem drinking have been demonstrated by Zarantonello (1986). He reported expectations for reinforcing benefits from alcohol use were related to abusive drinking among a clinical sample of patients admitted for alcohol treatment. Alcoholic inpatients were compared to a sample of non-problem drinking patients, using Brown, Goldman, Inn and Anderson's (1980) Alcohol Expectancy Questionnaire (AEQ). Inpatients specifically expected more global positive changes, greater increases in social assertiveness, greater enhancement of social and physical pleasure, and greater reduction in tension. These results parallel Brown, Goldman and Christiansen's (1985) earlier findings that greater alcohol outcome expectancy is related to abusive and excessive alcohol use among college and non-college drinkers. Further, Brown (1985b) found alcohol outcome expectancy was related to alcoholism treatment failure at one year follow-up. Interestingly, it was the specific expectation that alcohol leads to tension

reduction that was most strongly related to this outcome.

The current study will investigate the positive alcohol outcome expectancy as a predictor of alcohol quantity/frequency as well as problem drinking in a university undergraduate population.

### Gender Differences

In a review of literature examining gender differences in alcohol use among college students, Brennan et al. (1986) presented research findings which consistently reported higher rates of alcohol use for males. This was measured in terms of quantity, frequency, or quantity and frequency of alcohol use (e.g. Straus & Bacon, 1953; Orford et al., 1974; Stokes, 1974; Engs, 1977; Rosenbluth, Nathan, & Lawson, 1978; Kaplan, 1979; Wechsler & McFadden, 1979; and Rohsenow 1983). Also there were relatively higher rates of intoxication and negative social consequences resulting from drinking for males (e.g. Straus & Bacon, 1953; Orford et al, 1974; Wechsler & McFadden, 1979; Walfish, Wentz, Benzing Brennan & Champ, 1981; Shore, Rivers & Berman, 1983; and Humphrey, Stephens & Allen,

1983; cited in Brennan et al., 1986). In a six month longitudinal study, Igra and Moos (1979) found that while males drank more than females both at Time-One and Time-Two, females were more likely to increase their level of drinking relative to men over the six month period.

Some studies however have not found gender differences (e.g. Wechsler & McFadden, 1976; Abelson, Fishburn & Cisin, 1977; Hanson, 1977; cited in Kandel, 1980). This has lead these researchers to hypothesize a trend toward disappearing gender differences (e.g. Igra & Moos, 1979; Kandel, 1980).

Other recent studies which have found gender differences are interesting. Selnow (1985) and Selnow & Crano (1986) found males drank more alcohol than females. Addressing the controversy over gender differences, Selnow (1986) stated "little evidence can be found in [these] data to support the contention by some that...the male-female usage gap has become imperceptibly small" (p.337).

Perhaps the more important question is what could account for gender differences when they are found. One explanation has been that females appear to be more influenced than males by peer pressure (e.g. Forslund &

Gustafson, 1970; Igra & Moos, 1979). However, other research suggests males are more influenced by peer pressure. In a review of controlled studies, Collins and Marlatt (1981) found a strong tendency for college students to match the drinking rate of experimental confederates modeling heavy drinking. This modeling effect, contrary to the arguments by Igra and Moos (1979) and Kandel (1980), was particularly strong for males.

Attempting to identify a mediating variable which would account for the gender discrepancy in peer influence on alcohol use, Wilsnack and Wilsnack (1978) looked at the impact of varying gender roles on alcohol use among women. They reasoned that since women are traditionally expected to drink less than men, it might be expected that to the extent that women adopt less traditional, and more androgenous gender roles they would drink more. Gender roles, however, accounted for only a very small and insignificant proportion of the variance in female alcohol use.

### Summary

One of the most consistent findings in the alcohol literature has been that of gender differences--males



drinking more than females. However, the reason for this difference is not well understood. One popular explanation has rested upon differential effects of peer influences. Studies examining this explanation, however have had equivocal effects, with the more convincing evidence supporting peer pressure having a greater effect on males. Perhaps some of the discrepant research findings are due to differences in definitions of "alcohol use." This issue has often been neglected in the literature. The present study will utilize several predictors of alcohol use to improve the validity of the findings.

### **Statement of Purpose**

The first purpose of this study is to describe the rate of drinking, both in terms of quantity/frequency of alcohol use as well as problem drinking behaviors, among a sample of Nova Scotia university undergraduate students between the ages 18 and 25. These are the criterion variables being examined, and will be operationalized as scores obtained on the Quantity-Frequency Index of alcohol use (Calahan & Cisin, 1968) and the Straus-Bacon Problem Drinking Scale (Straus &

Bacon, 1953) respectively.

The second purpose is to address the important question of the validity of information provided by subjects on self-report measures. It cannot be assumed that the reported frequency and quantity of alcohol use is accurate (Bry, 1978). Some studies investigating the accuracy of self report measures in substance use research have supported their reliability and validity (e.g. Lavenhar, 1979; Porter, Vieira, Kaplan, Heesch & Coyne, 1973; Whitehead & Smart, 1972; in Kline et al., 1987). Smart et al. (1978), for example, found a lie scale (Eysenck & Eysenck, 1964) failed to predict the frequency and quantity of drinking or the occurrence of alcohol related problems. Orford et al. (1974), however, found the lie scale from the EPI was negatively related to a similar measure of negative social consequences of alcohol use. The evidence regarding the accuracy of reporting on problem drinking scales, to this point, has been equivocal.

While validity would be improved by corroborative measures employing alternate methods, such as blood serum level or peer reports, the prospect of doing so introduces ethical problems (Kline et al., 1987), as well as practical difficulties. The current study will

examine the validity of the self report measures, by administering the MMPI Lie scale.

Additionally, the criterion validity of the alcohol quantity/frequency and Straus-Bacon Problem Drinking scales will be examined by identifying a subsample among the student population who, it will be argued, drink more than the average of the student population--university pub "regulars" who drink early in the week, and early in the day. If there are differences in the quantity-frequency of alcohol use and negative alcohol related behaviors experienced by pub regulars, then to the extent that the Q-F Index and the Straus-Bacon Problem Drinking Scale have criterion validity, they will be sensitive to those differences.

The third purpose of this study is to explore the relation of peer drinking with alcohol use and with problem drinking. Following Kline et al. (1987) a Quantity-Frequency Index of alcohol use will be used by subjects with reference to each of their three closest friends.

The fourth purpose of this study is to identify the relationship of stress with alcohol use and with problem drinking. Stress will be operationalized as the score obtained on Burks and Martin's (1985)

Everyday Problem Scale, as well as the Hassles Scale (Kanner, Coyne, Schaefer & Lazarus, 1981).

Fifth, the relationships of alcohol use and problem drinking with the expectation of positive benefits as a result of using alcohol will be determined. Expectation of positive benefits from drinking will be measured using 30 items from Brown et al.'s (1980) Alcohol Expectancy Questionnaire.

The sixth purpose is to examine the relationship between psychological sense of community and the two alcohol use dependent measures will be investigated. Sense of community will be operationalized as the score obtained on the short form of the Sense of Community Index (Chavis, Florin, Rich & Wandersman, 1987).

The seventh purpose is to investigate gender differences in alcohol use and problem drinking in terms of differences in the other predictor variables.

### Hypotheses

#### Gender

It is hypothesized that gender will be related to the quantity-frequency of alcohol use and to alcohol related negative behaviors.

**Peer Modeling**

It is hypothesized that peer modeling will be related to alcohol use, and to negative drinking-related consequences.

**Stress**

It is hypothesized that daily stress will be related to alcohol use, and to negative drinking-related consequences.

**Positive Alcohol Use Expectancies**

It is hypothesized that expectations of positive benefits resulting from the use of alcohol will be related to alcohol use and negative drinking-related consequences.

**Psychological Sense of Community**

It is hypothesized that sense of community will be related to the quantity-frequency of alcohol use and negative drinking related consequences.

## METHOD

### Subjects

This study drew participants from the undergraduate population of Saint Mary's University and Technical University of Nova Scotia. Only participants aged 18 to 25 years were used in the analyses. Data collected from older and younger subjects were excluded. 346 questionnaires were completed, with an estimated 25 that were not returned. 300 questionnaires were from students within the age group of interest, 18 to 25 years. Two participants failed to specify gender. Of the 298 who did, 178 were female and 120 male. Due to missing data on the Quantity-Frequency, Straus-Bacon, Everyday Problems, Hassles, Alcohol Expectancy, Sense of Community, MMPI Lie scales, and the items regarding age and gender, total sample size for each data analysis varied between 285 and 300.

### Procedure

Questionnaires were administered in two

introductory psychology sections, a second year statistics section, a senior psychology seminar and a senior sociology seminar during class time at Saint Mary's University and to an introductory applied psychology class at Technical University of Nova Scotia. An additional group of participants was solicited in Saint Mary's University pub. Participants were instructed not to identify themselves on the questionnaire, assured of confidentiality, and informed they could withdraw from the study at any time. See appendix A for the standard verbal instructions given to the participants.

### Design

A stepwise multiple regression procedure was conducted in order to determine the proportion of variance of the criterion variables accounted for by the predictor variables, and to determine the relative contribution of each predictor to the explained variance. This particular regression procedure enters the predictor variables into a regression solution according to the order which maximizes prediction of the criterion variable. An equation taking the form

$$Y' = A + B[1] X[1] + B[2] X[2] \dots B[k] X[k]$$

is computed where  $Y'$  is the predicted score of the dependent measure, and  $B[1]$  through  $B[k]$  "represent the best fitting weights, with  $A$  as the value of  $Y'$  when all  $X$ s are zero" (Tabachnick & Fidel, 1983, p.96).

Second, the sample was split into derivation and validations subsamples with 213 and 87 participants in each. Separate stepwise regression solutions computed for each sub-sample in order to test the stability of predictors in predicting the criterion variables.

#### Validation Subsample

In an effort to test the criterion validity of the alcohol report measures, a sub-sample of 17 participants was selected. These individuals were solicited in the university pub, during the early afternoon, early in the week, with the assistance of the bartenders who indicated them to be pub "regulars." It is argued that a group of individuals who drink early in the day, and who are identified as doing so regularly, are likely to be heavier drinkers than the average university student. Their Q-F and S-BPDS scores were compared with an equal number of students



selected randomly from the main sample.

## Measures

### Alcohol Use

A Quantity-Frequency Index of alcohol first used by Calahan and Cisin (1968) was used to determine an average daily quantity of alcohol consumption (see Appendix B). Frequency of consumption of beer, wine, and hard liquor was measured by responses on a Likert type scale ranging from never to daily. Quantity of consumption was measured by responses ranging continuously from 0 to 12. The quantity of each type of beverage is multiplied by the proportion of alcohol content, and by the frequency of consumption, yielding an average amount of absolute alcohol consumed daily in ounces.

The Q-F Index has been used extensively in the alcohol use/abuse literature (e.g. Fondacaro & Heller, 1983; Jessor, Carman & Grossman, 1968). Downs (1985) reported its test-retest reliability at six weeks interval to be  $r = .85$ .

Negative behavioral consequences of alcohol use were measured by the Straus-Bacon Problem Drinking

Scale (Straus & Bacon, 1953). This eleven item questionnaire measures behaviors which are symptomatic of problem drinking (e.g. drinking before/instead of breakfast). Developed on a sample of university students, problem drinking is indicated by an affirmative response to at least one item (Appendix B). Despite an absence of psychometric data on Straus and Bacon's "scale," this symptom list and others like it have been used extensively in the alcohol research literature (e.g. Smart, 1985; Kline et al., 1987).

#### Peer Modeling

Following Kline et al. (1987), peer modeling of alcohol use was measured by taking an average of the Q-F reported by participants for their three closest friends (Appendix B).

#### Stress

Stress was measured by the Hassles Scale (Kanner et al., 1981), an index which measures stress in terms of life change events (Appendix B). Negative change events are more predictive of anxiety (e.g. Sarason, Johnson & Siegel, 1978) or physical symptoms (e.g. Gersten, Langner, Eisenberg & Simcha-Fagan, 1974;

Myers, Lindenthal & Pepper, 1974; Vinokur & Selzer, 1975; cited in Burks & Martin, 1985; Ross & Mirowsky, 1979) than positive change events. The types of change events measured include cognitive and emotional events (e.g. thoughts about death, being lonely), behavioral events (e.g. smoking too much, or using drugs), and health related events (e.g. physical illness, or concerns about general health). The Hassles Scale yields two stress scores, (1) a total, or number, score--the total number of items selected; and (2) an intensity score--the sum of subjective ratings of the severity of each item selected (1 = "somewhat severe," 2 = "moderately severe," or 3 = "extremely severe").

In a longitudinal study employing nine monthly re-testings, Kanner et al. (1981) found the Hassles Scale's average test-retest correlation to be .79 ( $p < .001$ ) for item frequency scores, and .48 for item severity scores. Kanner et al. (1981) also compared the Hassles Scale to alternate measures of stress. The average correlation of the nine monthly hassles scores with negative affect measured on the Bradburne Morale Scale was .34 ( $p < .001$ ). Additionally, the Hassles Scale, over nine months correlated .60 ( $p < .001$ ) with the Hopkins Symptom Checklist.

The Everyday Problem Scale (EPS) focusses on ongoing problems, rather than "change events," per se, many of which may be minor in nature (Burks & Martin, 1985; Appendix B). The EPS (Burks & Martin, 1985) is a measure of "ongoing problems and chronic hassles most likely to be experienced by undergraduate students" (p. 29). This measure correlated significantly ( $r = .42$ ,  $p < .001$ ) with the Hopkins Symptom Checklist, an instrument with demonstrated validity in terms of its sensitivity to change over time (Derogatis, Lipman, Rickels, Uhlenhuth & Covi, 1974; in Burks & Martin, 1985), as well as sensitivity to symptoms found in normal populations (Uhlenhuth, Lipman, Balter & Stern, 1974; in Burks & Martin, 1985).

The number of stressors selected on the EPS and the Hassles Scale have been correlated with the Life Experiences Survey (Sarason et al., 1978). Kanner et al. (1981) found an average correlation of .21 ( $n = 100$ ,  $p < .05$ ) in 9 retestings at monthly intervals. Burks and Martin (1985), on the other hand, reported a stronger correlation of .56 ( $n = 281$ ,  $p < .001$ ) between the EPS and the LES. Thus, while the Hassles may be a better predictor of stress related psychological symptoms, the EPS is more strongly related to life

change events related to stress.

Because participants in the present study will not be followed through time with multiple waves of data collection (as in Burks & Martin, 1985), the method of scoring the Hassles Scale was applied to the EPS.

### Positive Alcohol Expectancy

Brown et al.'s (1980) Alcohol Expectancy Questionnaire (AEQ) was used to measure expectancy of positive benefits from alcohol use. This six factor scale is comprised of 90-items, and was derived for use on university students. The six dimensions, or factors, include expectations that alcohol (1) will function as a global, positive transforming agent; (2) will enhance both social and physical pleasure; (3) will enhance sexual pleasure; (4) will arouse power and aggression; (5) will increase social assertiveness; and (6) will reduce tension and induce relaxation. For the purposes of this study an overall score representing a single variable dimension of "positive alcohol expectancy" was of interest. Alpha coefficients for the six AEQ scales range between .74 and .92, with an average of .84 (Brown, Christiansen & Godman (1987)).

Because separate factor scores were of less

interest than the need for brevity, only the 30 questions published in Brown's article were used. These 30 items represent those with the highest factor loadings on the six dimensions listed (Appendix B). As with the stress scales discussed above, two separate scores were derived for the Alcohol Expectancy Questionnaire (AEQ): (1) the number of items, out of 30, to which participants responded (AEQ #); and (2) an overall intensity score (AEQ (I)) calculated by summing the values of subjective ratings of agreement with each statement on a 3-point scale (1 = occasionally, 2 = often, 3 = always).

### Sense of Community

The short form of the Sense of Community Index was used to assess psychological sense of community (Chavis et al., 1987; Appendix B). This is a 12 item questionnaire utilizing a true/false question format. Separate factor scores are given for four components of sense of community: membership, influence, fulfillment of needs, and shared emotional connection. Reliability and criterion validity of this measure are quite good (Pretty, in press). Internal consistency (alpha coefficient) is reported at .71. Only the total sense

of community score was used in this study. Separate scores for each of the four dimensions will not be examined, as there is little evidence for their factor structure at this time.

### Social Patterns

Four items asked respondents about their attendance at specific social activities which are likely to include drinking (Appendix B). These items were scored on a Likert type multiple response scale.

### MMPI Scale-L

To assess response bias of the self report measures, the lie scale from the MMPI was administered, embedded within the Everyday Problem Scale (Appendix B). The incorporation of this method of checking the validity of self report scales is similar to attempts in earlier research by Smart, Gray and Bennet (1978) and Orford et al., (1974).

## RESULTS

### Reliability and Validity Issues

#### Stress Measures

##### Hassles Scale

Alpha coefficients of internal consistency were computed for both the Hassles intensity score and Hassles total score. Coefficients of .89 were obtained for both. Additionally, these scores were highly correlated ( $r = .93$ ,  $p < .001$ ).

Both Hassles scores also correlated negatively and significantly with the MMPI lie scale ( $r = -.15$ ,  $p < .01$  for both scores), suggesting a bias toward under-reporting both the number and intensity of daily hassles... Had this bias not been present, the relationships with the dependent measures discussed in the following sections may have been stronger.

##### Everyday Problem Scale

Alpha coefficients for the EPS(I) and EPS # were .72 and .76, respectively. The two scores were highly intercorrelated ( $r = .92$ ,  $p < .001$ ).

In the present study the EPS and Hassles scales



were strongly correlated. Number of Hassles correlated with number of everyday problems  $r = .47$  ( $p < .001$ ), and intensity of everyday problems  $r = .56$  ( $p < .001$ ). Intensity of Hassles correlated with number of everyday problems  $r = .51$  ( $p < .001$ ), and with intensity of everyday problems  $r = .67$  ( $p < .001$ ).

#### Alcohol Expectancy Questionnaire

Alpha coefficients of internal consistency were computed for both intensity and total scores of the AEQ. The coefficients obtained were .88 and .84, respectively. The coefficient for total expectancies is identical with the coefficient of internal consistency calculated on the full 90-item AEQ (Brown et al., 1987). Intensity and total scores on the AEQ were strongly correlated at .89 ( $p < .001$ ).

Both intensity and total scores on the AEQ were moderately negatively correlated with the MMPI lie scale ( $r = -.43$ ,  $p < .001$ ; and  $r = -.40$ ,  $p < .001$  respectively). These relationships with the lie scale suggest a tendency toward under-reporting both number of items agreed with, and strength of agreement on items selected. Had this response bias been absent, the strength of the relation between positive alcohol

expectancy and both dependent measures might have been stronger.

### Alcohol Measures

#### Q-F

Test re-test reliability on the Q-F measure was earlier reported at .85. Alcohol quantity/frequency was not correlated with the MMPI lie scale.

#### Straus-Bacon Scale

An alpha coefficient of internal consistency was computed on the Straus-Bacon Scale. The obtained coefficient was .55. The Straus-Bacon Scale was negatively and significantly correlated with the MMPI lie scale, suggesting a tendency toward under-reporting negative drinking related consequences. Had this response bias not been present, all correlations with this criterion variable may have been stronger.

### Validation Subsample

Student t-tests were calculated on the Q-F and Straus-Bacon means for each sample. The pub sample drank significantly more, on average, than the general sample ( $t = 3.35$ ,  $p < .01$ ). The pub sample also had

significantly higher problem drinking scores, on average ( $t = 2.11$ ,  $p < .05$ ).

### **Variables Related to Alcohol Quantity-Frequency**

#### **Correlational Results**

Pearson Product-Moment correlation coefficients were computed to determine the relationship of alcohol use (Q-F) to gender, age, peer alcohol use, stress, psychological sense of community, cognitive expectancies of positive benefits from alcohol use, and pattern of social activity. Where relationships involve one dichotomous variable (eg, gender) point biserial correlation coefficients were computed (see Appendix C-2).

#### **Peer Alcohol Use**

The average quantity/frequency of alcohol use by students' three closest friends was positively related to their own alcohol quantity/frequency scores ( $r = .25$ ,  $p < .001$ ).

### Positive Alcohol Expectancies

Confirming the hypothesis, both the number (AEQ #) and overall intensity (AEQ (I)) of positive benefits expected through drinking were positively related to quantity/frequency of alcohol use (respectively,  $r = .20$ ,  $p < .001$  and  $r = .22$ ,  $p < .001$ ).

### Age

As hypothesized, quantity/frequency of alcohol use was positively correlated with age ( $r = .12$ ,  $p < .05$ ).

### Gender

Confirming the hypothesis, quantity/frequency of alcohol use was significantly correlated with gender ( $r = .24$ ,  $p < .001$ ), with males tending toward heavier, more frequent drinking.

### Pattern of Social Activity

Number of university sporting events observed since September as well as number of university social events attended were significantly related to quantity/frequency of alcohol use ( $r = .12$ ,  $p < .05$ ;  $r = .12$ ,  $p < .05$ ).

### Stepwise Regression of Alcohol Quantity-Frequency

A stepwise multiple regression procedure was conducted (Appendix C-3) to determine those variables which would best predict the quantity/frequency of alcohol use, using a criterion for entry of  $p < .05$ . Only gender, peer alcohol use and number of positive alcohol expectancies entered the regression equation. These variables accounted for 12 percent of the variance in alcohol use. Following the entry of gender, which accounted for 6 percent of the variance, only peer alcohol use, and positive alcohol expectancies contributed uniquely to the explained variance, respectively adding 4% and 2%.

Next, the sample was split to test the stability of predictors in separately derived stepwise regression equations. First, 213 students were randomly selected out of the total sample as the derivation sample, and a stepwise multiple regression equation was computed (Appendix C-4). Second, a stepwise multiple regression equation was computed on a validation sample comprised of the remaining 87 students (Appendix C-5).

Derivation and validation samples differed. Only peer alcohol use entered the regression solution for the derivation group. Peer alcohol use, intensity of

alcohol expectancy, and number of Hassles entered in the validation group. The proportion of explained variance in Q-F score was 2.3% and 64%, respectively.

### Gender Differences

Means and standard deviations for each variable were generated for males and females, and Student t-tests computed on the differences (Appendix C-6). Using a Bonferoni correction procedure (Rosenthal & Rosnow, 1984), t-tests showed that males and females differed in (a) alcohol quantity/frequency (males drank 1.4 oz/day; females drank .51 oz/day), (b) negative alcohol related consequences (males averaged 4.3; females averaged 3.0 negative consequences), and (c) age (males sampled were a year older than females). While the detected age difference is significant, this difference appears to have no implications for the study, and may reflect random error in sampling.

### Stepwise Regression Analysis of Alcohol Quantity-

#### Frequency by Gender

Separate regression models were constructed for male and female participants. For males, only peer alcohol use entered the regression equation, accounting

for 12% of the variance in quantity-frequency of alcohol use (Appendix C-7). For females, intensity of positive alcohol expectancy, and age entered the regression equation, accounting for 18.8% of the variance in Q-F score (Appendix C-8).

### **Variables Related to Straus-Bacon Problem Drinking**

#### **Correlational Analysis**

The relationship of Straus-Bacon Problem Drinking to gender, age, peer alcohol use, stress, psychological sense of community, and cognitive expectancies of positive benefits from alcohol use is reported in Appendix C-1. Where relationships involve one dichotomous variable, (e.g. gender) point biserial correlation coefficients were computed instead of Pearson Product moment coefficients.

#### **Gender**

As expected, there was a significant correlation between gender and the Straus-Bacon Problem Drinking Scale ( $r = .30$ ,  $p < .001$ ). As previously discussed, males reported having significantly more negative drinking consequences than females.

### Peer Alcohol Use

Confirming the hypothesis, there was a significant positive relationship between average alcohol quantity/frequency by the students' closest three friends and problem drinking ( $r = .27, p < .001$ ).

### Stress

The number and intensity of stressful events on the Hassles scale both correlated positively and significantly with problem drinking ( $r = .16, p < .01$ ; and  $r = .14, p < .01$ , respectively), as hypothesized. Contrary to expectations, neither score from the Everyday Problem Scale was significantly correlated with problem drinking.

### Positive Alcohol Expectancy

Both the number and intensity of positive alcohol expectancies were significantly and positively correlated with problem drinking ( $r = .55, p < .001$ ;  $r = .58, p < .001$ ), as expected.

### Pattern of Social Activity

Number of university sporting events observed (Sport-0) since September and proportion of occasions



alcohol was consumed in the company of people living nearby (Drink) were significantly related (Appendix C-2) to problem drinking behaviors ( $r = .09$ ,  $p < .01$ ;  $r = .18$ ,  $p < .001$ ).

#### MMPI L-Scale

The lie scale from the MMPI was negatively and significantly correlated with problem drinking ( $r = -.31$ ,  $p < .001$ ).

#### Stepwise Regression of Straus-Bacon Problem Drinking

A stepwise multiple regression procedure was conducted in order to determine which variables best predicted Straus-Bacon Problem Drinking scores using a criterion of  $p < .05$  for entry into the analysis (Appendix C-9). Intensity of alcohol expectancies, gender, number of alcohol expectancies, peer alcohol use, and number of Hassles entered the regression equation. Together, these variable accounted for 40.5% of the variance on the Straus-Bacon Scale.

Next, the overall sample was split into derivation and validations subsamples and separate regression solutions for problem drinking conducted to test the stability of predictors of the Straus-Bacon Problem

Drinking Scale. The derivation and validation equations differed. In the derivation equation, AEQ(I) and age entered. In the validation equation AEQ(I) and peer alcohol use entered. The proportion of explained variance was 37% and 33%, respectively.

### Stepwise Regression Analysis of Straus-Bacon Problem

#### Drinking by Gender

Separate stepwise multiple regression analyses were conducted for males and females. Intensity of alcohol expectancies, peer alcohol use, and intensity of Hassles, entered the equation, accounting for 40% of the variance in problem drinking. For females, intensity of alcohol expectancies entered the equation, accounting for 32% of the variance in problem drinking.

## GENERAL DISCUSSION

### Predicting College Student Alcohol Use

#### The Importance of Peer Alcohol Use

It was hypothesized that peer alcohol use would predict quantity/frequency of drinking behavior. The hypothesis was confirmed. The average alcohol quantity/frequency of consumption by students' three closest friends predicted their own alcohol use. This replicates and extends Kline et al.'s (1987) earlier finding for adolescents to a college sample. The present result is consistent with the findings of Britt and Campbell (1977), Igra and Moos (1979), and Orford et al. (1974) who found peer alcohol use predicted alcohol use by college students. This finding also corroborates Straus and Bacon (1953) and Gusfield (1961) who found fraternity membership, as well as number of friends in the fraternity predicted quantity of alcohol use, frequency of alcohol use, and classification of drinking behavior (abstainer, light drinker, moderate drinker, etc). It is also consistent with Collins and Marlatt's (1981) finding that heavy drinking confederate models influenced college students to match their heavy drinking.

### Sense of Community and Consumption

The expectation that sense of community would be related to alcohol use was based on earlier research of "formal" and "informal" reference group influence on alcohol use (e.g. Igra & Moos, 1979; Selnow & Crano, 1986). This research found that the degree of association with a group predicted the strength of the relationship between the individual's drinking behavior and that of the group. The more one associates with a group, the more one drinks like the group. This effect has been consistent whether the reference group has prescribed alcohol use (Selnow & Crano, 1986; Igra & Moos, 1979) or proscribed it (Selnow & Crano, 1986). No relationship between psychological sense of community and alcohol use, however, was found in the present study.

Perhaps this outcome should have been anticipated. Previous research accounted for the direction of influence of group norms (i.e. for or against alcohol use), likewise the alcohol norms of each subject's community of influence should have been accounted for, but were not. Had half the subjects been influenced toward more alcohol use by their community, and half equally influenced toward less alcohol use, a

correlation of zero would be expected. It cannot be concluded that a correlation of zero means there was no relationship between these variables. Without controlling for community norms, any correlation could not be interpreted.

### Gender Differences

Separate regression equations for males and females revealed interesting gender differences in alcohol quantity/frequency. For males, only peer alcohol use entered the regression solution. Alcohol expectancy did not contribute further to the explained variance. For females the picture was the reverse: alcohol expectancy accounted for most of the explained variance in alcohol quantity/frequency, while peer alcohol use was not a significant variable. Following alcohol expectancy, age explained an additional 3% of the variance in female alcohol use. Age was not a significant predictor of male alcohol use.

The significance of age for females but not males in the regression analysis is similar to an earlier finding of Hanson (1977). In his study relative to males, proportionally more fourth year than first year female college students drank. One explanation for an

effect of age on drinking for women but not men in college could be staggered development with respect to alcohol use. Adolescent research has demonstrated males experience their first intoxication two years earlier than females on the average (Fromme & Samson, 1983). Fromme and Samson (1983) have argued that age at first intoxication is a more significant predictor of adult alcohol use than age at first use of alcohol. If males and females experience similar development with respect to their drinking, but males begin earlier, then culmination may be expected at an earlier age for males than females. The present findings and Hanson's (1977) results suggest this developmental sequence has culminated for males by the age of college entry, while for females it continues at least until senior year.

Male participants had higher alcohol quantity/frequency scores than women in the present study. This outcome replicates previous findings by Straus and Bacon (1953), Orford et al. (1974) Engs (1977), Rosenbluth et al. (1978), Kaplan (1979), Rohsenow (1983), Selnow (1985), Selnow and Crano (1986), Stokes (1974) and Wechsler & McFadden (1979). There has, however, been a popular contention in the

literature (e.g. Igra & Moos, 1979; Kandel, 1980) that gender differences have been disappearing in recent years. Three studies widely cited as supporting this argument are Hanson (1977), Wechsler and McFadden (1976), and Wechsler and Thum (1973). What is unclear from these studies is what kind of differences are disappearing (i.e. quantity, frequency, or proportion of drinkers). Kandel (1980), for example, cited both the Hanson, and Wechsler and McFadden studies as evidencing decreasing gender differences, but did not specify what these differences were. Subsequent discussion, however, suggests she was referring to differences in the proportion of male and female users. Igra and Moos (1979), on the other hand, interpret the Wechsler and McFadden, and Wechsler and Thum studies as supporting disappearing differences in the quantity of alcohol use. These three studies central to the disappearing gender gap hypothesis deserve some discussion.

In a sample of 1751 seventh to twelfth grade adolescents, Wechsler and McFadden (1976) reported finding no gender differences in the rates of drinking, number of heavy drinkers, level of intoxication, or frequency of intoxication. However, these findings

may be the result of methodological irregularities. Each criterion variable was assessed by a single item. "Alcohol use" was operationalized as having had a drink of beer, wine or liquor in the last year; "frequent alcohol use" was having had ten or more drinks over the last year. "Intoxication" was operationalized as having been drunk at least once in the last year, and "frequent intoxication" was having been drunk five or more times in the last year. Items were categorically answered "yes" or "no."

Unlike Wechsler and McFadden (1976), most researchers in the area have been careful to use more robust and extensive indicators of alcohol use. Measures based on Calahan and Cisin's (1968) quantity-frequency index, for example, are the standard yielding a daily average in ounces of absolute alcohol consumed. If one was especially interested in studying differences in the degree of use between males and females, it would be prudent to use such a measure of demonstrated comprehensiveness and reliability. Wechsler and McFadden, however, did not use comprehensive measures. Instead, their "measures" reduced all possible diversity in the criterion behaviors to only two response options. It is argued



that Wechsler and McFadden's study yields dubious support for the contention of disappearing gender differences.

In an earlier study by Wechsler and Thum (1973) even less evidence of disappearing gender effects was obtained in a similarly cursory study of substance use by sixth to twelfth grade adolescents. Despite similarly inadequate dependent measures males and females differed in alcohol use criteria, except for equal proportions of heavy drinkers ("users who reported that they had been drunk" at least once in the last year), among highschool seniors (p.1222).

Inferring support for the diminishing gender effect hypothesis (e.g. Kandel, 1980) from Hanson's (1977) study is even more dubious than from the previous studies. Hanson examined a university undergraduate sample, and found that compared to Straus and Bacon's (1953) findings, a higher proportion of first year students, both male and female, drank. He did note that among seniors the percentage of female drinkers approached that of male drinkers. This was not, however, the trend in the overall sample. With respect to disappearing gender effects, Hanson stated that "studies have consistently reported a higher

proportion of drinkers among males than among females. While the absolute rates vary by time and place, the sex differential has remained" (1977, p.19). He did not interpret his results to be an exception to the usual differences.

There is much evidence in the literature pointing to gender differences in favor of a higher proportion of male drinkers, heavier drinking by males, and more negative alcohol related consequences experienced by males who drink. The current findings support the earlier literature regarding the latter two. There has been a popular argument that gender differences have been disappearing in recent years. This argument is bolstered by a select few, but frequently cited studies. Three of the studies central to this position have been examined and discussed. It is suggested that there is a lack of evidence to support the hypothesis of disappearing gender effects.

#### Age and Alcohol Use

In the present study individuals tended to drink more with increasing age, as expected. The relationship between age and alcohol use has been of interest in research on adolescents. A strong positive

relationship between these variables has consistently been demonstrated (e.g. Kline et al., 1987; Selnow, 1985; Selnow & Crano, 1986). The importance of this relationship has been interpreted in the context of a developmental perspective on alcohol and drug use (Kandel, 1980). Kandel (1980) suggested it is important "to chart the development of the various problem behaviors to determine whether there tends to be a typical, though not necessarily invariant, sequence among them" (p. 257). In the adult research literature; however, the relation between age and alcohol use has been virtually ignored. The present finding suggests examination of age effects are appropriate beyond adolescence at least into early adulthood.

#### Alcohol Expectancies and Consumption

Positive alcohol expectancies were positively related to alcohol quantity/frequency. This outcome is consistent with that of Rohsenow (1983) who reported classification of drinking behavior (light, moderate, and heavy drinker) was positively related to the number of positive alcohol expectancies. These results also replicate Brown's (1985a) who found alcohol expectancy

predicted the pattern of alcohol use.

In a multiple regression analysis, however, Brown (1985a) found expectancy a more important predictor of alcohol quantity/frequency than age or gender. Unlike Brown's study, in the present regression analysis age did not enter, and gender entered ahead of expectancy. There are, however, a number of important differences between the two studies which may account for some of the discrepancies between findings. A brief 30-item version of the Alcohol Expectancy Questionnaire (Brown et al., 1980), was used in the present study rather than the complete 90-item form. One consequence of relatively shorter questionnaires is lower correlations (Kaplan & Saccuzzo, 1982). Thus attenuation due to the brevity of the measure may have resulted in a relatively weaker correlation between expectancy and alcohol quantity/frequency. Additionally, Brown examined a sample of undergraduates from a university in California. Her subjects may represent a different population from the undergraduates chosen from Nova Scotia universities in the present study.

### Stress and Alcohol Use

Contrary to the hypothesis, stress,

operationalized as daily hassles and ongoing problems failed to predict alcohol use. These findings contrast previous research by Lundin and Sawyer (1965) and Igra and Moos (1979) who found small but significant positive relationships between stress and alcohol use in college students. The discrepancy may be due to the different measures of stress employed. While stress was measured in terms of daily hassles and ongoing problems in the present study, Igra and Moos (1979) operationalized "stress" as physical symptoms (e.g. back pains, upset stomach, cold sweats, etc) and mood (e.g. bored, lonely, depressed, etc.). It is possible that indices measuring stress in terms of physical and psychological symptoms are more sensitive than the behavioral daily stressor-type indices used here.

Alternatively, different indicators of "stress" may vary in terms of their relationship to alcohol use. Stress has been defined many different ways in the alcohol and substance use literature, including trait anxiety (Brooks et al., 1981; Ratliff & Burkhart, 1984), daily events or "hassles" (Kanner et al. 1981), ongoing problems (Burks & Martin, 1985), depression (e.g. Williams, 1966; 1968), maladjustment (e.g. Cross & Davis, 1972), and physical symptoms (Igra & Moos,

1979). There has been an assumption in the literature that all will relate to alcohol in the same way, as though all these measures are interchangeable. Ratliff and Burkhart's (1984) finding that heavy drinking was positively related to stress, operationalized as health problems, but negatively related to trait anxiety suggests this is an erroneous assumption. It cannot be assumed that stress as defined here is the same as Lundin and Sawyer's (1965) and Igra and Moos' (1979) definition of stress. Consequently, our respective findings are not directly comparable.

### Psychometric Issues

#### Stability of Predictors

In order to test the stability of the predictors of alcohol use, the sample was randomly divided into derivation and cross-validation sub-samples and separate regression analyses performed on each. Peer alcohol use emerged as the only consistent predictor of alcohol quantity/frequency score.

Despite differences between the regression solutions, the important finding was the consistency of peer alcohol use between the sub-samples as well as in

the overall regression analysis. This consistency confirms the stability of peer alcohol use in predicting alcohol use.

The instability of these analyses, owing to different sample sizes, was expected and was not a problem because meticulous scrutiny of all the differences between derivation and validation samples was not intended. Meticulous scrutiny of the separate analyses by gender, however, was intended. Because there was a large difference in the number of males and females, some of the differences in these regression analyses may be due to instability rather than to true differences between male and female alcohol use and negative drinking related consequences.

### Response Bias

The MMPI lie scale was unrelated to the alcohol quantity/frequency measure. This result is consistent with the widely held belief that participants do not systematically tend toward either over or under-reporting their alcohol use. This finding corroborates Smart et al. (1978) who found no relation between the EPI lie scale and the quantity/frequency index.

### **Criterion Validity**

While the reliability of the alcohol quantity/frequency index has previously been demonstrated (Downs, 1985), its validity has not been demonstrated. Pub "regulars" were found to drink significantly more than other subjects. This difference supports the criterion validity of the alcohol quantity/frequency index--differences between two populations of drinkers were detected by the measure.

### **Predicting Problem Drinking**

#### **Alcohol Expectancies and Problem Drinking**

Positive alcohol expectancies were positively related to negative drinking consequences. This result corroborates Brown's (1985a) finding. Further, the present multiple regression outcome replicates her regression findings that alcohol expectancy predicted problem drinking better than gender or age among college students. The present study is an important confirmation of Brown's (1985a) findings.

#### **Gender Differences**

Separate regression analyses for females and males



revealed interesting differences in Straus-Bacon Problem Drinking scores. For women, problem drinking was predicted by positive alcohol outcome expectancies. There were more variables involved for men. In addition to positive outcome expectancies, peer alcohol use and stress contributed to problem drinking. Perhaps it was the contributions of these additional variables that was responsible for the relatively higher rate of negative alcohol related consequences experienced by men in this study. With fewer variables contributing to female problem drinking scores, it is argued here that the women in this study had fewer reasons to drink in a manner that would precipitate negative drinking consequences.

Higher problem drinking scores among males replicates earlier findings by Straus and Bacon (1953), Orford et al. (1974), Wechsler and McFadden (1979), Walfish et al. (1981), and Shore et al. (1983).

#### Peer Alcohol Use and Problem Drinking

It was hypothesized that peer alcohol use would predict negative drinking consequences. The hypothesis was confirmed. While few studies have looked at the influence of peer modeling on problem drinking, the

present finding corroborates Orford et al.'s (1974) finding that peer drinking was related to a measure of social complications resulting from alcohol use. Results of separate regression analysis by gender, however, extend previous research by identifying peer influence as contributing uniquely to the prediction of problem drinking for males but not females.

### Social Functions and Problem Drinking

The number of university social functions attended predicted the amount of alcohol use, but was unrelated to problem drinking. This finding is similar to Igra and Moos (1979) finding that the number of formal university social group activities attended predicted heavier drinking.

The number of sporting events attended as a spectator predicted both alcohol use, and negative drinking consequences. The proportion of occasions on which individuals drank with people who live nearby was related to problem drinking consequences, but not alcohol quantity/frequency behavior.

### Stress and Problem Drinking

Confirming the hypothesis, stress was weakly

related to negative drinking consequences. This finding is consistent with a similar study by Brooks et al. (1981) who found trait anxiety positively related to a problem drinking scale. Their dependent measure is similar to the Straus-Bacon Problem Drinking Scale, in that items enquire for negative behavioral consequences of alcohol use, including legal, educational, psychosocial, and physical problems. This result is also consistent with Parker (1975; in Brennan et al., 1986) who found neuroticism related to an index of problem drinking. Stress, defined as ongoing problems, however, was unrelated to problem drinking.

As suggested earlier, it is often assumed that different operational definitions of stress are directly comparable. Some research (Ratliff & Burkhardt, 1984) disputes this assumption with respect to drinking behavior. However, for problem drinking there has been a consensus on its relationship with different operational definitions of stress. The present findings suggest a similar conclusion for problem drinking. Not all measures of stress are interchangeable. Life change events predicted problem drinking, but ongoing problems did not.

## Psychometric Issues

### Stability of Predictors

In order to test the stability of the predictors of negative drinking consequences the sample was randomly divided into derivation and cross-validation sub-samples and separate regression analyses performed on each. Despite differences between sub-sample regression solutions, the important result of this analysis was the consistency with which alcohol expectancy predicted negative drinking consequences. This consistency confirms the stability of this variable in predicting problem drinking.

### Response Bias

The Straus-Bacon Scale was negatively related to the MMPI lie scale, suggesting a bias toward under-reporting alcohol related negative drinking consequences. This result is inconsistent with Smart et al. (1978) who found no relation between the EPI lie scale and the Straus-Bacon measure. However, it is consistent with Orford et al. (1974) who found a negative relationship between the EPI lie scale and a measure of negative alcohol related social consequences similar to the Straus-Bacon Scale.

The contrasting relationships between the criterion variables and the MMPI lie scale can perhaps be explained in terms of value judgements about the meaning of responses on each measure. The Q/F index has alcohol quantity selections ranging from "do not drink...at all" to "twelve or more" [beverages], and alcohol frequency response selections ranging from "do not drink at all," to "every day." Unless the individual is responding at, or close to the ceiling on questionnaire items, it seems unlikely that responses should imply social censure. To admit to one more drink does not cause the respondent to perceive themselves in a less favorable light. This is not the case on the Straus-Bacon Problem Drinking Scale. While the questionnaire is not labelled as a problem drinking measure, it is obvious that having experienced more items on this list (e.g. drinking having adversely affected class work, caused tension and family disagreement, or trouble with the police) is less socially desirable. Similar judgements may have been applied when answering the Hassles Scale and the Alcohol Expectancy Questionnaire resulting in their negative correlations with the MMPI lie scale. Hence, researchers intending to use these measures should

question the validity of responses, and guard against bias by using a lie scale. Researchers may also benefit by taking greater pains to motivate participants to answer more accurately. These findings suggest unbiased responding cannot be relied upon on these measures.

### Criterion Validity

The criterion validity of the Straus-Bacon Problem Drinking Scale has not previously been examined. Pub "regulars" were found to experience significantly more negative drinking consequences than other subjects. This difference supports the criterion validity of the SBPDS--differences between two populations of drinkers were detected by the measure.

### Implications for Prevention and Treatment Programmes

The meaning of the findings, and consequently their generalizability may be limited by sample self-selection. It was estimated that 25 individuals did not return their questionnaires. As a result, it cannot be known what effect these individuals may have had on the results. Also, because sample selection was restricted to undergraduates at two maritime

Canadian universities, generalization of these findings is limited to other similar undergraduates.

But even for this limited group of young adults, this study has important implications for prevention and treatment of alcohol use leading to undesirable alcohol related consequences.

Prevention programmes should have broad targetting objectives. They might address all undergraduates who drink, for example, and focus specifically on the amount of alcohol use. This research suggests different emphases for men and women are warranted. For men, emphasis should be placed on peer selection. Choosing friends who drink less than oneself might be recommended. For women, emphasis should be placed on their expectation of positive benefits deriving from alcohol use. Persuasive arguments should be used to counter the effects of specific expectations.

Treatment programmes should focus on problem drinking--drinking to a degree that negative behavioral consequences are experienced. Again, this research indicates different approaches for men and women. For both women and men, most emphasis should be placed on persuasive arguments to counter the effects of alcohol outcome expectancies. For men, additional should be

devoted to facilitating changes in peer association to include spending less time with heavy drinking peers and more time with lighter drinking or abstinent peers.

### Conclusions

These findings confirm previous research demonstrating the relationships of gender, peer alcohol use, positive alcohol expectancies, and age to alcohol use. They also confirm previous findings demonstrating the relationships of positive alcohol expectancies, gender, peer alcohol use, stress, to problem drinking. The present findings also contribute to previous knowledge in demonstrating a relationship between pattern of social behaviors and both alcohol use and problem drinking.

Stress, defined as life change events predicted problem drinking; stress, defined as ongoing problems did not predict problem drinking. Neither form of stress predicted drinking behavior. Previous research suggests not all measures of stress are related to alcohol use in the same way. These findings extend this research to problem drinking.

Most important are the multiple regression



findings demonstrating that for males and females different factors contributed uniquely to alcohol use as well as problem drinking. Peer drinking predicted male alcohol use, whereas for females it was the expectation of positive benefits resulting from drinking, and age. This gender difference in peer effects is an important contribution to the research literature. Research has, until now, invariably demonstrated the general importance of peer influence, but has not addressed male and female differences in this variable.

For males, expectations of positive benefits from drinking, peer alcohol use, and stress predicted problem drinking. For females, only the expectation of positive benefits from drinking entered the regression solution. Other variables did not make a significant unique contribution to the explained variance in female problem drinking. Again, this is an important contribution to previous literature which demonstrated the importance of stress and peer effects in problem drinking generally, but has not examined gender differences in these factors.

The MMPI Lie Scale was correlated with the other measures used in order to identify any systematic

tendency toward over- or under-reporting on the indices used. These findings do not support Bry's (1978) view that self-report measures are generally valid.

Instead, they suggest accurate reporting on some measures (Q/F Index for self and peers, Sense of Community Index, and Everyday Problem Scale), and systematic under-reporting on others (Straus-Bacon Scale, Hassles Scale, and Alcohol Expectancy Questionnaire).

#### Final Concerns and Comments

Some researchers (e.g. Kandel, 1980; Biddle, 1980) have argued that while adolescents are strongly influenced by peer drinking as they approach adulthood, it is their parents, and not their peers, who they plan to emulate in their future drinking practices. However, during college years young adults continue to be influenced by their peers in their drinking practices. Future research should include comparison of parental and peer influence on drinking behavior in early adulthood.

A greater concern than alcohol use is problem drinking. While the Straus-Bacon Problem Drinking

Scale used to measure negative drinking consequences has questionable psychometric status as an index of problem drinking, it, and other similar behavior lists, has been the most common means of investigating problem drinking. The relationship between peer use and negative drinking consequences has implications for treatment prevention and intervention. Selecting non-drinking peers may moderate drinking, and consequently, prevent or reduce problem drinking consequences.

Expecting treatment or prevention benefits through peer selection presupposes a causal effect of peer use on self use. The inability to make such causal assumptions is the pervasive weakness of the kind of correlational research utilized in this study. The causal influence of peer drinking on drinking by college students has, however, been demonstrated in a controlled experimental study by Marlatt (1981). Other variables such as positive alcohol expectancies may also be amenable to experimental manipulation through persuasive communication.

However, not all variables can be manipulated and be studied in rigorous controlled experiments. More use of structural equation modeling methodologies is recommended in researching weak causal inferences based

upon correlational data. These procedures test relationships against theories which postulate particular variables to be causally related to others. Findings, at best, may be consistent with such a theoretical interpretation of results. The pervasive drawback is that when one variable appears causally prior to another in the findings, the true relationship may actually be indirect through a variable that was not measured. This is essentially the same as the "third variable" problem in simple correlational research. It is only if all possible "third variables" are measured that the researcher be certain of a true causal relationship. Thus, these techniques may be of more use in ruling out causal relationships than ruling them in. Still, they hold promise for research in the area, and to this point have been under-utilized. In the meantime, studies such as this one help determine the variables that should be entered into such an equation model.

Further investigation into gender differences in the relationship of peer alcohol use, positive alcohol outcome expectancies, and age to alcohol use should be undertaken. With regard to problem drinking, gender differences in peer alcohol use and stress should be

further investigated.

With respect to the measures used, this research confirms the utility of the Q-F Index, the S-BPDS, the AEQ, and the MMPI Lie Scale. The stress scales were less important than was expected; the EPS was of no utility, and the Hassles Scale was only marginally useful suggesting, perhaps, that alternative operational definitions of stress are indicated for future research.

## Appendix A

### Instructions to Participants

My name is Brenton Crowhurst. I am a student working on my Master's degree in Psychology. Your instructor has given permission to ask your help in collecting information I need for my research. I am interested in finding out about the drinking patterns of university students. I have a questionnaire that I will ask you to fill out. In it, you will find some questions on your alcohol use, and that of your three closest friends. You will also find some questions regarding daily events you may experience. Completing this questionnaire is entirely voluntary, and you may stop at any time. The information will be kept completely anonymous and confidential. Please do not put your name on any of these forms. When you are finished, I will collect them. It is very important that you answer the questions honestly. If you have any questions, please ask now.

## Appendix B

### Sample Items from Indices Administered to Participants

#### Quantity-Frequency Index of Alcohol Use

1. How often do you usually drink beer?
  0. do not drink beer at all
  1. every day
  2. three or four days a week
  3. one or two days a week
  4. three or four days a month
  5. about once a month
  6. less than once a month, but at least once a year
  7. less than once a year
2. Think of all the times you have had beer recently. When you drink beer, how much do you usually have at one time, on the average?
  0. do not drink beer at all
  1. twelve or more cans/bottles of beer (two six-packs) or more
  2. about nine cans/bottles of beer
  3. six cans/bottles of beer
  4. five cans/bottles of beer
  5. four cans/bottles of beer
  6. three cans/bottles of beer
  7. two cans/bottles of beer
  8. one can/bottle of beer
  9. less than one can/bottle of beer

#### Straus-Bacon Scale

1. Has your drinking ever affected your classwork or exams so that you did not do so well?  
yes\_\_\_\_; no\_\_\_\_
2. Has your drinking ever caused tension or disagreement with family or friends?  
yes\_\_\_\_; no\_\_\_\_

3. Have you been in trouble with the police as a result of your drinking?

yes\_\_\_\_; no\_\_\_\_

#### Peer Information

1. How often does your friend usually drink beer?

- 0. does not drink beer at all
- 1. every day
- 2. three or four days a week
- 3. one or two days a week
- 4. three or four days a month
- 5. about once a month
- 6. less than once a month, but at least once a year
- 7. less than once a year

2. Think of all the times your friend has had beer recently. When s/he drinks beer, how much does s/he usually have at one time, on the average?

- 0. does not drink beer at all
- 1. twelve or more cans/bottles of beer (two six-packs) or more
- 2. about nine cans/bottles of beer
- 3. six cans/bottles of beer
- 4. five cans/bottles of beer
- 5. four cans/bottles of beer
- 6. three cans/bottles of beer
- 7. two cans/bottles of beer
- 8. one can/bottle of beer
- 9. less than one can/bottle of beer

#### Hassles Scale

1. Misplacing or losing things?

- [ ] somewhat severe;
- [ ] moderately severe;
- [ ] extremely severe



## 2. Troublesome neighbours?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## 3. Social obligations?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## 4. Inconsiderate smokers?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## Everyday Problem Scale

## 1. Too much schoolwork?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## 2. Doing worse in school than you expected?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## 3. Had problems with a professor?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

## 4. Decisions about course selection, major, or career?

- ☐ somewhat severe;
- ☐ moderately severe;
- ☐ extremely severe

### Alcohol Expectancy Questionnaire

1. Drinking alcohol makes the future seem brighter.

- ☐ never;
- ☐ occasionally;
- ☐ often;
- ☐ always.

2. Alcohol makes me more interesting.

- ☐ never;
- ☐ occasionally;
- ☐ often;
- ☐ always.

3. Drinking makes me feel good.

- ☐ never;
- ☐ occasionally;
- ☐ often;
- ☐ always.

4. After a few drinks, I am more sexually responsive.

- ☐ never;
- ☐ occasionally;
- ☐ often;
- ☐ always.

### Sense of Community Index

1. I think my block is a good place for me to live.

true\_\_\_\_; false\_\_\_\_.

2. I feel at home on this block.

true\_\_\_\_; false\_\_\_\_.

3. I care about what my neighbors think of my actions.

true\_\_\_\_; false\_\_\_\_.

4. It is very important to me to live on this particular block.

true\_\_\_\_; false\_\_\_\_.

### Social Patterns

1. How many sporting events or activities have you participated in since September?

- ☐ 0-4
- ☐ 5-9
- ☐ 10-14
- ☐ 15-19
- ☐ 20-24
- ☐ >24

2. How many sporting events or activities have you attended since September?

- ☐ 0-4
- ☐ 5-9
- ☐ 10-14
- ☐ 15-19
- ☐ 20-24
- ☐ >24

3. How many social events or activities associated with the university have you attended since September?

- ☐ 0-4
- ☐ 5-9
- ☐ 10-14
- ☐ 15-19
- ☐ 20-24
- ☐ >24

4. Of the times you have drunk alcohol in the company of others, what percentage of the time has sit been with people who you live with or near?

- ☐ no more than 1 out of 5 times (20% of the time)
- ☐ no more than 2 out of 5 times (40% of the time)
- ☐ no more than 3 out of 5 times (60% of the time)
- ☐ no more than 4 out of 5 times (80% of the time)
- ☐ more than 80% of the time.

## Appendix C

## Results of Statistical Analyses

Table 1

Q-F and Straus-Bacon Scale Means, Standard Deviations,  
and t-Values for Pub Vs. General Samples

Variable	Pub		General		t
	M	SD	M	SD	
QF	1.29	0.978	0.408	0.49	3.35 <sup>a</sup>
S-Bacon	4.65	2.40	2.88	2.40	2.40 <sup>b</sup>

<sup>a</sup> =  $p \leq .003$

<sup>b</sup> =  $p \leq .023$

Table 2  
Correlation Matrix for All Variables

Variables	1	2	3	4	5	6	7
1 Q-F	.85*						
2 S-Bacon	.32 <sup>a</sup>	.55 <sup>+</sup>					
3 Gender	.24 <sup>a</sup>	.30 <sup>a</sup>	--				
4 Age	.12 <sup>c</sup>	.07	.25 <sup>a</sup>	--			
5 SCI	.02	-.03	.02	-.01	.74 <sup>+</sup>		
6 Peer Use	.25 <sup>a</sup>	.27 <sup>a</sup>	.14 <sup>b</sup>	.04	.08	--	
7 EPB #	.004	.08	-.02	-.12 <sup>c</sup>	-.04	-.02	.76 <sup>+</sup>
8 EPB (I)	.002	.09	-.09	-.10 <sup>c</sup>	-.06	.004	.92 <sup>a</sup>
9 Hassle #	-.02	.16 <sup>b</sup>	-.08	-.14 <sup>b</sup>	-.08	-.03	.47 <sup>a</sup>
10 Hassle (I)	-.02	.14 <sup>b</sup>	-.12 <sup>c</sup>	-.14 <sup>b</sup>	-.08	-.01	.51 <sup>a</sup>
11 AEG #	.20 <sup>a</sup>	.55 <sup>a</sup>	.04	-.05	.03	.21 <sup>a</sup>	.03
12 AEG (I)	.22 <sup>a</sup>	.58 <sup>a</sup>	.09	-.10 <sup>c</sup>	-.03	.23 <sup>a</sup>	.07
13 L-Scale	-.01	-.31 <sup>a</sup>	-.06	.13 <sup>b</sup>	.03	-.01	-.09
14 Sport-D	.12 <sup>c</sup>	.09 <sup>b</sup>	.02	-.03	.12 <sup>b</sup>	.02	-.004
15 Sport-P	.08	.08	.13 <sup>c</sup>	.03	.16 <sup>b</sup>	.02	.09
16 Social	.12 <sup>c</sup>	.06	-.04	.01	.12 <sup>c</sup>	-.01	.01
17 Drink	.06	.18 <sup>a</sup>	-.06	-.10 <sup>c</sup>	.11 <sup>c</sup>	.07	.08

a =  $p < .001$

b =  $p < .01$

c =  $p < .05$

\* = 6-week test-retest reliability coefficient.

+ = Cronbach's alpha coefficient.

Table 2 (Continued)

Variables	8	9	10	11	12	13
8 EPB (I)	.72+					
9 Hassle #	.56 <sup>a</sup>	.89+				
10 Hassle (I)	.67 <sup>a</sup>	.93 <sup>a</sup>	.89+			
11 AED #	.05	.10 <sup>b</sup>	.10 <sup>b</sup>	.84+		
12 AED (I)	.10 <sup>b</sup>	.15 <sup>b</sup>	.18 <sup>a</sup>	.89 <sup>a</sup>	.88+	
13 L-Scale	-.09	-.15 <sup>b</sup>	-.15 <sup>b</sup>	-.40 <sup>a</sup>	-.43 <sup>a</sup>	.54+
14 Sport-O	.05	-.03	.03	.06	.07	-.02
15 Sport-P	.09	-.01	.03	.11 <sup>c</sup>	.14 <sup>b</sup>	-.06
16 Social	.04	.02	.05	.07	.09	.03
17 Drink	.07	.16 <sup>b</sup>	.16 <sup>b</sup>	.26 <sup>a</sup>	.27 <sup>a</sup>	-.09

\* = 6-week test-retest reliability coefficient.

+ = Cronbach's alpha coefficient.

Table 2 (Continued)

Variables	14	15	16	17
14 Sport-D	--			
15 Sport-P	.54 <sup>a</sup>	--		
16 Social	.39 <sup>a</sup>	.41 <sup>a</sup>	--	
17 Drink	.07	.08	.12 <sup>c</sup>	--

a =  $p < .001$

b =  $p < .01$

c =  $p < .05$

Table 3

**Stepwise Multiple Regression Analysis of Quantity-  
Frequency of Drinking Behavior**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
Gender	.06	.06	18.54 <sup>a</sup>	.22
Peer Alcohol	.11	.04	16.65 <sup>a</sup>	.18
AEQ #	.13	.02	13.85 <sup>a</sup>	.16

<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.



Table 4

**Stepwise Regression Analysis of the Quantity-Frequency  
of Drinking Behavior: Derivation Sample**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
Peer Alcohol Use	.028	.023	5.75 <sup>a</sup>	.17

<sup>a</sup> =  $p < .05$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

**Table 5**  
**Stepwise Regression Analysis of the Quantity-Frequency**  
**of Drinking Behavior: Validation Sample**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
Peer Alcohol Use	.60	.59	113.09 <sup>a</sup>	.69
AED (I)	.64	.04	65.63 <sup>a</sup>	.22
Hassles #	.66	.01	47.11 <sup>a</sup>	-.14

<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

**Table 6**  
**Variable Means, Standard Deviations, and t-Values for**  
**Male and Female Participants**

Variable	Males		Females		t
	M	SD	M	SD	
QF	1.4	2.5	0.51	0.56	3.63 <sup>a</sup>
S-Bacon	4.3	2.4	3.0	1.8	5.10 <sup>a</sup>
Age	20.9	1.9	20.0	1.5	4.32 <sup>a</sup>
SCI	7.05	2.8	7.0	2.8	0.29
Peer Use	1.4	1.2	0.97	1.6	2.50 <sup>a</sup>
EPB #	8.1	6.7	8.2	4.2	-0.25
EPB(I)	13.3	10.5	15.2	10.0	-1.62
Hassles #	20.9	15.8	23.2	14.1	-1.27
Hassles(I)	34.0	26.9	41.1	30.5	-2.12 <sup>a</sup>
AED #	20.8	6.6	20.2	6.3	0.73
AED(I)	62.3	13.6	60.0	13.0	-1.48
L-Scale	3.1	2.0	3.3	1.9	-0.95
Sport-O	1.62	1.06	1.59	1.06	0.30
Sport-P	2.08	1.49	1.71	1.29	2.22 <sup>a</sup>
Social	1.53	0.96	1.61	0.97	-0.67
Drink	3.43	1.63	3.63	1.7	-0.99

a =  $p < .001$

b =  $p < .01$

c =  $p < .05$

Note: maximum probability for significance is .0035,  
 allowing for a familywise error rate of .05 for all  
 unplanned comparisons.

Table 7

**Stepwise Multiple Regression Analysis of Quantity-  
Frequency of Drinking Behavior for Males**

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Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
Peer Alcohol	.13	.12	15.76 <sup>a</sup>	.35

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<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

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Table 8

**Stepwise Multiple Regression Analysis of Quantity-  
Frequency of Drinking Behavior for Females**

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Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AEQ(1)	.16	.16	32.5 <sup>a</sup>	.44
Age	.20	.028	20.35 <sup>a</sup>	.19

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a = p < .0001

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

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Table 9

**Stepwise Multiple Regression Analysis of Strauss-Bacon  
Problem Drinking**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AEB(1)	.32	.32	133.58 <sup>a</sup>	.30
Gender	.38	.06	87.76 <sup>a</sup>	.26
AEB #	.40	.01	61.29 <sup>a</sup>	.25
Peer Alcohol	.407	.009	47.56 <sup>a</sup>	.11
Hassles #	.415	.006	39.24 <sup>a</sup>	.09

<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

Table 10

**Stepwise Multiple Regression Analysis of Straus-Bacon  
Problem Drinking: Derivation Sample**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AED(I)	.358	.358	113.63 <sup>a</sup>	.61
Age	.373	.012	60.41 <sup>a</sup>	.12

<sup>a</sup> =  $p < .00001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

Table 11

**Stepwise Multiple Regression Analysis of Straus-Bacon  
Problem Drinking: Validation Sample**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AEQ(1)	.28	.27	29.19 <sup>a</sup>	.32
Peer Alcohol	.35	.06	20.35 <sup>a</sup>	.31

<sup>a</sup> =  $p < .00001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.



Table 12

**Stepwise Multiple Regression Analysis of Strauss-Bacon  
Problem Drinking for Males**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AED(I)	.34	.34	57.33 <sup>a</sup>	.46
Peer Alcohol	.38	.03	33.54 <sup>a</sup>	.23
Hassles (I)	.40	.03	25.58 <sup>a</sup>	.19

<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

Table 13

**Stepwise Multiple Regression Analysis of Straus-Bacon  
Problem Drinking for Females**

Variable Entered	R <sup>2</sup>	R <sup>2</sup> Change	F	Beta
AEG(1)	.33	.32	82.35 <sup>a</sup>	.57

<sup>a</sup> =  $p < .0001$

Only variables with F-values associated with a probability of less than .05 were selected for entry in the stepwise regression solution.

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