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## **DOCTOR OF PHILOSOPHY**

**An evaluation of two brief interventions aimed at reducing college students' alcohol use.**

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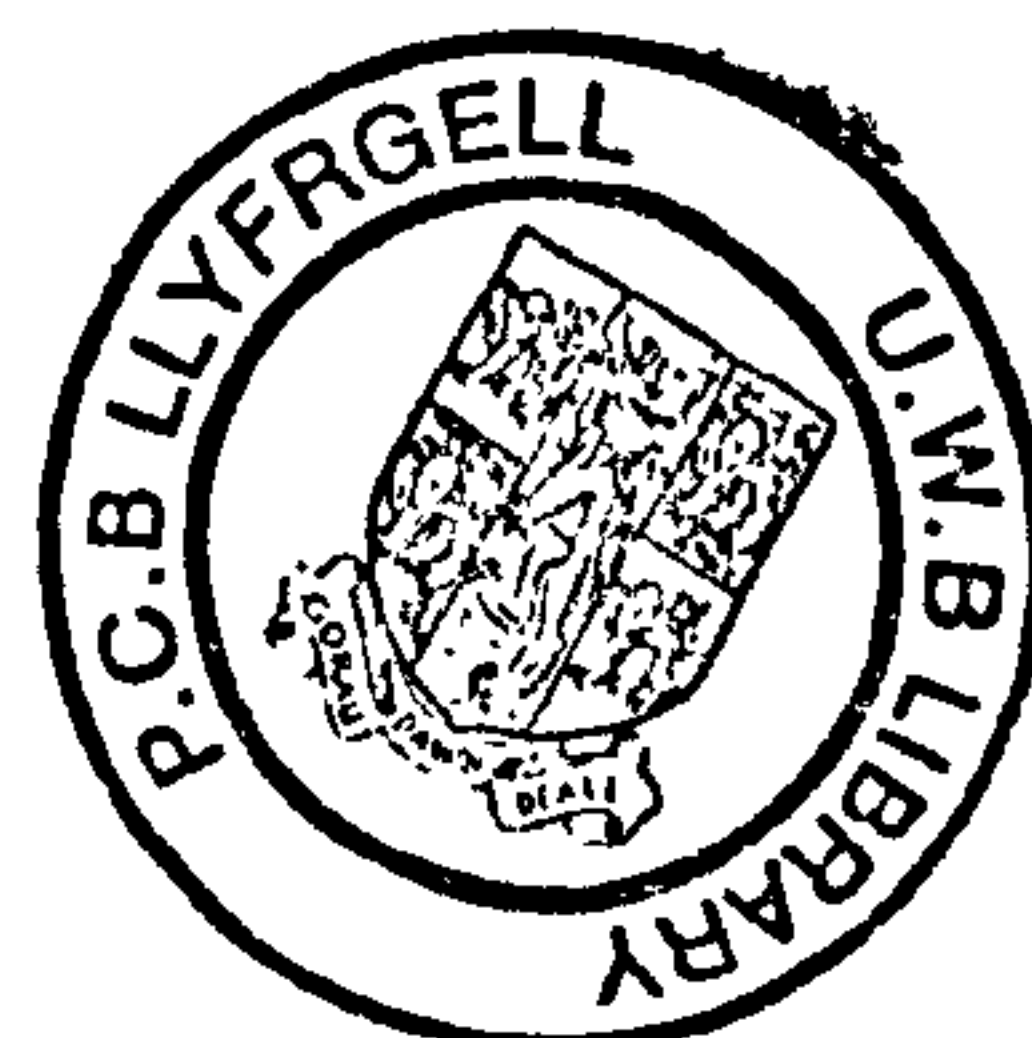
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An Evaluation of Two Brief Interventions Aimed at Reducing College  
Students' Alcohol Use

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## Abstract

College students' drinking patterns have been a cause for concern for a number of years. The present study evaluated the relative effectiveness of two brief interventions aimed at reducing alcohol consumption among heavy-drinking students. The first intervention delivered personalised feedback about students' alcohol use and other alcohol-related information. The other one delivered nonpersonalised feedback. It was hypothesised that the personalised feedback would be more successful than nonpersonalised feedback in motivating heavy-drinking students to reduce their alcohol consumption. The study began with a large-scale, screening survey of students' alcohol use. The survey first identified heavy-drinking students, who then completed a baseline assessment comprising questionnaire measures related to personality, motivation, reasons for drinking, high-risk drinking situations, and alcohol-related problems. Following the baseline assessment, the heavy-drinking students (n= 111) were randomly assigned to either one of three groups; personalised feedback, nonpersonalised feedback, or a non-intervention control group. Students (n= 110) in all three groups were followed-up 12 weeks after the interventions had been delivered. The results showed that personalised alcohol-related feedback produced the greatest increase in students' readiness to change their excessive drinking. However, there was no evidence for an effect of intervention on students' actual consumption. At baseline it was found that as students' alcohol-related problems increased there were also increases in (a) the amount of alcohol that they consumed, (b) the negative-affect situations in which they drank, and (c) their maladaptive motivational patterns. In fact, each of the latter three variables contributed uniquely to the variance in alcohol-related problems. The results were discussed from the perspective of a motivational model of alcohol use (Cox & Klinger, 1988). It was concluded that the findings of the present study have important implications for future brief interventions among students.

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## Chapter 1

### Alcohol Use Patterns, Related Factors, and the Use of Brief Interventions Among College Students

Since the early 1950s, university students' alcohol use has been regularly researched. In the United States, public health concerns have ensured that this subject has attracted continual attention. Ongoing national surveys have reported the prevalence of alcohol use and the rates of alcohol consumption among students. In addition, research has shown that many students consume alcohol in a manner that is harmful and hazardous to their health (see Engs, Diebold, & Hanson, 1996; Johnston, O'Malley, & Bachman, 1996; Presley, Meilman, & Lyerla, 1995; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994).

In the United States three major databases investigating college students' use of alcohol have been established. The oldest of these is the Monitoring the Future Study which, since 1980, has focused primarily on the prevalence of, and trends in, alcohol and other drug use. Using annual samples that ranged from a minimum of 1,040 to a maximum of 1,490 students, the study has sought to provide a representative picture of the consumption of alcohol and other drugs among traditional-age, American undergraduates (see Johnston, O'Malley, & Bachman, 1998).

The second major database is the Core Alcohol and Drug Survey, which, since 1989, has concentrated on the prevalence and consequences of alcohol and other drug use among students, age of first use, and family history of alcohol and drug problems. Cohorts covering two-year periods have averaged 43,000 students drawn from approximately 82 institutions. The results of the Core survey were intended to aid colleges to assess their particular concerns regarding students' alcohol use (see Presley, Meilman, Cashin, & Lyerla, 1996).

Finally, the College Alcohol Study surveyed 140 colleges in 1993, 133 colleges in 1997, and 128 in 1999 providing samples numbering 15,103 students in 1993, 14,521 in 1997, and 14,138 in 1999. Central to this study has been an examination of both the prevalence and consequences of alcohol use, paying special attention to binge drinking, and college alcohol

policies. The study's intention has been to present a nationally representative depiction of alcohol consumption among students (see Wechsler, Lee, Kuo, & Lee, 2000).

As Meilman, Cashin, McKillip, and Presley (1998) pointed out, there are similarities in the findings of the three databases despite differences in methodology. Notably, all three found similar proportions of students who practised binge drinking. Defined as drinking five or more drinks in a row in the last two weeks, the Monitoring the Future Study found a rate of 40.7 percent student binge drinkers in 1997, whilst the Core Alcohol and Drug Survey discovered a rate of 40.4 percent in 1994. The College Alcohol Study, on the other hand, found a slightly higher binge drinking rate of 44.1 percent in 1999, but this difference was largely attributable to the more stringent definition of binge drinking used in the study, namely five or more drinks in a row in the last two weeks for men and four or more for women.

Binge drinking has been consistently associated with a whole host of negative consequences. According to Dimeff and McNeely (2000), alcohol use is a factor in nearly all behavioural and health problems experienced by college students in the U.S.A., including impaired academic performance, vandalism and fighting, sexually transmitted diseases, and road traffic accidents and fatalities. The College Alcohol Study (Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler et al., 2000) has found that students who practised binge drinking were at increased risks for experiencing a range of educational, interpersonal, health, and safety problems. The range of problems included unplanned and unsafe sexual activity, physical and sexual assault, accidental injuries, criminal acts, interpersonal problems, physical and cognitive impairment, and poor academic performance (Wechsler, Davenport et al., 1994). In addition to the well established strong association between binge drinking and problems, it has been found also that students who do not binge drink are at an increased risk of experiencing adverse effects from other students' heavy drinking such as physical/sexual assault, having property damaged, and having study/sleep interrupted (Wechsler, Moeykens, Davenport,

Castillo, & Hansen, 1995).

### 1.1 Motivation for Drinking

What motivates a student to drink excessive amounts of alcohol in the face of the negative consequences described above? One easy answer, of course, is that the individual is unaware of the well-established link between drinking alcohol and the range of adverse consequences. However, Carey and Correia (1997) pointed out that the rate of problematic drinking among college students has remained largely unchanged despite the fact that the vast majority of college campuses operate alcohol education and alcohol abuse prevention programs. It is important, therefore, to understand the motivational variables that underlie alcohol use.

Many studies have investigated students' motives for drinking. Both personal and social motives, such as socialising with others, reducing tension, and enhancing mood, have been found to predict alcohol consumption (Abbey, Smith, & Scott, 1993; Billingham, Parrillo, & Gross, 1997; Goodwin, 1990; Haden & Edmundson, 1991; Smith, Abbey, & Scott, 1993; Wood, Nagoshi, & Dennis, 1992). Some of these studies have found that personal motives, such as drinking to enhance mood, predicted problem drinking (Billingham et al., 1993; Wood et al., 1992), whereas others discovered that social motives predicted non-problematic, albeit frequent, consumption of alcohol (Goodwin, 1990; Haden & Edmundson, 1991).

Cognitive-motivational models of alcohol use have been advanced to explain the relationship between motives for drinking and the quantity and pattern of an individual's alcohol consumption. Tension reduction theory, which developed from earlier drive reduction research and theory, proposed that drinking alcohol was a rewarding behaviour because it reduced tension in the form of various aversive, affective states such as fear, anxiety, conflict, and frustration. However, the evidence from research into the relationship between alcohol use and tension reduction has been confusing and contradictory (see Cappell & Greeley, 1987).

Closely related to, and developed in response to the results of studies into tension reduction theory, the stress response dampening model maintained that alcohol was particularly reinforcing when consumed in reaction to stress and stressful situations because it dampens the physiological stress response (see Sher, 1987). This effect was identified by Levenson, Sher, Grossman, Newman, and Newlin (1980) who found that alcohol consumption was related to a reduction in a variety of physiological and psychological stress responses among 96 male college students at Indiana University. In a further study, Sher and Levenson (1982) discovered that male college students who showed prealcoholic personality characteristics (outgoing, aggressive, impulsive, and antisocial) obtained greater stress response dampening effects than students with other personality characteristics.

Both tension reduction theory and the stress response dampening model have contributed to an understanding of the motivation for drinking although neither is considered as complete explanations. Cappell and Greeley (1987) concluded that the reduction of tension is only one of many motives for drinking and should be regarded as a valuable contribution to more complex models of alcohol use. Similarly, Sher (1987) recommended that the stress response dampening effect be viewed as a psychobiological component within the larger context of a cognitive-social learning theory of alcohol use.

The motivational model of alcohol use advanced by Cox and Klinger (1988, 1990) is an integrative approach that sets the decision an individual makes to drink or not to drink on a particular occasion within the framework of the wide range of biological, psychological, social, and cognitive elements that influence alcohol use. The decision to drink is based on the expectation that an overall positive affective change will result from the consumption of alcohol. An expectation of a change in affect in terms of either enhanced positive affect and/or reduced negative affect, therefore, is the basic goal that motivates an individual to drink.

A range of biopsychosocial factors contribute to the expectation that alcohol use will produce such an affective change. For instance,



biochemical reactivity to alcohol, personality characteristics, and sociocultural/environmental factors will have influenced an individual's past experiences with drinking. The effects of these factors will have been reinforcing either for drinking or not drinking, and in that way will form the current expectations an individual has about the affective consequences of drinking alcohol.

As well as past experiences of drinking, an individual's current life situation also will influence the decision to drink or not. Situational factors such as the availability of alcohol and a setting in which drinking occurs will contribute to that decision. Furthermore, the current incentives that an individual is pursuing in life will have a crucial impact on alcohol use because those incentives represent a primary source of the type of affect that is currently experienced. In other words, positive affective states are determined largely by current positive incentives and negative affective states are produced largely by current negative incentives. It follows then that having satisfying positive incentives in life and an adequate chance of achieving attractive goals will reduce the motivation to drink. By the same token, having unpleasant negative incentives and little possibility of avoiding aversive incentives will be likely to increase the motivation to drink.

Past experiences and current factors contribute in varying degrees to the set of beliefs, thoughts, memories, and perceptions, related to alcohol use, which are held by an individual. These cognitive processes, termed cognitive mediating events in Cox and Klinger's (1988, 1990) model, determine the type of expectations an individual will have regarding both the direct and indirect effects of alcohol consumption on affect. Consuming alcohol has a direct, chemical effect which is usually characterised as a positive change in affect in terms of reducing tension or enhancing mood. However, drinking can also produce, or be expected to produce, an affective change indirectly by achieving peer approval for instance. Direct and indirect effects may be seen in the example of a student who expects drinking to produce a positive, direct change in affect, as it has done in the past, by reducing the negative affect felt as a result of

receiving a poor grade. However, the student might also expect a negative, indirect change in affect because an evening's drinking, and the consequent hangover the next day, will disrupt revision for an examination at which it is imperative to do well since academic success is the leading, positive incentive in this particular student's life. In this instance, as in all others, the decision to drink or not is based on whether the expected positive effects of drinking outweigh the negative ones.

The direct and indirect expected effects of drinking alcohol, therefore, are weighed by an individual in terms of how his or her affect will be changed. The expected effects may be either positive by enhancing positive affect and/or reducing negative affect, or they may be negative by reducing positive affect and/or intensifying negative affect. If the net expected effects of drinking are positive then weight will be added to the decision to drink and the prospect of consuming alcohol will be attractive. In a similar way weight will be added to the decision not to drink if the expected effects are negative.

In summary, the decision an individual makes either to drink or not to drink on a particular occasion is influenced by an interaction among a range of biological, psychological, and sociocultural/environmental factors. The influence of these factors has served to shape an individual's past experiences of drinking in terms of either positive or negative effects. The immediate social/environmental context and the positive and negative incentives in an individual's life are the current factors that also will contribute to the decision to drink or not. Individuals, therefore, hold beliefs and perceptions that form the expectations they have about the effects of drinking alcohol. When the expected positive effects outweigh the negative ones then the individual will be motivated to drink rather than not to drink and vice versa.

It is a straightforward task to apply the motivational model of alcohol use (Cox & Klinger, 1988, 1990) to the college environment in an attempt to answer the question posed in the opening of this section. As Calamari and Cox (1997) explained, some students will be biologically predisposed to develop alcohol use problems. This predisposition, which

may be indicated by a positive family history of alcoholism, for example, will increase an individual's vulnerability to develop alcohol problems. Thus, a student may be at risk for drinking problems by virtue of a biologically based vulnerability, and he or she might develop alcohol use problems through an interaction between the vulnerability factor and environmental influences. Such an individual would have beliefs and expectations about the effects of alcohol based on past experiences with drinking. For example, he or she might expect alcohol use to facilitate relationships with the opposite sex and to alleviate anxiety and stress, despite the attendant hangovers. Drinking for these reasons is encouraged in the college environment and would bring further positive effects in the form of peer approval. However, the positive incentives in the student's life, such as academic success and leisure activities, may become disrupted by continued heavy drinking. In this situation is seen the beginning of one chain of events in which emotional satisfaction derived from nondrinking incentives is reduced, which leads to increased negative affect and makes further drinking more attractive, particularly as it still brings positive social rewards.

More scenarios featuring other students' drinking for different reasons could be composed. However, each situation would illustrate the crucial part played by the value, or weight, attached to the function drinking serves in a student's life. The decision to drink is the end of a dynamic process in which, although different reasons prevail at different times in different situations, drinking occurs when the expected positive effects outweigh the negative ones. In consequence, the student who values peer approval over academic success is liable to drink to the detriment of his or her college work, which will result in a false reflection of his or her ability. The range of factors found to be related to student drinking will now be reviewed, and each factor will be interpreted in terms of the motivational model of alcohol use.

## 1.2 Factors Related to College Student Drinking

### 1.2.1 Family History

A family history of alcoholism is an important predictor of problematic alcohol use (Chassin, Rogosch, & Barrera, 1991; MacDonald, Fleming, & Barry, 1991; Sher, 1991). However, the results from studies of family background and alcohol use among college students have been mixed. For example, whilst some studies found a link between family history and problem drinking (Berkowitz & Perkins, 1986; Kushner & Sher, 1993; Perkins & Berkowitz, 1991), other research failed to find an association between alcohol abuse in the family and students' alcohol consumption (Engs, 1990; Schall, Kemeny, & Maltzman, 1992).

It has been suggested that family history of alcoholism is possibly a more complex risk factor than first thought. Baer, Kivlahan, and Marlatt (1995) in a study of 366 University of Washington students found that family history did not predict level of consumption or alcohol problems. However, it was discovered that the students who reported familial alcoholism and who lived in fraternities reported less alcohol-related problems and symptoms of alcohol dependence than those residing in dormitories or off-campus. The authors concluded, with caution, that family history of alcoholism exerts an influence on college students' drinking in an interactive way with other factors, notably the place of residence.

In terms of the motivational model of alcohol use, it appears that family history of alcoholism is an indicator of a biological factor that can influence drinking. The increased vulnerability for developing a drinking problem that a positive family history of alcoholism indicates, seems to interact with environmental factors in the emergence of problematic alcohol use.

### 1.2.2 Personality Factors

There has been much research aimed at identifying personality characteristics that predate the emergence of problematic alcohol use. As a result of a variety of prospective and retrospective research (for a review see Cox, 1987; Cox, Yeates, Gilligan, & Hosier, 2001) nonconformity,

independence, impulsivity, hyperactivity, and antisocial behaviour have been identified as personality factors that reliably predict future alcohol problems.

An early archival study of college students (Loper, Kammeier, & Hoffman, 1973) found that first year undergraduates at the University of Minnesota who, 13 years later, received treatment for alcoholism scored significantly higher on three standard scales (F, Pd, and Ma) of the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943) than other students. It was inferred from their elevations on these scales that the students who later developed alcohol dependence were more impulsive, nonconforming, and gregarious than their classmates.

Personality characteristics such as those identified in the above study were the subject of research that investigated the stress response dampening effect of alcohol (Sher & Levenson, 1982). In two experiments it was discovered that those with prealcoholic characteristics (outgoing, aggressive, impulsive, and antisocial) obtained a greater stress dampening effect from drinking alcohol in comparison with other students. This finding was supported, albeit to a reduced degree, in a similar study by Sher and Walitzer (1986) of 96 male college students which concluded that, although there is a relationship between personality factors and the action of alcohol on a stress response, it appeared to be less important than was first thought.

Other studies have investigated the relationship between personality characteristics and student drinking. Berkowitz and Perkins (1986), Nagoshi, Wilson, and Rodriguez (1991), Schall et al. (1992), and Wood, Nagoshi, and Dennis (1992) all found that impulsivity was related to both alcohol use and alcohol problems, whereas Camatta and Nagoshi (1995) concluded, from a study of 135 students at Arizona State University, that impulsiveness and sensation seeking were positively related to the level of drinking but not to drinking problems. In addition, sensation seeking was found to be the best predictor of alcohol use among college students in research by Jaffe and Archer (1987), whilst La Grange, Jones,

Erb, and Reyes (1995), in an investigation of biochemical and personality correlates of 88 college students in New Mexico, discovered that disinhibition, as measured on the Sensation Seeking Scale (Zuckerman, 1979), was positively related to the frequency of alcohol use.

The role of personality characteristics in the decision to drink, according to the motivational model of alcohol use, would be to promote either drinking or not drinking. The research with college students suggests that those who are impulsive, nonconforming, and sensation seeking tend to drink more, and are more likely to suffer alcohol-related problems than other students. A student with these characteristics may drink for the immediate rewarding effects of alcohol whilst paying little or no regard to the negative consequences. In addition, such an individual would be more likely than others to be poorly motivated to conform to socially acceptable behaviour, preferring instead the approval of heavy drinking peers.

### 1.2.3 Previous Drinking

Consumption levels prior to university admission are strongly predictive of alcohol use once students are at college. Baer et al. (1995) studied 366 heavy drinking students as they made the transition from high school to college. Results showed that although these students were already heavy drinkers, the frequency of their consumption, the usual amount they drank per occasion, and the maximum amount they drank all increased from high school to college. As Baer et al. (1995) pointed out, it is not altogether surprising to detect a rise in consumption from high school to first year in college given the less socially constrained environment of living away from home in the company of other students. However, Wechsler, Isaac, Grodstein, and Sellers (1994) found that increases in alcohol use continued from the first to the second year of college. In this study 611 students surveyed in their first year at Massachusetts colleges were followed-up in their second year. The results revealed a continuing increased pattern of binge drinking that began in school or earlier, coupled with a transition from nonbinge drinker to binge drinker for more than a third of men and a fifth of women, although

students who had started drinking in their second year were light rather than heavy drinkers. These conclusions were supported by the results of a large survey of 17,592 students at 140 colleges across the U.S. which found that binge drinking in the last year of high school was a very strong predictor of heavy alcohol use at college (Wechsler, Dowdall, Davenport, & Castillo, 1995).

Clearly the research into students' drinking patterns as they moved from high school to college, and progressed through college, has shown that past experiences with alcohol contribute to the motivation to drink or not. It appears that the rewarding effects of alcohol that a student has experienced in the recent past ensured a continuing and increased pattern of heavy drinking.

#### 1.2.4 Social Context

The research that has investigated the social context in which college students consume alcohol is complementary to some extent to the studies of students' perceptions of normative drinking, which are discussed in a later section. Perceptions of social norms in general and those for drinking in particular, are influenced by a number of factors including the social setting in which an individual is situated. However, as Schall et al. (1992) in a study of 598 students suggested, the relationship between drinking and social influences is not straightforward. For example, fraternities and sororities are well established as living environments in which heavy drinking is promoted and, therefore, will attract students who are disposed toward drinking and already drink more than other students. Furthermore admittance to a fraternity is more likely for a student who is accepting of the heavy drinking ethos. Hence, some differences in alcohol use among students are the result of self-selection of residence. In other words, students who are already heavy drinkers are likely to choose to live in heavy drinking environments. Schall et al. (1992) clearly illustrated this by pointing out that 79 per cent of the students they studied were first year undergraduates in the first month of term and, therefore, not in a position to be drinking heavily as a result of social influences.

Social influences do play a part, of course. As we have seen, some alcohol-related behaviours are socially acceptable on campus, and place of residence may promote specific drinking styles (Baer, 1994). Furthermore, as Wechsler, Dowdall, et al. (1995) made plain, binge drinking appears inextricably linked to important social factors in student life, such as parties, involvement in athletics, living situation, and interaction with friends. Research on "drinking games" on campus has illustrated this point. These games typically are drinking contests, the point of which is to identify the student who can consume the greatest amount of alcohol, or they involve the performance of a particular task while intoxicated and feature the consumption of large amounts of alcohol. Nagoshi, Wood, Cote, and Abbit (1994) studied 151 undergraduates at Arizona State University and found that drinking game participation was a highly significant predictor of heavy consumption. It was concluded, in accord with earlier studies (e.g. Pedersen, 1990; Wood, Johnson, & Sher, 1992), that drinking games served a socialisation function possibly by fostering group identification and acceptance.

The group context in which students drink has been the subject of other research. Perkins and Berkowitz (1986) suggested that large, social gatherings were the context in which students drank the heaviest. Harford, Wechsler, and Rohman (1983) found that the presence of the opposite sex in the particular social setting was related to lower consumption. However, they also identified a gender difference in typical social drinking contexts, namely men drank heaviest in small, same-sex groups, whereas women's consumption was highest in large, mixed-sex groups. Similar results were obtained in a more recent study of 93 male and 93 female undergraduates (Senchak, Leonard, & Greene, 1998). Women drank more in large, mixed-sex groups relative to small, same-sex and small, mixed-sex groups. Men, on the other hand, drank more and were more frequently intoxicated in large, mixed-sex and small, same-sex contexts than in the small, mixed-sex situation.

Other studies have focused on the effects of sociability and social interaction among college students on alcohol consumption. Wiggins and



Wiggins (1992) pointed out that the mixed findings of previous research into the relationship between sociability and drinking are possibly accounted for by the different ways in which sociability was measured. They hypothesised that sociability was a multidimensional construct and that some dimensions, but not others, would be related to alcohol use. In their study of 283 students at the University of North Carolina Wiggins and Wiggins (1992) found that none of the dimensions of sociability they used was related to level of alcohol consumption. On the other hand, Nezlek, Pilkington, and Bilbro (1994) argued that previous research had produced inconsistent results because sociability had been operationalised through personality constructs and measures thereby failing to focus on the behavioural indicants of sociability as seen in the social interactions among students. In a study of 90 students in Virginia, Nezlek et al. (1994) found that some aspects of social interaction were related to binge drinking. Specifically, men who binged three or more times per week experienced less intimacy or closeness with same sex friends and romantic partners than both men and women who either binged less than three times per week or did not binge drink at all. The students whose frequency of binge drinking was once or twice per week reported more depth and breadth of disclosure and intimacy in their social interactions than any other students. The authors concluded that excessive binge drinking interfered with interpersonal relationships, but that some binge drinking facilitated interaction of this type for two possible reasons. First, individuals who binge at a certain frequency may be less inhibited and more spontaneous in social interactions. Second, occasional binge drinking is socially desirable among students, and the individual who drinks in this manner is viewed as more relaxed and easy to interact with than others who binge drink excessively or not at all.

Carey (1993) used the Inventory of Drinking Situations (IDS; Annis, Graham, & Davis, 1987) to investigate students' heavy drinking in intrapersonal and interpersonal situations. She found that heavy drinkers, in comparison to light and moderate drinkers, were at greatest risk for excessive drinking in situations involving social pressure to drink,

pleasant times with others, pleasant emotions, and physical discomfort. More recently, Carey (1995b) in a study of 139 undergraduates, found that heavy drinkers reported drinking more than light drinkers in five of the eight drinking situations, namely social pressure to drink, pleasant times with others, pleasant emotions, urges and temptations, and conflict with others. Furthermore, among heavy drinkers alcohol-related problems were strongly associated with excessive consumption in situations involving social pressure or conflict and pleasant social occasions. Carey (1995b) concluded that high scores on the IDS scales identified 'at-risk' drinkers and, therefore, represented a useful tool for assessment and counselling.

### 1.2.5 Affect

It will be remembered that the motivational model of alcohol use (Cox & Klinger, 1988, 1990) stated that an individual drinks ultimately in order to produce a change in affect. It will be remembered also that the tension reducing/stress dampening action of alcohol was implicated as an influential factor in college students' alcohol consumption. It is generally accepted that one of the functions drinking serves is to reduce or relieve the stress, tension, and anxiety in life (Perkins, 1999). Subjective feelings of stress are often expressed as emotions, and a case can be made that reducing stress is equivalent to changing affect. Thus the relationship between stress and affect is an important one in the consideration of alcohol use on campus.

Patterns of stress-motivated drinking among students were investigated by Perkins (1999) using cross-sectional and longitudinal data. It was found that stress-related motives for drinking were more prominent than other reasons for consuming alcohol. It appeared also that although alcohol consumption declined in the years following graduation from college, drinking to reduce or relieve stress became more prominent. In addition it was found that drinking to cope with stress and anxiety became more problematic in terms of adverse consequences, and this style of drinking began sooner for females than males in the post-college years. The results suggested that drinking in college mainly for stress-related

motives prefaced post-college problem drinking, and that this pattern emerged earlier in women.

The relationship between stress, affect, and alcohol use appears to be a complex one. A number of studies (e.g., Nagoshi, Wood, Cote, & Abbit, 1994; Wood, Nagoshi, & Dennis, 1992) have shown that alcohol-related problems are better predicted by negative reasons for drinking, such as coping with anxiety, stress, or shyness, rather than celebratory ones such as being at a party or other social occasion. This distinction was explored further by Camatta and Nagoshi (1995) in a study of 135 college students which found that stress and depression were related to alcohol problems, but not to consumption. It was concluded that stress produced depression when the individual held irrational beliefs about her or his ability to cope which in turn gave rise to alcohol use problems.

#### 1.2.6 Perceptions of Normative Drinking

A number of studies have revealed biases in college students' perceptions of drinking norms and the consequences of drinking. Baer, Stacy, and Larimer (1991), in two studies of 131 and 280 students resident either in dormitories, sororities, or fraternities, found that nearly all the respondents perceived their friends as drinking more than they, themselves, did. Students also perceived the level of average drinking in their own social living situation to be higher than the actual average consumption obtained from self-reports.

In a study of 252 students who were residents in two fraternities and two sororities, Baer and Carney (1993) found that respondents' estimates of the alcohol-related problems experienced by the typical student, whether living in a fraternity/sorority or elsewhere, were significantly higher than for themselves. Students also rated others' consumption as higher than their own, but neither this finding nor the previous one was associated with heavy or risky drinking. Baer and Carney (1993) concluded that their results did not appear to reflect 'denial' among heavy drinkers and suggested that biases in the perception of others' consumption and problems may have a motivational origin. That is, they speculated that students would experience less fear and anxiety regarding their own risky

drinking if they thought that others drank more and had more problems than they did.

Baer (1994) further assessed biased perceptions of drinking in a study of 126 heavy drinking first-year students living in either a dormitory, fraternity/sorority, or off-campus situation. The results suggested that perceived drinking norms were higher for fraternity residence than for other living situations, thereby supporting previous findings (Baer & Carney, 1993. Baer et al., 1991). It appeared that the general view that male students living in a fraternity drink more was shared by students regardless of where they themselves lived, and that this perception predated college admission. Baer (1994) went on to report that peer disapproval of drinking behaviours changed over time and varied with the type of behaviour. Specifically, students expressed increasing disapproval of drink driving over the course of their first year, whereas the level of disapproval of consuming enough alcohol to pass out did not change over the first year. Baer (1994) concluded that it was vital to further investigate the social norms related to drinking, how they might change over time, and the type of accommodation in which a student lives. Information of this type would be extremely useful, especially for interventions aimed at reducing heavy alcohol use and its concomitant problems.

#### 1.2.7 Alcohol Outcome Expectancies

The expectation of a favourable outcome resulting from the consumption of alcohol influences the decision to drink alcohol. Alcohol-related expectancies have been found to reliably predict future alcohol use in both adolescents and adults (Brown, Creamer, & Stetson, 1987; Goldman & Rather, 1993; Oei & Baldwin, 1994; Stacy, Marlatt, & Widaman, 1990). A variety of instruments have been developed to measure alcohol outcome expectancies (e.g., Brown, Christiansen, & Goldman, 1987; Fromme, Stroot, & Kaplan, 1993; Young & Knight, 1989).

Among college students a number of relationships have been found between alcohol expectancies and actual consumption. For example, Baldwin, Oei, and Young (1993), in a study of 118 undergraduates in

Australia, discovered that the expectation that drinking would increase assertiveness was related to heavy alcohol use. Further research conducted by Fromme et al. (1993) found that, among the 344 students studied, negative as well as positive expectancies of the outcome from drinking alcohol predicted consumption levels. In another study Wood, Nagoshi, and Dennis (1992) found that 280 student drinkers reported stronger alcohol outcome expectancies of tension reduction, social enhancement, and activity enhancement. The expectation that drinking alcohol would result in a generally positive outcome was found to predict the maximum daily quantity of alcohol consumed reported by 140 undergraduates who were studied by Carey (1995a). This research also discovered that sexual enhancement expectancies predicted the frequency of days on which students were intoxicated in the previous month.

Although alcohol outcome expectancies have been found consistently to predict college students drinking, Cronin (1997) took a different perspective. He argued that as expectancies were essentially a long term, stable factor related to drinking they would not predict drinking as well as an individual's specific reason for drinking. The results of Cronin's study (1997) of 426 first year students in a South Australian university supported this argument. It was found that the reasons reported as influencing drinking better predicted all alcohol measures than alcohol expectancies. In particular, reasons related to social camaraderie predicted the frequency of binge drinking episodes, the average number of drinks typically consumed, and the frequency of days on which drinking occurred. However, it was found also that students who drank primarily to enhance their mood states experienced the most alcohol problems.

#### 1.2.8 Motives and Reasons for Drinking

It will be remembered that Cronin (1997) argued that reasons for drinking proved superior to alcohol outcome expectancies in predicting a number of alcohol measures, because they assessed the motivation directly related to the decision to drink. Research focused on college students has provided evidence of the relationship between drinking motives and both alcohol consumption and alcohol-related problems.

Klein (1992) found that men who were resident in fraternities were most likely to report negative reinforcement motives for drinking and to experience more alcohol-related problems. Bradley, Carman, and Petree (1992) discovered that both personal and social motives independently predicted drinking problems. Carey and Correia (1997) in a study investigating the drinking motives of 139 undergraduates obtained three main findings. First, drinking motives contributed significantly to the prediction of alcohol problems over and above the well established association between high-risk drinking and the occurrence of problems. Second, both positive and negative reinforcement motives predicted alcohol-related problems. Finally, contrary to earlier research findings, gender differences in both drinking motives and prediction of drinking problems were not found. Carey and Correia (1997) concluded that motivations related to the decision to drink play a role in the prediction of problematic alcohol use. On this basis they suggested that development of a high-risk motivational profile may be useful both for identification purposes and for intervention with students experiencing the adverse consequences associated with heavy drinking.

### 1.3 Interventions Aimed at Reducing Alcohol Abuse

Since the findings of a landmark study (Edwards, Orford, Egert, Guthrie, Hawker, Hensman, Mitcheson, Oppenheimer, & Taylor, 1977) in which a single session of advice proved as effective as longer, more intensive treatment for men with alcohol problems, the effectiveness of brief interventions has attracted a great deal of research attention. Reviews of the research in this area have all endorsed the value of brief interventions, concluding that such initiatives are more effective than no treatment at all and often as effective as more intensive treatments of a longer duration (see Bien, Miller, & Tonigan, 1993; Heather, 1995, 2001; Miller, Brown, Simpson, Handmaker, Bien, Luckie, Montgomery, Hester, & Tonigan, 1995).

On close inspection it appears that brief interventions are most effective among drinkers with low to moderately severe alcohol problems

(Bien et al., 1993; Heather, 2001), making such approaches particularly relevant to college students. In consequence, brief interventions have played a part in the prevention of alcohol problems on campus and have proved effective for college students whose level of dependence is generally low to moderate despite their well documented heavy drinking patterns (Dimeff, Baer, Kivlahan, & Marlatt, 1999).

In the U.S. many college campuses offer educational programmes aimed at increasing students' awareness of the risks related to alcohol abuse. Primary prevention initiatives of this type include alcohol awareness events, lecture sessions, and the general dissemination of informational literature. Research has shown that primary prevention programmes have been of limited effectiveness in reducing alcohol consumption and the rate of attendant problems on campus (National Institute on Alcohol Abuse and Alcoholism, 1995a).

On the other hand, secondary prevention programmes have met with more success. Recent research at the University of Washington has shown that a variety of brief interventions mediated reduced consumption rates and adverse consequences over periods of up to two years (Baer, Marlatt, Kivlahan, Fromme, Larimer, & Williams, 1992; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990; Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley, Somers, & Williams, 1998). The first two studies made use of an intervention strategy called the Alcohol Skills Training Program (ASTP; Fromme, Marlatt, Baer, & Kivlahan, 1994). Based on cognitive-behavioural principles and techniques, the ASTP (delivered in 6- or 8-weekly group sessions) reduced students' alcohol consumption and their level of alcohol-related problems.

The most recent study (Marlatt et al., 1998) combined the most effective components of the ASTP with a motivational interviewing style (Miller & Rollnick, 1991) in a two session intervention called Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff et al., 1999). Students who received BASICS showed significantly greater reductions in alcohol use and related problems at 1- and 2-year follow-ups in comparison to students who received assessment only. Building on the

success of the ASTP and BASICS interventions, the Multi-Media Assessment of Student Health (MMASH; Dimeff & McNeely, 2000) was developed expressly for use in a primary health care setting with heavy drinking students. A pilot study of this programme appeared to show reductions in binge drinking and alcohol-related problems, providing enough evidence to merit further research.

Other studies have demonstrated the effectiveness of brief interventions among college students. Agostinelli, Brown, and Miller (1995) used an intervention consisting of normative feedback regarding alcohol use that was sent by post to heavy drinking students. The students who received personalised feedback showed a greater reduction in usual intoxication levels and weekly drinking in comparison to students who received no feedback. A brief intervention that mediated a reduction in the occurrence of alcohol-related problems was conducted by Cronin (1996). This study found that students who had indicated the number and type of problems that they predicted would occur during the forthcoming spring vacation reported less problems than students who were not asked to make similar predictions. Finally, Borsari and Carey (2000) used an adapted version of the BASICS programme (Dimeff et al., 1999) that produced reductions in drinking relative to a control group of students but did not affect the level of alcohol-related problems.

Research evaluating interventions designed to reduce alcohol abuse and the concomitant problems clearly indicates the efficacy of such initiatives. A prominent feature of the evidence is the effectiveness of feedback comprising alcohol-related information tailored to the individual student. The immediate question then is, what type of material represents the most efficient information to feedback to students? Clearly, the effectiveness of a brief intervention may depend on "more than a simple word of advice" (Bien et al., 1993), although all successful interventions have contained an element of verbal or written advice, suggesting that this may represent the cornerstone of effective approaches.

Feedback to individuals of their assessment results appears to constitute a potent factor in effective brief interventions. The type of



information that has proved successful includes a summary of drinking habits compared to general and environment-specific norms, the occurrence of negative consequences, personal risk factors (e.g., family history), identification of high-risk drinking situations, the existence of physical and/or cognitive impairment, and cognitive factors such as alcohol-related expectancies. Relaying such information to an individual can have a powerful effect on her/his motivation to change which is not prompted by a whole range of general, educational information regarding the use of alcohol (Dimeff et al., 1999; Miller, 1995). However, as Bien et al. (1993) emphasised, more information is needed to identify the specific content that is sufficient for a successful intervention as well as the factors that are indispensable to an effective brief intervention.

Turning from the type of information to the type of people for whom brief intervention works best, it appears that those with low to moderate levels of alcohol dependence and alcohol-related problems benefited the most (Bien et al., 1993). On that basis, the target population of university students in the present study was eminently qualified, by virtue of well-documented risky drinking habits but moderate levels of dependence, for inclusion in a brief intervention procedure. Primarily it was expected that students who were assessed as excessive drinkers would be helped to reduce their drinking to a greater degree by a brief intervention consisting of personalised rather than nonpersonalised feedback. During the course of evaluating the relative effectiveness of two brief interventions, the characteristics of students most successful both within each intervention and regardless of the type of intervention will be determined. The following chapters describe the methods that were used to address the above questions.

Chapter 2 describes a screening survey of university students' alcohol consumption. It begins with a review of the findings of surveys aimed at identifying the drinking patterns and consequences of alcohol use among students in the United States and the United Kingdom. The review pays particular attention to the definition of binge drinking. The results of the survey are compared to similar surveys carried out in the

United States and the United Kingdom.

Chapter 3 evaluates the utility of reasons for drinking and drinking situations in predicting alcohol consumption and the related problems among heavy-drinking students. The chapter features a factor analysis of both reasons for drinking and drinking situations that forms the basis for investigating their relative value as predictors of problematic drinking.

Chapter 4 examines the relationships between personality, motivation, and alcohol use among heavy-drinking students. The associations that are identified form the basis for further investigation. This investigation determines the ability of personality factors, motivational variables, and alcohol measures to predict the incidence of alcohol-related problems among heavy-drinking students.

In Chapter 5 the evidence regarding the effectiveness of brief interventions to reduce drinking is reviewed. The review first deals with the use of brief interventions in the general population and then moves on to examine their use with college students. The chapter goes on to discuss the functional components and elements common to successful brief interventions. Chapter 5 concludes with hypotheses concerning the outcome of the two brief interventions.

Chapter 6 details the methodology used to evaluate two brief interventions aimed at reducing alcohol consumption among heavy drinking students. The chapter explains the three phases of the evaluation and describes the questionnaires used at each phase; assessment, intervention, and follow-up. The chapter also describes the design of each intervention, the nature of the feedback information, and the style in which both types of feedback were delivered.

Chapter 7 reports the results of the evaluation and discusses the implications of the outcome. The dissertation concludes in Chapter 8 with a general discussion of findings from the present study, and includes recommendations for future interventions with heavy-drinking students.

## Chapter 2

### Screening University Students for Excessive Alcohol Consumption and Alcohol-Related Problems

Alcohol use among college students has received much attention from researchers since the first such study in the 1950s (Straus & Bacon, 1953). Most of the research has been carried on in the United States where the results of such investigations continually show that college students' drinking constitutes a major social problem (Baer, Kivlahan, & Marlatt, 1995). The seriousness of the problem has been reflected in the U.S. Surgeon General's call for a reduction in consumption (Office of Substance Abuse Prevention, 1991), and the view of college presidents nation-wide that students' alcohol use has been the leading problem on campus (Carnegie Foundation for the Advancement of Teaching, 1990).

#### 2.1 Patterns of Consumption

Rates of drinking, patterns of consumption, and the problems associated with alcohol use among college students have been established by large-scale surveys. It has been found generally that the majority (over 80 percent) of college students have consumed alcohol (National Institute of Alcoholism and Alcohol Abuse [NIAAA], 1995a, 1997). Furthermore, 67.5 percent of students used alcohol in the month prior to being surveyed, in comparison to 61.7 percent of noncollege peers (Johnston, O'Malley, & Bachman, 1995). Although survey data have shown an overall decline in the rate of student alcohol use since 1980, findings have also revealed that an episodic pattern of excessive alcohol use, often termed binge drinking, among students has been consistently associated with a range of negative consequences (Engs, Diebold, & Hanson, 1996; Johnston et al., 1995; NIAAA, 1995a; Presley, Meilman, & Lyerla, 1994, 1995; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994).

(Binge drinking has been defined as consuming five or more drinks on a single occasion by males, and four drinks by females (NIAAA, 1995a; Wechsler, Dowdall, Davenport, & Rimm, 1995).) Defined in this way, Wechsler et al. (1994) found that 44 percent of the 17,592 students whom

they surveyed were heavy episodic drinkers. A similar rate of 42 percent heavy drinkers was reported from the Core Alcohol and Drug Survey, which collected data from 58,625 students (Presley et al., 1994), whilst the annual Monitoring the Future Study produced a figure of 40 percent of students who reported heavy episodic alcohol use (Johnston et al., 1995). It is widely recognised, therefore, that students consume large amounts of alcohol during the occasions on which they drink, and it is this pattern of use that has been consistently linked to major negative effects on students' health and social functioning.

## 2.2 Consequences of Consumption

The range of adverse consequences associated with college students' heavy use of alcohol is well documented. Engs et al (1996), surveying a national sample of 12,000 college students in the U.S., reaffirmed the principal finding of previous studies that heavy drinking is related to a higher incidence of health, social, academic, and legal problems (see Engs & Hanson, 1993, 1990, 1985; Hanson & Engs, 1992). These problems include academic failure; conflict with authorities; criminal damage; depression; drunk driving; medical illness and physical injury; physical and sexual assault; suicide; and unprotected, unplanned, and unwanted sexual activity (Eigen, 1991; Presley et al., 1994; Wechsler et al., 1994; Wechsler & Isaac, 1992; Wechsler, Moeykens, Davenport, Castillo, & Hansen, 1995; Werner, Walker, & Greene, 1994). The spectrum of adverse consequences has been reflected in the 15 percent increase, over the five years to 1994, in hospital admissions for alcohol overdose on campus (Commission on Substance Abuse at Colleges & Universities, 1994), and the NIAAA's report (Eighth Special Report to the U.S. Congress on Alcohol and Health, 1993) that national rates for alcohol abuse and dependence are highest among young people aged 18 to 29, alongside the estimate that 10 to 15 percent of students experience major problems related to their alcohol consumption (Eigen, 1991).

The proportions of students experiencing the negative consequences of their alcohol use, whether severe or not, have been detailed in a variety

of studies. For example, Presley et al. (1994) in a survey of 51,971 students found that 62.8 percent had experienced hangovers, 35.6 percent had missed a class, 33.3 percent had been in an argument or fight, 13.5 percent had been in trouble with the authorities, and 16.1 percent had suffered personal injury. Similarly, Wechsler, Dowdall, Davenport, and Rimm (1995) discovered that among 12,243 students surveyed 64 percent experienced hangovers, 30 percent missed a class, 22 percent had argued or fought, 21 percent had unplanned sex, and 10 percent suffered injury. The results of a survey of 12,081 students by Engs et al. (1996) also found comparable levels of alcohol related problems, and provided evidence that a higher proportion of males than females missed classes, damaged property, got into fights, and had trouble with authorities.

Of greatest concern, as Wechsler, Dowdall, Davenport, and Castillo (1995) pointed out, is the evidence that clearly links the binge pattern of alcohol use with higher risks of acute health problems. For example, Wechsler and Isaac (1992), in a study of 1,669 first-year students at colleges in Massachusetts, found that binge drinkers were six times as likely to drive a car after consuming large amounts of alcohol and twice as likely to ride with a drunk driver. Werner, Walker, and Greene (1994) also found drunk driving to be a commonly reported problem in their study of 492 freshmen students, 34 percent of whom admitted to driving whilst intoxicated and 10 percent who had driven under the influence of alcohol six or more times in the previous year. High rates of this extremely risky practice were reported also by Hurlbut and Sher (1992), who found that 54 percent of students canvassed had driven whilst intoxicated. Presley et al. (1994) discovered that 35 percent had driven a vehicle while under the influence of alcohol.

Risky sexual behaviour has been consistently associated with heavy drinking. Meilman (1993) surveyed 439 undergraduate and graduate students and found that 15 percent had abandoned safe-sex practices when they had been drinking. Wechsler and Isaac (1992) discovered that approximately a third of the binge drinking students they surveyed, engaged in unplanned sexual activity in comparison to 10 percent of the

nonbinge drinkers, whilst Wechsler, Dowdall, Davenport, and Rimm (1995) identified 21 percent of students who had unplanned sex and 11 percent who engaged in unsafe sex as a result of their drinking. Furthermore, Wechsler et al. (1994) concluded that frequent heavy drinkers were seven to ten times more likely to engage in unprotected and/or unplanned sexual activity. Both sexual assault and so-called date, or acquaintance, rape also have been associated with heavy drinking (Berkowitz & Perkins, 1986; Engs & Hanson, 1985; Presley et al., 1994; Wechsler et al., 1994), although Williams and Smith (1994), in a study of 221 students who were enrolled in introductory psychology and sociology courses, suggested that moderate, rather than heavy, drinking was related to dating violence.

Binge drinking is also potentially harmful to students who do not consume large amounts of alcohol. In a study of 17,592 students at 140 U.S. colleges, Wechsler, Moeykens et al. (1995) found that 66 percent of their sample had experienced at least one adverse effect of other students' drinking. Specifically 43 percent had their sleep/study interrupted, 44 percent 'baby-sat' a drunken student, 21 percent had suffered an unwanted sexual advance, 13 percent had been assaulted, 12 percent had property damaged, and the chances of experiencing these negative consequences increased with the percentage of heavy drinking students in the college population. It was discovered that students whose alcohol consumption was not heavy but attended a college with a high proportion of heavy drinkers were 3.6 times more likely to suffer the secondary effects of drinking than those resident at colleges with a lower proportion of binge drinkers. In addition, it was also revealed that the likelihood of suffering consequences from others' drinking increased with the amount of alcohol a student consumed.

Clearly the consequences of heavy drinking among college students are a major problem. According to Wechsler et al. (1994), alcohol use is the principal cause of accidental deaths on campus in the U.S., and drinking is implicated in nearly half of all fatal road traffic accidents which are described as the leading cause of death to America's young people. Neither

are these problems confined to youth for, as Marlatt, Baer, and Larimer (1995) pointed out, some students are not only at risk for immediate drink related problems but also for the continuation of such problems and the development of alcohol dependence. Whilst the majority of students appear to 'mature out' of heavy drinking patterns as they age and assume adult responsibilities, a substantial minority of approximately 30 percent will continue to drink alcohol in a problematic way (Fillmore, 1988; Jessor, Donovan, & Costa, 1991; Zucker, Reider, Ellis, & Fitzgerald, 1995).

### 2.3 Patterns and Consequences of Alcohol Consumption among Students in the United Kingdom

In contrast with the U.S. there has been little research into the use of alcohol among college students in the U.K. There have been no national surveys of students' alcohol consumption and alcohol-related problems in the U.K. unlike the wealth of such material available in the U.S. During their investigation of 456 undergraduates at a Scottish university, Delk and Meilman (1996) found five published studies (Anderson, 1984; Brown & Gunn, 1977; Collier & Beales, 1989; Orford, Waller, & Peto, 1974; West, Drummond, & Eames, 1990) that directly addressed consumption patterns among British students, and one that indirectly considered this issue (Leavy & Alexander, 1992).

(Orford et al. (1974) found that, on average, first-year students at an English university drank alcohol on 80 days in the previous year and consumed approximately three drinks on those days.) Hangovers had been experienced by 50 percent of the male students and 27 percent of the females, whilst 12 percent of the men and 9 percent of the women had missed classes or academic work as a result of their drinking. A higher rate of drinking than the previous study was identified by Brown and Gunn (1977), among students at the University of Reading where 70 percent of the men and 25 percent of the women reported drinking alcohol on three or more days per week, whilst Anderson (1984) discovered that Oxford University students consumed an average 9.4 drinks over a four-day period. An average consumption rate of 18 to 21 drinks per week for

men and 11 to 15 drinks per week for women was reported by London medical students in a survey by Collier and Beales (1989), which also found that 53 percent of the students had experienced adverse effects of drinking on their academic performance. Similar consumption levels to the previous study were reported in a survey of undergraduates at London University by West et al. (1990) who also identified a positive relationship between alcohol use and a range of adverse consequences. More recently, Leavy and Alexander (1992) reported average weekly alcohol consumption of 35 drinks for first-year male students and 12 drinks for first-year female students at a university in Scotland.

In their attempt to address the shortage of knowledge regarding the use of alcohol among college students in the U.K., Delk and Meilman (1996) conducted a postal survey of 700 randomly selected undergraduates at a university in Scotland. Data were collected from 456 undergraduates using the Core Alcohol and Drug Survey (Presley, Meilman, & Lyster, 1994), which had been used extensively in the U.S., thereby making possible direct comparisons between American and British students. It was found that Scottish undergraduates, in comparison to American students, drank more frequently in the previous year, consumed more alcohol in a typical week, and engaged in binge drinking more often during the previous two weeks. Specifically, 62 percent of the Scottish students drank alcohol on three or more days of the week compared to 21 percent of the American students; Scottish students consumed 10.2 drinks per week on average in contrast to 4.7 drinks for the American students; and 63 percent of Scottish students said they consumed five or more drinks in one sitting as opposed to 40 percent of the American students.

Since 1996 only two other published studies have investigated alcohol use among university students in the U.K. The first of these surveyed 3,075 students at 10 universities throughout the U.K. (Webb, Ashton, Kelly, & Kamali, 1996). It was found that 61 percent of the male students exceeded the recommended weekly limits (21 units for men and 14 units for women), drinking 31.8 units on average per week. On the other hand, 48 percent of the female students exceeded the recommended



weekly limits drinking 17.3 units on average per week. Binge drinking, which was defined as consuming at least half the recommended weekly consumption in a single session, was practised by 31 percent of the men and 24 percent of the women. The second, and most recent study, explored the attitudes and motivations related to binge drinking among 136 undergraduates at a campus-based university in Wales (Norman, Bennett, & Lewis, 1998). Using the same definition of binge drinking as the previously cited study, it was found that 46.3 percent of the students engaged in binge drinking at least once a week. Male students were more likely to drink in this way and to engage in nearly twice as many binge drinking sessions per month as the female students. In detail, 64.4 percent of the men engaged in binge drinking at least once a week and reported 4.67 binge drinking sessions per month in contrast to 32.5 percent of the women who reported 2.46 sessions per month. In addition, the average weekly amount of alcohol consumed by students was 18.18 units, but, on average, the males drank nearly three times as much alcohol per week as the females (26.97 units and 9.40 units respectively).

Clearly there is a shortage of survey data regarding alcohol use among university students in the U.K., which is comparable to that collected in the U.S. Therefore, the primary aim of the present study will be to discover the rates and patterns of alcohol consumption among undergraduates at a Welsh university. In addition, direct comparisons will be made, wherever possible, between the results of the present study, the reported alcohol use among students in the U.S.A., and alcohol data collected from students elsewhere in the U.K. At the same time particular attention will be focused on the association between a binge pattern of alcohol consumption and the occurrence of adverse consequences. Before proceeding then, it is important first to address the issues surrounding the definition of binge drinking.

#### 2.4 Binge Drinking Defined

Defining binge drinking has proved problematic for researchers working in the area of alcohol consumption patterns. Alternative terms

have been used to describe the style of drinking in which an individual consumes an excessive amount of alcohol at one sitting. Binge drinking is the most regularly used term especially in the United States and Australia, but other descriptions have been used, such as "risky single-occasion drinking" (RSOD: Murgraff, Parrott, & Bennett, 1999), "frequent binge drinking" (Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996), "heavy sessional drinking" (Measham, 1996), and "heavy episodic binge drinking" (Nezlek, Pilkington, & Bilbro, 1993). In addition, it has been pointed out that binge drinking has a different meaning for clinicians who have applied the term to describe the prolonged bouts of alcohol consumption practised by chronic alcohol abusers (Wechsler & Austin, 1998).

Apart from the issues related to terminology, there are variations of what constitutes binge drinking in terms of the quantity of alcohol consumed and the frequency of use. Consuming five or more drinks per occasion is the most widely used cut-off point for binge drinking in the U.S.A. (Hanson & Engs, 1992; Marlatt, Baer, & Larimer, 1995; Wechsler & Isaac, 1992), Canada (Smart & Walsh, 1995), and Australia (Polkinghorne & Gill, 1995). Wechsler et al. (1994) further refined binge drinking criteria to take account of gender differences by suggesting a cut-off point of five or more drinks for men and four or more drinks per occasion for women.

On the other hand, to designate binge drinking researchers in the U.K. have employed a cut-off point of 11 units of alcohol or more per occasion (Anderson & Plant, 1996; Measham, 1996), amending that figure, to take account of gender, to ten units for men and seven units for women (Bennett, Smith, & Nugent, 1990; Moore, Smith, & Catford, 1994; Norman, Bennett, & Lewis, 1998; Webb, Ashton, Kelly, & Kamali, 1996). At the same time U.K. government policies have been guided by recommendations put forward by the Health Education Authority (HEA, 1996), and the British Medical Association (BMA, 1995). The former defined increased risk of alcohol-related harm following from four units or more per day for men and three units per day for women, whilst the latter recommended three drinks for men and two drinks for women as

daily limits.

Clearly the cut-off points used by researchers in the U.K. far exceed officially endorsed guidelines. The discrepancy has arisen because much of the previous research into binge drinking in the U.K. has defined such a style of consumption as drinking half the recommended weekly amount in a single session (Bennett et al., 1990; Moore et al., 1994; Norman, et al., 1998). Further confusion was caused, as Murgraff et al. (1999) pointed out, when the daily limits of four units for men and three units for women, recommended by the HEA (1996) were mistakenly translated into an advised weekly consumption of 28 units for men and 21 units for women. Obviously the question, "what level of alcohol consumption on one occasion constitutes a risk to the individual of adverse consequences?" needs to be answered.

As long ago as 1969, Cahalan, Cisin, and Crossley argued that five or more drinks in a row could be used as a benchmark for evaluating the social harm related to alcohol use. (The Harvard School of Public Health College Alcohol Study (CAS) has provided support for this benchmark (see Wechsler et al. 1994; Wechsler, Dowdall, Davenport, & Castillo, 1995), and further evidence was supplied by Midanik, Tam, Greenfield, and Caetano (1996) in a study of over 20,000 alcohol consumers in the U.S.A. in which it was found that those who consumed five or more drinks in a row were at a significantly higher risk for drink driving, alcohol-related job problems, and alcohol dependence than those who did not consume five or more drinks in a row.)

The five drinks for men and four for women measure of binge drinking, therefore, can be adopted with some confidence. One notable variation is the definition endorsed by the WHO which sets an index that links personal harm and excessive consumption at six or more drinks on one occasion. The WHO definition is the one used in the AUDIT questionnaire. However, it appears that a consensus has emerged which currently restricts the latitude in binge drinking limits to a minimum. Thus, the AUDIT limit of six drinks or more in a row regardless of gender compares favourably with the widely accepted '5/4 measure' which, in

turn, is a small step from the most conservative definition current in the U.K. of four units for men and three units for women recommended by the HEA (1996). Further research is necessary to resolve the issue of a unified definition of binge drinking, particularly in the U.K., where there is little empirical evidence available to support the present limits.

In relation to the search for a standardised definition of binge drinking, one issue remains to be discussed. In order to make valid cross-cultural comparisons of binge drinking and the related consequences, a reliable scheme for converting alcoholic drinks from different countries into standard measures is necessary. To this end Miller, Heather, and Hall (1991) addressed the problem of varying standard drink units across different countries, different research groups, and different measurement units. To improve the reliability of cross-cultural comparisons of alcohol consumption, they strongly recommended that alcohol consumption should be reported in terms of metric volume of absolute ethanol rather than metric weight. With this recommendation in mind, one unit/drink of alcohol was defined as containing 8 g or 10 ml of absolute ethanol (see page 36 for number of units specified in common U.K. beverages).

However, the present study planned to compare alcohol use among students in Wales with data collected from American students in two separate studies (Delk & Meilman, 1996; Wechsler et al., 2000). In the first of these, Delk and Meilman (1996) compared drinking levels among Scottish and American students contending that one 'drink' as defined in American research was approximately equivalent to one unit of alcohol which is the measure used in alcohol research in the U.K. Both studies defined a standard drink in the same way; a 12-oz (360 ml) bottle or can of beer, a 4-oz (120 ml) glass of wine, a 12-oz (360 ml) bottle or can of wine cooler, or a shot of liquor (1.25 oz or 37 ml). In a similar way the AUDIT assumes approximate equivalence in standard drink units between the U.S. and the U.K., stating that a standard drink in the U.S.A. contains 10g alcohol and is equivalent to a standard drink of another country as long as the alcoholic content does not differ by more than 25 percent. The U.K. unit, which is equal to 8 g of alcohol conforms to this specification and,

therefore, can be treated as equivalent to the American 'drink'. On this basis, the cross cultural comparisons planned in the present study can be carried out with confidence.

## 2.5 Method

### 2.5.1 Participants

The participants were 729 (females 59.5%; males 40.5%; mean age = 21 years old,  $SD = 5.7$ ) undergraduates registering for their second year at the University of Wales, Bangor. Second-year students were selected as the target population for two reasons. First, students in their second year were expected to show more settled patterns of alcohol use in contrast to first-year students, the bulk of whom would be experiencing living away from home for the first time. Second, the screening procedure was intended to identify certain students who would be invited to participate in a further study which would last a year, thereby making third year students unsuitable for this purpose.

### 2.5.2 Screening Instrument

The screening instrument used in the study was an amended version of the Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992), which was entitled the Alcohol Use Questionnaire (AUQ). The AUDIT is a ten item measure comprising three questions about alcohol consumption, three questions related to alcohol dependence, and four questions regarding alcohol-related problems. It was developed by the World Health Organisation to identify individuals whose use of alcohol has become hazardous and harmful to their health.

To derive a detailed measure of alcohol consumption for the purposes of this study, the AUDIT was amended in the following ways. First, the choices offered on AUDIT Question One, "How often do you have a drink containing alcohol?" were extended to supply more detail. Therefore, the response choice, "Two to four times a month" was converted to two alternatives, "Twice a month" and "Once a week". In addition, a further response choice, "Daily" was inserted. Second, the choice "10 or more" in response to AUDIT Question Two, "How many

drinks containing alcohol do you have on a typical day when you are drinking?" was converted to three categories of choice, "10 to 12", "13 to 15", and "16 or more". Tables 2.1 and 2.2 show the difference between the AUDIT and AUQ response categories available on Questions 1 and 2.

Table 2.1

Question 1: How often do you have a drink containing alcohol?

AUDIT response options	AUQ response options
Never	Never
Monthly or less	Monthly or less
2 to 4 times a month	Twice a month
	Once a week
2 to 3 times a week	2 to 3 times a week
4 or more times a week	4 or more times a week
	Daily

Table 2.2

Question 2: How many drinks containing alcohol do you have on a typical day when you are drinking?

AUDIT response options	AUQ response options
1 or 2	1 or 2
3 or 4	3 or 4
5 or 6	5 or 6
7 to 9	7 to 9
10 or more	10 to 12
	13 to 15
	16 or more

Third, AUDIT Question 3, "How often do you have six or more drinks on one occasion?" was changed to read, "What is the maximum number of drinks you have on any one occasion?" in order to yield a comprehensive measure of the maximum amount of alcohol consumed.

Finally, an extra question, "How often do you drink this maximum amount?" was inserted in order to determine the frequency at which the maximum amount of alcohol was consumed. These amendments produced a detailed quantity-frequency measure, including an estimate of the frequency of binge drinking, as well as providing a full score on the AUDIT. Table 2.3 shows how Question 3 on the AUDIT was replaced by Questions 3 and 4 on the AUQ.

Table 2.3

The Replacement of AUDIT Question 3 by AUQ Questions 3 and 4

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AUDIT Question 3	How often do you have 6 or more drinks on one occasion?
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Response Options	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
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AUQ Question 3	What is the maximum number of drinks you have on any one occasion?
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Response Options	1 or 2	3 or 4	5 or 6	7 to 9	10 to 12	13 to 15	16 or more
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AUQ Question 4	How often do you drink this maximum amount?
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Response Options	Never	Less than	Monthly	Twice a month	Weekly	2 or 3 times a week	4 to 6 times a week	Daily
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As mentioned earlier, amendments were made to the AUDIT questionnaire in order to obtain more detailed data in terms of the quantity, frequency, and variability of alcohol use, whilst allowing for conversion to a complete score on the AUDIT. In this way it is possible to circumvent the problems surrounding the definitional criteria of binge drinking and to enable comparisons between different studies. In addition, many studies have used questionnaires that specify a time scale of alcohol use such as "how many times in the past two weeks have you

had five or more drinks at a sitting?" (see Core Alcohol and Drug Survey: Presley, Meilman, & Lyerla, 1994). The Alcohol Use Questionnaire (AUQ) employed in the present study does not specify a time scale, leaving that choice to the respondent instead. This approach ensured greater flexibility in the production of estimates of the amounts of alcohol consumed and the frequency of consumption.

The AUQ asks respondents to define an alcoholic drink in the following ways. One drink is equivalent to a half-pint of beer, cider, or lager (containing 3.5 or 4% alcohol), a small (4 oz) glass of wine (containing 11 or 12% alcohol), or a single 'pub' measure of spirits (containing 40% alcohol). Two drinks are equivalent to a pint of beer, cider, or lager, a large (8 oz) glass of wine, a double 'pub' measure of spirits, a half-pint/half-can of high strength beer or lager (containing 8 or 9% alcohol), or a bottle (330 ml) of lager or alcopop. Four drinks are equivalent to one pint/can of high strength beer or lager.

### 2.5.3 Procedure

All participants received a package (see Appendix A, p. 253) which comprised a bilingual information sheet, bilingual consent form, the Alcohol Use Questionnaire (AUQ), and a 'freepost' labelled envelope in which to return the completed questionnaire. The AUQ package was distributed on the day (24/9/1999) that second year undergraduate students registered at the start of the academic year. To register for the new year, students follow a route through the main University building, along which they stop to fill in various forms related to course modules, fees and grants, membership of the National Union of Students (NUS), and so on. At a location along the registration route, a number of desks and chairs were positioned for students to sit whilst they completed the AUQ. Posters on the walls advertised the purpose for which the area was intended and carried the message that £100 could be won for completing the questionnaire. Students were handed the AUQ package and invited to sit at the desks and answer the questionnaire. They were directed to read the information sheet and consent form before completing the AUQ. They were informed also that they were free to take away the AUQ in order to



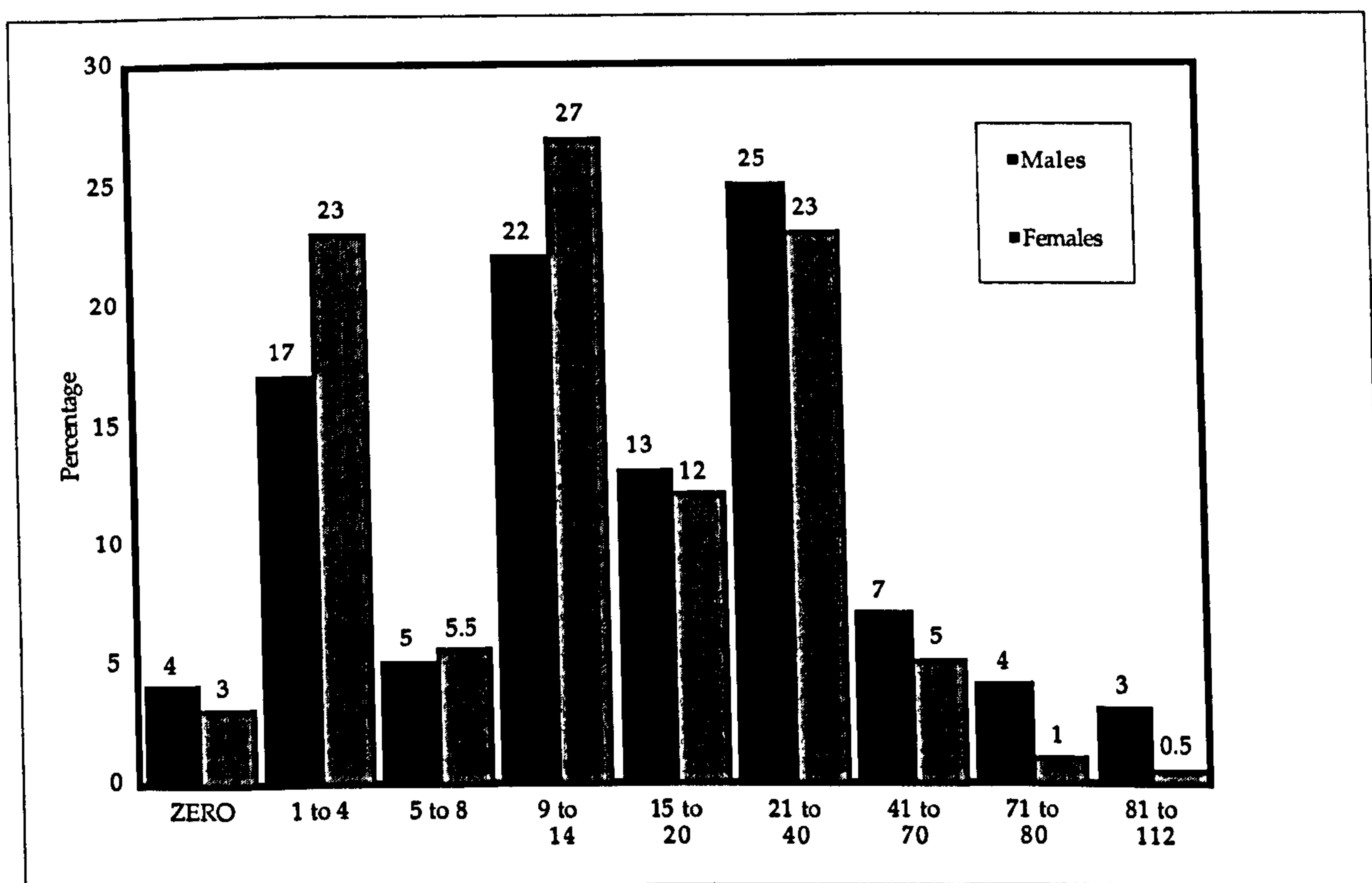
complete it later and return it by post in the 'freepost' labelled envelope provided. Completed questionnaires were collected from students as they moved away from the desks to continue their way along the registration route.

The data collection procedure occurred throughout registration day which lasted from 9.15 a.m. until 4.30 p.m. Four third-year Psychology students assisted the author in the data collection. This meant that throughout the whole day there were at least two people distributing the AUQ and one person collecting the completed questionnaires, and ensured that every second-year student who registered on the day received the AUQ package.

## 2.6 Results

Out of 1,450 AUQ packages which were distributed on second year registration day, 729 (50.3%) completed questionnaires were returned. Age of the sample population ranged from 18 to 67 years old with a mean age of 21 ( $SD = 5.7$ ) and a median age of 19. 723 of the questionnaires contained a complete set of responses to the alcohol consumption questions. Figure 2.1 displays the weekly consumption, in units of alcohol, for male and female students. Alcohol consumption ranged from zero to 112 units and the average weekly consumption for the whole sample was 20 units of alcohol ( $M = 20.4, SD = 21.2$ ). On average, students consumed alcohol two or three times a week and typically consumed five or six units. A significant difference was found between the frequency of consumption for males and females, in that the proportion of male students who drank everyday was higher than expected, whereas the proportion of female students who drank two or three times per week was higher than expected,  $\chi^2(6, n = 718) = 26.67, p < .05$ . It was found that 66% (485) of all students consumed 20 units or less, including 4% who drank no alcohol at all, and that 34% (244) of students, regardless of gender, exceeded the recommended weekly limit for males of 21 units. Average weekly consumption for male students was 25 units of alcohol, and 115 (40%) exceeded the recommended weekly limit of 21 units, whilst the average

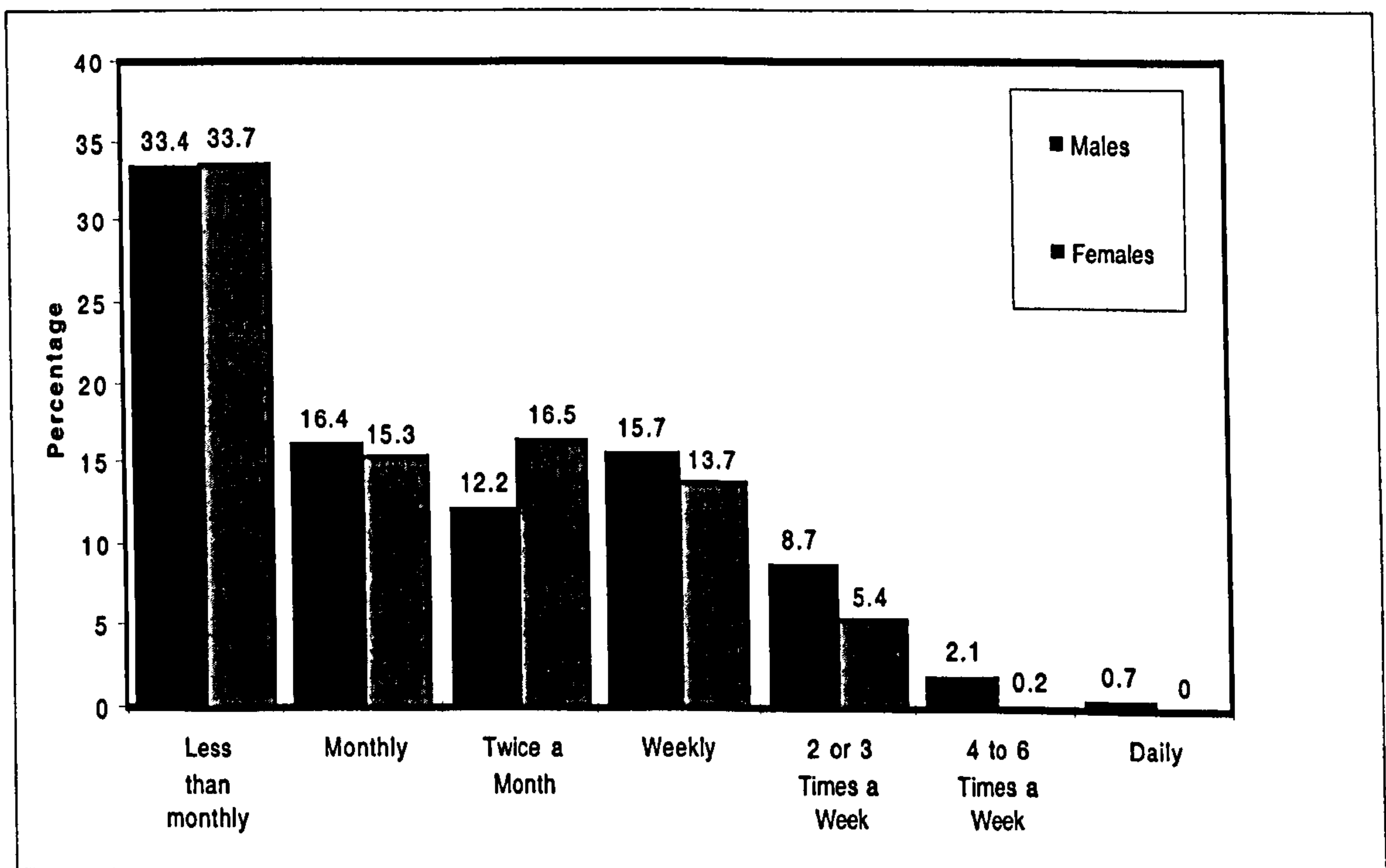
weekly consumption for female students was 17 units of alcohol, and 176 (41%) exceeded the recommended weekly limit for females of 14 units. Male students consumed significantly more units of alcohol ( $M = 25.0$ ,  $SD = 25.2$ ) per week than female students ( $M = 17.4$ ,  $SD = 17.3$ ),  $t(461.06) = 4.47$ ,  $p < .05$ . With the exception of the average weekly consumption for female students, the findings here were lower than those reported by Webb et al. (1996), who surveyed 3,075 second-year students at 10 universities in the U.K. They found that the average weekly consumption for male students was 32 units of alcohol, and 61% exceeded the recommended weekly limit of 21 units. On the other hand, the average weekly consumption for female students was 17 units of alcohol, and 48% exceeded the recommended weekly limit for females of 14 units.



**Figure 2.1.** Weekly consumption in units of alcohol for male and female students.

In respect of binge drinking among students, it was found that 626 respondents (86.8%) indicated that they consumed at least 5 units of alcohol on one occasion, whereas 95 students (13.2%) replied that they never drank 5 or more units at one sitting. Figure 2.2 shows how often students drank 5 or more units on one occasion. For the whole sample it was found that 358 (49.7%) students consumed at least 5 units on one

occasion at a rate of once a month or less. On the other hand 268 (37.3%) students drank at least 5 units at one sitting at least twice a month. Further inspection shows that a slightly higher percentage of male students (49.8%;  $n=143$ ) drank 5 or more units on one occasion monthly or less than female students (49.0%;  $n=208$ ), whereas 39.2 percent ( $n=113$ ) of male students consumed 5 or more units at least twice a month in comparison to 35.8 percent ( $n=152$ ) of female students. Drinking 5 or more units at one sitting from at least once a week to every day was reported by 160 (22.3%) students. Proportionately more male (27.2%;  $n=78$ ) than female students (19.3%;  $n=82$ ) drank 5 or more units at least once a week. It was found, also, that during the previous two weeks men drank 5 or more units on one occasion more often ( $M = 2.99$ ,  $SD = 2.70$ ) than women ( $M = 2.04$ ,  $SD = 1.50$ ), and this difference was significant,  $t(162.80) = 3.35$ ,  $p < .05$ .



**Figure 2.2.** Frequency of male and female students drinking 5 or more units on one occasion.

In comparison to data collected by Delk and Meilman (1996) from undergraduates at a Scottish university and American students, Table 2.4 shows that students in the present study consumed twice as much alcohol per week, on average, than the Scottish students and nearly five times as

much as the American students. Table 2.4 shows also that 33.7 percent of the present sample exceeded the recommended consumption limit for men compared to 10.2 percent of the Scottish students and 4.5 percent of the American students. With respect to proportions of students who abstained from drinking alcohol it can be seen that 3.6 percent of students in the present study drank no alcohol whereas 9.8 percent of Scottish students and 39.3 percent of American students abstained.

Table 2.4

Number of Drinks per Week Consumed by Students from a University in Wales, by students at a Scottish University, and by College Students in the United States

	Welsh Students (N=723)	Scottish Students (N=430)	US Students (N=33,659)
No. of Drinks	%	%	%
None	3.6	9.8	39.3
1	10.0	6.3	12.7
2 - 5	12.4	24.9	22.2
6 - 9	17.7	15.0	7.7
10 - 15	10.4	22.5	10.4
16 - 20	12.2	11.3	3.1
21 or more	33.7	10.2	4.5
Mean	20.4	10.2	4.7
SD	21.0	10.2	8.3

The number of binge drinking episodes reported by students in the two weeks prior to completion of the AUQ is shown in Table 2.5 alongside the comparative proportions cited by Delk and Meilman (1996). Among the students in the present study, 37.3 percent reported at least one binge drinking episode in the previous two weeks compared to 62.6 percent of the Scottish students and 40.4 percent of the American students. Binge drinking three or more times in the previous two weeks was reported by 8 percent of the Welsh students in contrast to 31.4 percent of the Scottish students and 16.3 percent of the American students. There is an apparent contradiction between University of Wales students' higher average

weekly consumption but lower incidence of frequent binge drinking than both Scottish and American students. This arose because the average weekly consumption of frequent binge drinkers at the University of Wales was very high ( $M = 45$  units,  $SD = 31$ ) and inflated the average weekly consumption of the sample as a whole.

Table 2.5

Number of Binges in the Previous Two Weeks Reported by Students in Wales, Scotland, and the United States.

	Welsh Students (n= 721)	Scottish Students (n= 452)	US Students (n= 31,039)
Number of Binges	%	%	%
None	62.8	37.4	59.6
1 or 2	29.3	31.2	24.0
3 or more	8.0	31.4	16.3

Further comparisons were made between the results of the present study and data collected in the Harvard School of Public Health 1999 College Alcohol Study (Wechsler, Lee, Kuo, & Lee, 2000). Table 2.6 shows student patterns of alcohol use, displaying the percentages of students in each category. It should be noted that Wechsler, Dowdall, Davenport, and Rimm (1995) defined binge drinking as the consumption of at least five drinks in a row for men or four drinks in a row for women, whereas the criterion used in the present study varied slightly. It was at least five drinks in a row for men and three and a half drinks for women. This variation was due to the choices available in response to AUQ item three (see page 35). It can be seen, therefore, that there was a far higher proportion of abstainers among the American students (19.2%) than the Welsh students (3.6%), whereas the proportion of nonbinge drinkers was higher among the Welsh students (57.6%) in comparison to the American students (36.6%). Among the binge drinkers 14 percent more of the American students than the Welsh students binged three or more times in

the previous two weeks. It can be noted, however, that there was little difference between the proportions of Welsh students (38.8%) and American students (44.1%) who reported binge drinking, and a similarly small difference between the proportions of Welsh students (61.2%) and American students (55.8%) who did not practise binge drinking.

Table 2.6

Welsh Students' Patterns of Alcohol Use in Comparison to Students in the 1999 College Alcohol Study.

Category	Welsh Students (n=721)  %	Harvard School of Public Health 1999 College Alcohol Study (n=13,819)  %
Abstainer	3.6	19.2
Nonbinge Drinker*	57.6	36.6
Occasional Binge Drinkert†	30.6	21.4
Frequent Binge Drinker§	8.2	22.7

\*Students who consumed alcohol but did not binge

†Students who binged 1 or 2 times in a 2 week period

§Students who binged 3 or more times in a 2 week period

The relationship between the pattern of alcohol consumption among students and alcohol-related consequences was assessed with bivariate correlations. Scores on the AUQ were converted to produce a full score on the AUDIT screening questionnaire as well as the three component scores of the AUDIT; alcohol consumption, alcohol dependence, and alcohol problems. Table 2.7 shows male and female students' mean scores for the complete AUDIT as well as the three components. According to Saunders, Aasland, Babor, de la Fuente, and Grant (1993), there are two cut-off scores on the AUDIT which may be used depending on the aims of the intended research project. A total score of eight or more produces the highest sensitivity, whilst a total of ten or more represents a score of higher specificity. Students in the present study

had a mean total score of 10.46 ( $\underline{SD}$ = 6.24) and the bulk of that score came from the alcohol consumption component ( $\underline{M}$ = 6.59,  $\underline{SD}$ = 2.78).

Table 2.7

AUDIT Scores for Male and Female Students at a University in Wales.

AUDIT	Males	Females
<b>Alcohol Consumption: Hazardous Use</b>		
Mean (SD)	6.99 (2.80)	6.31(2.76)
Range (n)	0-12 (288)	0-11(426)
<b>Alcohol Dependence:</b>		
Mean (SD)	1.59 (2.18)	1.02(1.55)
Range (n)	0-10 (289)	0-9(426)
<b>Alcohol Problems: Harmful Use</b>		
Mean (SD)	3.34 (3.48)	2.22(2.74)
Range (n)	0-16 (289)	0-14(426)
<b>AUDIT Total Score:</b>		
Mean (SD)	11.84 (6.83)	9.53(5.67)
Range (n)	0-37 (291)	0-33(428)

AUDIT Alcohol Consumption: Minimum=0; Maximum=12.  
 AUDIT Alcohol Dependence: Minimum=0; Maximum=12.  
 AUDIT Alcohol Problems: Minimum=0; Maximum=16.  
 AUDIT Total Score: Minimum=0; Maximum=40.

Using a cut-off AUDIT total score of eight or more, 67.1 percent ( $\underline{n}$ = 729) met this criterion which indicated a strong likelihood of hazardous or harmful alcohol consumption among these students. Taking a cut-off AUDIT total score of ten or more reduced the proportion of students who were very likely to be practising hazardous or harmful alcohol use to 43.8

percent. However close examination of the AUDIT component scores showed elevated scores on the items contributing to alcohol consumption in contrast to low scores on the items contributing to both alcohol dependence and alcohol problems. On this basis the students in the present study indicated a strong likelihood of hazardous alcohol use, if meeting the AUDIT cut-off criteria.

The results showed that male students ( $M = 6.99$ ,  $SD = 2.80$ ) scored higher on the AUDIT alcohol consumption items than female students ( $M = 6.31$ ,  $SD = 2.76$ ). This difference was significant,  $t(712) = 3.23$ ,  $p < .05$ , two-tailed. Similarly, a significant difference,  $t(544.43) = 4.76$ ,  $p < .05$ , two-tailed, was found between the AUDIT total scores recorded by males ( $M = 11.84$ ,  $SD = 6.83$ ) in comparison to females ( $M = 9.53$ ,  $SD = 5.67$ ). Both male and female students generally scored low on the items related to alcohol dependence and alcohol problems. However, there was a significant difference in the proportions of male (3.8%;  $n = 11$ ) and female (1.2%;  $n = 5$ ) students scoring high on the AUDIT alcohol dependence items, in that a higher proportion of males recorded elevated dependence scores than females,  $\chi^2(1, n = 715) = 5.45$ ,  $p < .05$ . A similar result was found in the case of scores from the alcohol problems component of the AUDIT, in that a higher proportion of males (11.1%;  $n = 32$ ) than females (4.0%;  $n = 17$ ) scored highly on those items,  $\chi^2(1, n = 715) = 13.53$ ,  $p < .05$ .

Table 2.8 shows the correlations between three AUDIT component scores and three consumption variables as well as four variables that represent the frequency of binge drinking and the drinking categories abstainer, nonbinge drinker, occasional binge drinker, and frequent binge drinker. Scores on the two AUDIT components Dependence and Problems were summed to produce a composite score that best represented the adverse consequences of heavy drinking.

All the AUDIT scores were significantly, positively related with the alcohol consumption variables and drinking category. In the case of the drinking variables, the strongest correlations across all three AUDIT scores were found for the typical amount of alcohol consumed by students per week. The largest correlation of all was the one between the typical weekly



amount and the AUDIT Consequences score, with the relationship explaining 30 percent of the variance in the occurrence of adverse consequences. Thus, the more alcohol a student usually drank per week the more likely that student was to be practising alcohol use that was harmful to her/his health and indicative of alcohol dependence. The relationship suggests that the more alcohol students drink per week the more they will experience a greater number and higher frequency of adverse consequences.

Correlations between the measures of binge drinking, using the two alternative definitions, showed a significant, positive relationship with all the AUDIT variables. The number of times a student drank five or more drinks in a row in the previous two weeks was most highly correlated with the AUDIT Consequences score, accounting for 16 percent of the variance. Using a gender specific definition of binge drinking (5 or more drinks for males, 4 or more for females) decreased the strength of this relationship which then explained 14 percent of the variability in AUDIT Consequences scores. These results suggest that the more often students binge drink the more likely they are to experience adverse consequences and be drinking in a way that is hazardous and harmful to their health. Furthermore this association is strongest when binge drinking is defined without respect to gender.

A similar pattern of correlations in regard to the drinking category to which students were assigned can be seen in Table 2.8. There was a significant, positive relationship between drinking category group membership and all AUDIT scores and the relationships were strongest when binge drinking was defined without respect to gender. Therefore, an increase in the measure of harmful alcohol use can be observed across the four groups, Abstainers, Nonbinge Drinkers, Occasional Binge Drinkers, and Frequent Binge Drinkers, and this association is strongest when binge drinking is defined without regard to gender. Therefore, regardless of gender, frequent binge drinkers are likely to report the greatest number and frequency of adverse consequences and to display the strongest indication of alcohol use that is harmful to their health.

Table 2.8

Correlations of AUDIT Scores with Alcohol Consumption Variables and Drinking Category Group Membership.

Variables	AUDIT Dependence Score	AUDIT Problems Score	AUDIT Consequences Score
Usual Frequency of Alcohol Consumption per Week	.35 r <sup>2</sup> =.12	.42 r <sup>2</sup> =.18	.45 r <sup>2</sup> =.20
Typical Amount of Alcohol Consumed per Day	.31 r <sup>2</sup> =.10	.39 r <sup>2</sup> =.15	.41 r <sup>2</sup> =.17
Typical Amount of Alcohol Consumed per Week	.44 r <sup>2</sup> =.19	.51 r <sup>2</sup> =.26	.55 r <sup>2</sup> =.30
Binge Frequency <sup>a</sup>	.36 r <sup>2</sup> =.13	.36 r <sup>2</sup> =.13	.40 r <sup>2</sup> =.16
Binge Frequency <sup>b</sup> (Gender Specific)	.34 r <sup>2</sup> =.12	.34 r <sup>2</sup> =.12	.38 r <sup>2</sup> =.14
Drinking Category Group <sup>c</sup>	.32 r <sup>2</sup> =.10	.32 r <sup>2</sup> =.10	.37 r <sup>2</sup> =.14
Drinking Category Group <sup>d</sup> (Gender Specific)	.30 r <sup>2</sup> =.09	.30 r <sup>2</sup> =.09	.34 r <sup>2</sup> =.12

Note. All correlations are significant at  $p < .001$ , two-tailed.

a: Frequency of students consuming 5 or more drinks in a row at least once in the previous 2 weeks.

b: Frequency of male students consuming 5 or more drinks in a row and female students consuming 4 or more drinks in a row at least once in the previous 2 weeks.

c: Membership of the groups Abstainers, Nonbinge Drinkers, Occasional Binge Drinkers, Frequent Binge Drinkers.

d: Membership of the above groups based on the gender specific definition of binge drinking.

The final data analysis was aimed at answering two questions. First, does the frequency of binge drinking affect the number of adverse consequences students experience? Second, when binge drinking is defined regardless of gender, do males experience the same number of consequences as females? Table 2.9 shows the mean number of consequences for male and female students separately in the three drinking categories, Nonbinge Drinkers, Occasional Binge Drinkers, and Frequent Binge Drinkers. Means derived from a gender specific definition of binge drinking (5 or more for males, 4 or more for females) are

displayed in comparison to the number of consequences in each category under a non-gender specific definition of binge drinking (5 or more drinks in a row for males and females).

Table 2.9

Number of Consequences Reported by Male and Female Drinkers under both a Gender Specific and a Non-Gender Specific Definition of Binge Drinking.

Drinking Category	Gender Specific Definition of Binge Drinking		Non-Gender Specific Definition of Binge Drinking	
	Males Consequences	Females Consequences	Males Consequences	Females Consequences
Nonbinge Drinkers	M= 3.69 SD=3.92 (n=165)	M= 2.50 SD=3.03 (n=250)	M= 3.69 SD=3.92 (n=165)	M= 2.41 SD=3.01 (n=262)
Occasional Binge Drinkers	M= 6.20 SD=5.11 (n=80)	M= 4.26 SD=4.03 (n=138)	M= 6.20 SD=5.11 (n=80)	M= 4.59 SD=4.01 (n=128)
Frequent Binge Drinkers	M= 8.88 SD=6.36 (n=33)	M= 6.38 SD=5.64 (n=26)	M= 8.88 SD=6.36 (n=33)	M= 6.67 SD=5.72 (n=24)

A two-factor analysis of variance was conducted on the data under each definition of binge drinking, followed by a Bonferroni modified least-significant difference test to determine the source of any significant main effects. Taking the results from the gender specific definition of binge drinking first, there was a main effect for drinking category,  $F(2, 686) = 42.47, p < .01$ , with Occasional Binge Drinkers reporting significantly more consequences than Nonbinge Drinkers ( $p < .05$ ), and Frequent Binge Drinkers experiencing significantly more consequences in comparison to Occasional Binge Drinkers ( $p < .05$ ). There also was a main effect of gender,  $F(1, 686) = 19.70, p < .001$ , in that male students reported significantly more problems than female students. Comparisons showed

that males who were Occasional Binge Drinkers experienced significantly more consequences than female Occasional Binge Drinkers ( $p < .05$ ), whereas there was no significant difference between male and female Frequent Binge Drinkers. Figure 2.3 shows the mean number of consequences for male and female students in each of the three drinking categories, with a binge being defined as five or more drinks in a row for males and four or more for females. There was no interaction between Drinking Category and Gender. The comparisons, therefore, showed that male students frequently drinking five or more drinks in a row and female students frequently drinking four or more experienced the same number of consequences. On the other hand, men who occasionally drank five or more drinks in a row experienced significantly more consequences than women who occasionally drank four or more drinks in a row.

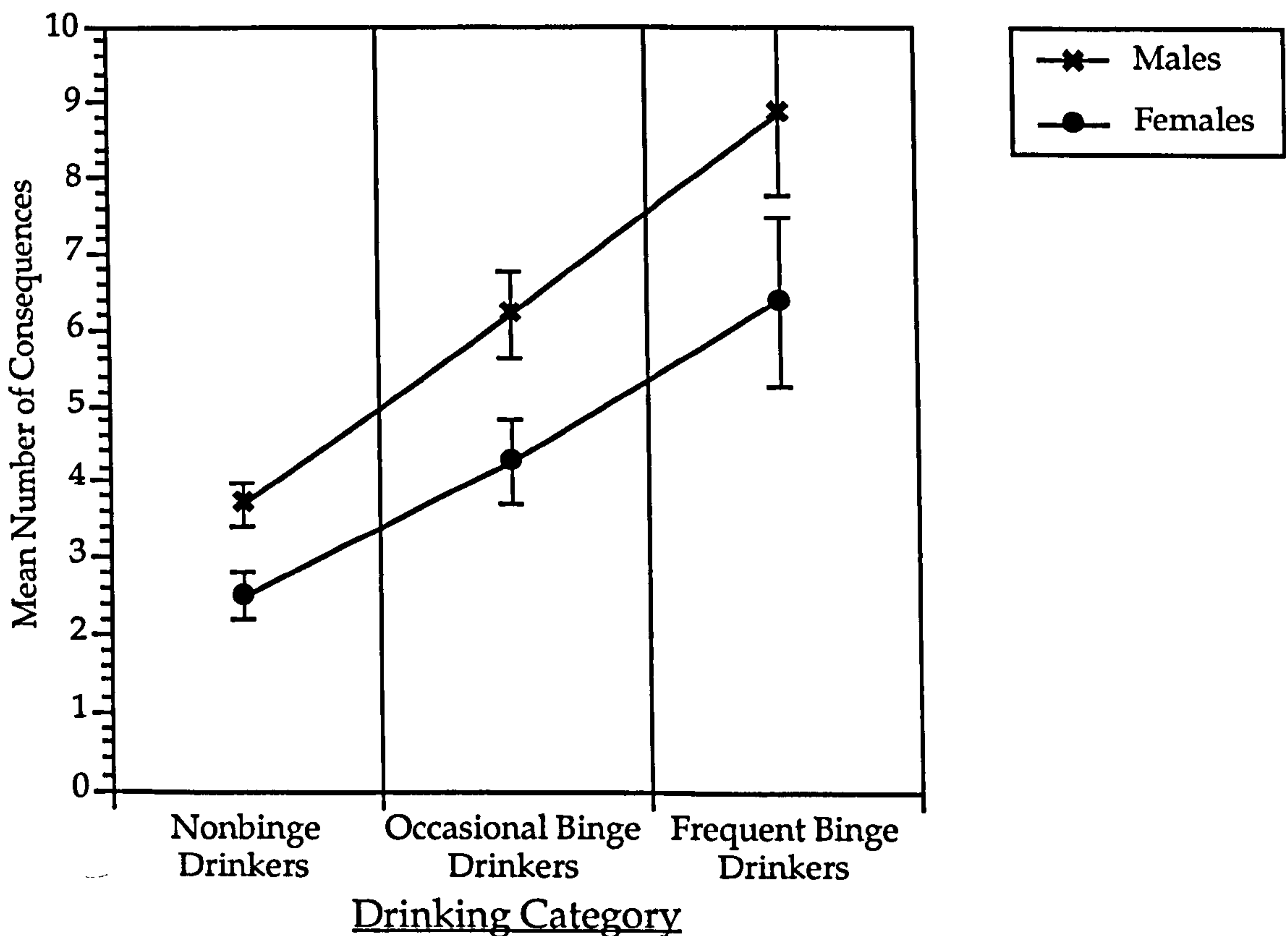
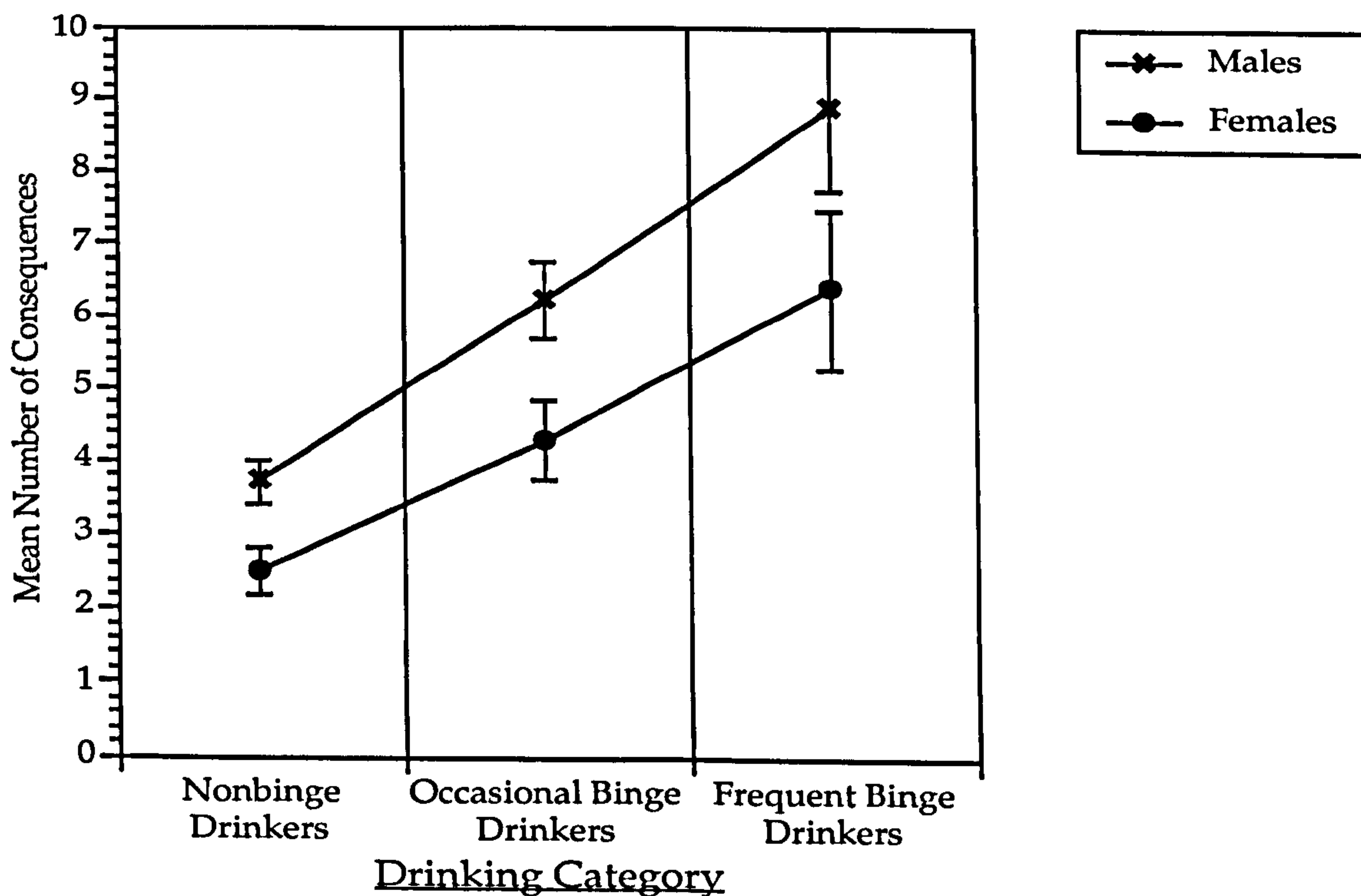


Figure 2.3. Mean consequences for male and female students in each of the drinking categories (Gender-specific definition of binge drinking).

Moving on to the concluding analysis using a non-gender specific definition of binge drinking, there was a main effect for drinking category,

$F(2, 686) = 47.38, p < .01$ , with Occasional Binge Drinkers reporting significantly more consequences than Nonbinge Drinkers ( $p < .05$ ), and Frequent Binge Drinkers experiencing significantly more consequences in comparison to Occasional Binge Drinkers ( $p < .05$ ). There also was a main effect of gender,  $F(1, 686) = 15.88, p < .001$ , in that male students reported significantly more problems than female students. The interaction between Drinking Category and Gender was found to be nonsignificant.

Figure 2.4 shows the mean consequences reported by male and female students in each of the three Drinking Categories, with a binge being defined as five or more drinks in a row for males and females. Bonferroni modified least-significant difference tests showed no significant differences in the number of consequences between male and female Occasional Binge Drinkers and male and female Frequent Binge Drinkers. Therefore, when defining binge drinking, regardless of gender, male and female binge drinkers experience the same level of consequences whether they binge drink occasionally or frequently.



**Figure 2.4.** Mean consequences for male and female students in each of the drinking categories (Nongender-specific definition of binge drinking).

## 2.7 Discussion

The results of the screening survey of students provided a picture of the rates of drinking, patterns of consumption, and the problems associated with drinking alcohol among second year undergraduates in North Wales. The majority of students, both male and female, drank alcohol at a weekly rate which was within the recommended guidelines for safe drinking. However, a substantial minority of both male and female students exceeded the recommended limits. The typical weekly amounts of alcohol reported by the heavy drinking minority served to inflate the average weekly consumption which exceeded recommended limits for both male and female students. Nearly one quarter of students reported an average weekly consumption of between 21 and 40 units, and one in ten students consumed between 41 and 112 units per week on average.

Such a high consumption rate probably resulted in part from the timing of the survey which took place on, and around, registration day. This period of the new academic year is characterised by social events and traditionally viewed as a time of much celebration and accompanying high levels of alcohol use. This is a limitation of the study, therefore, that makes it necessary to qualify the data in terms of the time of year at which students are sampled. Student drinking will fluctuate over time dependent on a variety of factors including available money, academic workload, and traditional celebratory times of the year such as Christmas, New Year, and the completion of end of semester examinations. As Vik, Culbertson, and Sellers (2000) pointed out, surveys of student drinking in general are limited by their cross-sectional design, which is a restriction that can best be overcome in a longitudinal study. However, the present screening survey provided a 'snapshot' of concurrent alcohol use among students, with the limitation that the data were collected during what can reasonably be termed a peak period for alcohol consumption.

Typical patterns of alcohol use were reflected in the data related to binge drinking. Using a broad definition of binge drinking as the consumption of five or more units on one occasion, an overwhelming

majority of students had practised this style of consumption in the recent past. More than a third of all students practised binge drinking at least once a fortnight and over a fifth did so at least once a week. Men binged more often than women by a ratio of three to two times a fortnight.

The overall pattern that emerged was that the majority of students drank within safe limits. At the same time approximately a third of students were drinking large amounts of alcohol on a regular basis and although about the same number of women as men were exceeding their respective recommended limits, men were the higher consumers. Women typically drank less, usually drank less often, binged less often than men, and appeared to be practising safe drinking to a greater degree than men.

North Wales students showed a different pattern of alcohol use than the Scottish and American students in Delk and Meilman's (1996) study. The results showed that Welsh students consumed more alcohol, and less of them abstained, than either the Scottish or American students. In comparison to the Scottish students, more than three times as many Welsh students were drinking at excessive levels, whilst nearly eight times as many Welsh as American students were the heaviest consumers. On the other hand, fewer of the Welsh students practised binge drinking than either the Scottish or American students, with nearly four times as many Scottish students bingeing three or more times in the previous two weeks and twice as many American students binge drinking at the same frequency.

Therefore, the Welsh students were consuming considerably more alcohol than either the Scottish or American students when they binged. It is possible that this clear difference in consumption patterns originated from the Welsh students being surveyed at a time of peak consumption, as discussed earlier. Also, cultural differences in norms, attitudes, and expectations regarding the use of alcohol, might explain the glaring difference between the Welsh and American students, but would not account for the discrepancy between the Welsh and Scottish students.

Discrepancies of a similar nature were seen in the comparisons that

were made between Welsh undergraduates and the American students sampled in the College Alcohol Study (Wechsler et al., 2000). Far more American students abstained from drinking than Welsh students, whilst far fewer Welsh students frequently binged than American students. However, the proportion of students who binged at least once in the previous two weeks was similar for the two sets of students, and similar also to the rate obtained in other large scale surveys (Johnston et al., 1997, 1998; Presley et al., 1996).

Despite the difference in sampling methods between the present study and the surveys conducted by Delk and Meilman (1996) and Wechsler et al. (2000), the comparisons that were carried out identified a major difference in consumption patterns between the students in North Wales and the students in Scotland and those in the U.S.A. Namely, the binge drinking students in North Wales drank considerably more alcohol when they binged than the other students.

It is not surprising to learn that British students drink more than American students given that, in the U.K., excessive drinking by students is tolerated, and generally viewed as expected and, to a degree, acceptable (Murgraff et al., 1999; Norman et al., 1998). On the other hand, students in different parts of the U.K. would not be expected to differ radically in patterns of drinking. If the difference is not attributable to the time in the academic year when students were sampled then it may arise from local differences in the availability of inexpensive alcohol. For example, students who regularly binge drink at the Students Union bars, in a pub, or at a club may consume far more than they usually drink because they find that alcohol is on sale at reduced prices and, therefore, they obtain more alcohol for their available money.

Examination of the scores on the AUDIT questionnaire revealed that, using the more conservative recommended cut-off point of eight or more, the majority of students satisfied the criteria for hazardous or harmful alcohol use which contradicted the earlier finding that the majority of students drank below the recommended safe levels. However, using a cut-off point of ten or more produced a more consistent result in



that a minority of students, albeit a substantial one, were drinking in a hazardous and harmful manner. It should be noted, also, that the scores related to alcohol dependence and alcohol problems were low while it was the index of alcohol consumption that heavily contributed to the total AUDIT score. This result can be interpreted simply by saying that students were drinking in a manner that was hazardous but not necessarily harmful nor indicative of alcohol dependence. In addition, males significantly outscored females on all AUDIT indices and are, therefore, the most likely to be drinking in a hazardous way.

It is noteworthy that all the AUDIT indices were significantly, positively related to all the alcohol variables. Standing out as the best predictor of hazardous or harmful drinking was the weekly amount of alcohol a student usually consumed rather than the frequency at which a student binge drank. Moreover, the usual weekly amount of alcohol consumed best predicted both the indicator of alcohol dependence and the problems related to alcohol use. In this instance, it is reasonable to expect a measure of usual weekly intake of alcohol to be highly associated with alcohol dependence. However, given that previous research has established a strong link between student binge drinking and problems, it is not reasonable to expect a relationship between usual weekly intake and alcohol problems to exist that is stronger than the one between measures of binge drinking and alcohol problems. The explanation for this unexpected result may be simply that binge drinking was the usual pattern of use among these students and, therefore, the usual amount of alcohol a student reported drinking per week was the best predictive measure of alcohol-related problems rather than the frequency at which a student binge drank.

In the case of the two pairs of measures of binge drinking, binge drinking frequency and drinking category, the strongest relationships were seen when defining a binge as consuming 5 or more units in a row at least once in the previous two weeks regardless of gender. On this basis, the number of times a student binged in the previous two weeks best predicted the number of adverse consequences experienced, and the drinking

category to which a student was assigned best predicted hazardous or harmful use of alcohol. These results showed that the most accurate predictive measure of adverse consequences was the frequency of binge drinking rather than the drinking categories ordinarily used in the College Alcohol Study (Wechsler et al., 2000). This was because the binge drinking frequency, derived from the AUQ, was more detailed than the drinking category variable in which individuals were assigned to a group on the basis of broad criteria.

The final results showed that, regardless of which of the two binge drinking definitions was used, binge drinkers experienced more adverse consequences than nonbinge drinkers. In addition, students who binge drink three or more times in the previous two weeks experienced more adverse consequences than those who binge drink once or twice in the same time period. Therefore, the frequency of binge drinking increases the amount of adverse consequences related to alcohol use that a student experiences.

In answer to the final question, "Do male binge drinkers experience the same number of consequences as female binge drinkers?", the data analysis produced a conditional result. Namely, when defining binge drinking the same way for male and female students, male binge drinkers experienced the same level of consequences as female binge drinkers. However, when binge drinking was defined differently for male and female students, then male frequent binge drinkers experienced the same level of consequences as female frequent binge drinkers, whilst men who were occasional binge drinkers experienced more consequences than women who were occasional binge drinkers.

Taken on its own, the first part of the answer is evidence that binge drinking can be defined without reference to students' gender, which is contrary to the recommendations made by Wechsler, Dowdall, Davenport, and Rimm (1995) who concluded that females, who drank four drinks in a row, were as likely as males, who drank five drinks in a row, to experience the same level of alcohol-related consequences. The second part of the answer was inconclusive. Both males frequently drinking five in a row

and females frequently drinking four in a row experienced the same level of consequences, but, among occasional binge drinkers, men experienced more consequences than women which should not be the case under a gender-specific definition.

It appears, therefore, that there is little evidence to support a gender specific definition of binge drinking. However, the vast majority of published safe drinking guidelines, including those from government sources, recommend gender-specific limits that reflect the well-established differential effects of alcohol on men and women (Ashley, Ashley, Rehm, Walsh, Single, & Room, 1999; BMA, 1995; Department of Health, 1995; International Centre for Alcohol Policies, 1996; U.S. Department of Agriculture, 1995). Gender-specific recommendations of safe drinking limits are based on women's increased vulnerability to medical illnesses such as liver and heart disease. This vulnerability is attributed to the lower metabolic rates of women and the consequent higher blood alcohol levels when drinking the same amounts as men. But the present study, in common with other surveys of binge drinking among students, measures the behavioural consequences of heavy drinking rather than the incidence of disease. It is important, therefore, to reliably determine the level of alcohol use at which a student is susceptible to adverse behavioural consequences, and whether or not that level is different for women and men.

### 2.7.1 Limitations and Recommendations

There are a number of potential sources of error in the data collected from the self-report questionnaire on which the survey was based. The validity of self-reported alcohol use has been the subject of much discussion because of the possibility that over- and under-estimation, as well as untruthfulness, might distort the results. A number of studies have provided support for the validity of self-report data in alcohol research (see Maisto, McKay, & Connors, 1990; Midanik, 1982; Sobell & Sobell, 1990; Sobell, Toneatto, & Sobell, 1994). However, Midanik, Hines, Barratt, Paul, Crosby, and Stall (1998) found that summary measures of alcohol use, similar to the one used in the present study, yielded higher

estimates of consumption than a Timeline Follow-back interview technique (Sobell & Sobell, 1992). On the other hand, O'Hare (1991) showed that a retrospective drinking-diary method, which is similar to the Timeline technique, produced higher estimates of average alcohol consumption and heavy drinking than a standard summary measure.

Despite this conflicting evidence, Babor, Brown, and Del Boca (1990) asserted that self-report data are relatively accurate if the participants are not intoxicated, confidentiality is assured, and the wording of questions is clear and understandable. The last two points were adequately addressed in the present study, but it was not possible to control for participants being intoxicated when completing the questionnaire, such as through the use of breathalysers. However, it may reasonably be expected that students would complete their registration first and then go for a drink afterwards than vice versa.

Apart from the issue of self-reports, distortions in the data could arise from non-responding and the time of year at which the data were collected. There was a large enough sample in the present study to be confident that it provided a representative example of second-year students' alcohol use, although it is possible that non-responders were more likely to be heavy drinkers than light drinkers because heavy drinkers would be the most likely to miss registration day as a result of intoxication, illness, or a hangover. However, the data showed that heavy drinkers did attend registration and completed the questionnaire.

The time of year at which the study was conducted was problematic because students provided information regarding their current use of alcohol at a time of peak consumption. There is nothing to say, therefore, that these students did not drink at a lower level for the rest of the year. However, it seems safe to assume that there would be other times of peak consumption throughout the year.

The obvious way to address these problems is to conduct a longitudinal study across an academic year. Following collection of cross-sectional data, a representative subsample of students could be studied using drinking-diary techniques that include a measure of the number and

nature of adverse consequences. In this way a clear picture of student drinking and attendant problems could be obtained.

Comparisons with other survey data were problematic because different instruments were used. Apart from the different wording of questionnaires there is the problem of the equivalence of drinks or units from country to country, which devalues any comparisons to some extent. However, the data yielded percentages of heavy drinkers and nonbinge drinkers that were remarkably similar to those reported by the Core Alcohol and Drug Survey (Presley, Meilman, Cashin, & Lyster, 1996), the Monitoring the Future project (Johnston, O'Malley, & Bachman, 1998), and the College Alcohol Study (Wechsler, et al., 2000). Comparisons were limited though and only tentative statements can be made regarding alcohol use among the students in the present study and those in other countries. Future cross-cultural research should aim at standardising measures of alcohol consumption.

In a similar vein, the indices of alcohol-related problems/consequences were not directly comparable between the College Alcohol Study (Wechsler et al., 2000) and the present study. The College Alcohol Study measured the prevalence of 12 alcohol-related problems, three of which are directly comparable with AUDIT consequences of which there are seven. Two others are expressed by one AUDIT item in a less specific way. Therefore, analysis of the relationships between alcohol use and problems/consequences was based on two different measures that were only broadly comparable at best. However, the analysis was aimed at determining the degree and strength of a measure of consequences defined by the AUDIT, without regard to other definitions, in an effort to scale binge drinking in terms of adverse consequences.

Finally, and following from the previous point, O'Hare, Cohen, and Sherrer (1997) stressed that the validity of alcohol consumption measures in relation to problem drinking among students has not been clearly determined. This point should be emphasised because binge drinking, under competing definitions, has become a benchmark for problem drinking among students without the establishment of a valid

relationship between alcohol consumption and problems/consequences. As O'Hare et al. (1997) stated, alcohol measures either need to be correlated with the frequency and severity of adverse consequences that distinguish the episodic, less serious from the chronic, more serious, or should be related to a standardised measure of problem drinking such as the AUDIT. Future research should aim for an unequivocal answer to the question of gender-specificity in binge drinking. In addition, the question of which alcohol use measure best predicts adverse consequences should be clarified.

### 2.8 Conclusion

The survey of second-year undergraduates at a university in North Wales showed that a substantial minority of students consumed alcohol to excess. It appeared that this minority consumed considerable amounts of alcohol at a time in the academic year that is viewed as a period of peak consumption. Adverse alcohol-related consequences were most strongly associated with the average weekly amount of alcohol a student consumed rather than the frequency at which a student binge drank. It was inferred from the results that binge drinking was the typical pattern of drinking among a substantial minority of students and that this pattern is repeated at peak consumption times throughout the academic year. Whether or not some students drink this way on a regular basis can only be speculated upon, but the suspicion is that regular heavy drinking is only constrained by lack of money, academic workload, and possibly adverse consequences.

Only tentative concluding statements can be made regarding comparisons with students in other countries. The North Wales sample showed a different pattern of drinking than both the American and Scottish samples. It appeared that students in North Wales drank more per week on average than American and Scottish students. There were fewer abstainers and fewer drinkers who binged three times or more in the previous two weeks among the North Wales students than either the American or Scottish students. A greater proportion of the North Wales students were consuming the greatest amount of alcohol than both the

American and Scottish students. Cultural factors were thought to account for the differences between North Wales students and American students. On the other hand, cultural norms would not be expected to adequately explain the difference between North Wales students and Scottish students. Possibly local student environments make a difference within the U.K. where heavy drinking is generally tolerated. However, it could simply be that the North Wales students were sampled at a time of peak consumption, whereas the Scottish students were surveyed during a low consumption period.

Although students drank excessively, particularly in a binge drinking pattern, few showed signs of alcohol dependence. Binge drinking students experienced more adverse consequences than nonbinge drinking students and the number of problems increased with the number of binge drinking occasions. Drinking five or more units of alcohol in a row at least once in two weeks will place students at risk for experiencing adverse consequences and the risk will increase with the frequency of this pattern of consumption.

Male students consumed more alcohol, drank more often, binged more frequently, experienced a greater number of adverse alcohol-related problems, and practised safe drinking less frequently than female students. In addition, more males than females showed signs of alcohol dependence. Men and women, in the main, experienced the same level of consequences when they binge drank, regardless of whether a gender specific or non-specific definition of a binge was used. It was concluded, therefore, that there was little support for a gender-specific measure of binge drinking, and that possibly an alternative alcohol use measure based on the typical weekly consumption represented a more accurate indicator of risky drinking.

## Chapter 3

### Reasons for Drinking and Drinking Situations as Predictors of Alcohol Consumption among College Students

People consume alcohol for a wide range of reasons and in a number of situations. Reasons for drinking and drinking situations are alcohol-related domains that are complementary to some extent. For example, individuals will report drinking alcohol at a social event because everybody else does so and they have a better time after consuming a few drinks in that situation. Drinking occurs within a context and, therefore, contextual details are important for a full understanding of alcohol use. As Beck, Summons, and Thombs (1991) stated, context can be viewed as a combination of the social and motivational aspects of drinking, and the details related to both where and why drinking occurs should be more informative than either of those domains taken separately.

Research into the reasons people give for their drinking and the type of situations in which they consume alcohol has typically focused on one or the other rather than the two in tandem. Hence, here the two domains will first be considered separately.

#### 3.1 Reasons for Drinking

Reasons for drinking have been conceptualised and measured in a number of ways. Early research used a two-dimensional scheme which distinguished social from personal reasons for the consumption of alcohol (Cahalan, Cisin, & Crossley, 1969; Farber, Khavari, & Douglass, 1980). Farber et al. (1980), using factor analytic techniques, developed a questionnaire that measured two dimensions labelled positive reinforcement motives and negative reinforcement motives. The former set of motives related primarily to those of a social and affiliative nature, whilst the latter type of reasons referred essentially to counteracting negative mood (Carey & Carey, 1995). Negative reinforcement motives have often been labelled simply as escape drinking/coping motives, and positive reinforcement motives have been described as social drinking/social enhancement reasons (MacLean & Lecci, 2000).



Further research indicated that a three-dimensional model explained alcohol use motives better than a two-dimensional one (Connors, O'Farrell, Cutter, & Thompson, 1987; Cutter & O'Farrell, 1984; Newcomb, Chou, Bentler, & Huba, 1988). On this basis, Cooper, Russell, Skinner, and Windle (1992) developed a three-dimensional measure of drinking motives, called the Drinking Motives Questionnaire, by factor analysing 21 reasons for drinking drawn from previous research (Beckwith, 1987; Cahalan et al., 1969; Mulford & Miller, 1963; Polich & Orvis, 1979; Snow & Wells-Parker, 1986). This third dimension referred to positive reinforcement motives specifying the use of alcohol to enhance positive affect that were distinct from both social and coping reasons for drinking.

It is possible, therefore, that the two-dimensional model inadvertently oversimplified positive reinforcement motives by judging drinking, both to obtain positive social rewards and to enhance positive affect, as one dimension. In a similar way, although three dimensions conveyed more detail in regard to drinking motives than two dimensions, a three-dimensional model failed to separate two types of social motives, one positive and the other negative, respectively drinking to obtain positive, social rewards and drinking to avoid social censure or rejection.

Aiming to clarify the situation, Cooper (1994) argued that four empirically distinct drinking motives could be identified on the basis of Cox and Klinger's (1988, 1990) motivational model of alcohol use. Cooper (1994) designated motives in terms of their valence (positive or negative) and their source (internal or external). The four classes of motives can be described thus: (1) internal, positive reinforcement motives (drinking to enhance positive affect), (2) external, positive reinforcement motives (drinking to obtain positive social rewards), (3) internal, negative reinforcement motives (drinking to reduce or regulate negative affect), (4) external, negative reinforcement motives (drinking to avoid social censure or rejection). As Cooper (1994) pointed out, the vast majority of research had concentrated on only two classes of motives, drinking to regulate negative affect (coping motives) and drinking to obtain positive

social rewards (social motives).

It should be noted here that Cooper's (1994) scheme was a slight misinterpretation of Cox and Klinger's (1988, 1990) model. In this model positive and negative motives were crossed with the pharmacological and instrumental effects of alcohol rather than an internal or external source. In other words, the effects of drinking are experienced directly in the chemical action of alcohol or indirectly as when drinking with other people brings with it a feeling of camaraderie for example.

Research into drinking motives has shown that the consumption of alcohol to cope with negative affect is associated with heavy and abusive drinking, drinking alone, and alcohol-related consequences among adolescents (Cooper, 1994; Reifman & Windle, 1994; Windle & Windle, 1996), adults (Carey & Carey, 1995; Cooper et al., 1992; Glynn, LoCastro, Hermos, & Bosse, 1983; Snow & Wells-Parker, 1986), and college students (Bradley, Carman, & Petree, 1992; Carey & Correia, 1997; Jessor, Carman, & Grossman, 1968; Klein, 1992; Ratliff & Burkhart, 1984). On the other hand, social drinking, both to obtain positive social rewards and to enhance positive affect generally, was found to strongly predict alcohol consumption among students (Bradley et al., 1992; Carey & Correia, 1997; Ratliff & Burkhart, 1984). Other researchers have pointed to other, contradictory results which showed either a weak association or no association at all between social drinking and consumption level (Carey & Carey, 1995; Farber et al., 1980). Carey and Correia (1997) suggested that this ambiguity may have arisen because all of these studies used the two-dimensional measure which confounded the social and affective components. However, in the case of Carey and Carey (1995) the explanation may lie in the type of sample used in the study, which tested drinking motives among psychiatric outpatients, a third of whom had been treated for alcohol/drug problems.

Despite the problems related to the optimum number of dimensions necessary to fully express motives for drinking alcohol, a common thread is apparent in the research into college students' reasons for their use of alcohol. Ratliff and Burkhart (1984) measured the drinking

motives of 140 undergraduates by the use of the Reasons for Drinking Questionnaire (RFDQ; Farber et al., 1980). The results showed that heavy drinkers scored higher on both positive social and negative affective reasons than moderate drinkers, and that heavy drinkers experienced more problems related both to their physical health and with authority than moderate drinkers. In addition, and in contradiction of Ratliff and Burkhardt's (1984) expectations, male students were more likely to report negative affective reasons for their drinking than female students, and women, in contrast to men, experienced fewer problems.

Subsequent studies by Klein (1992) and Bradley et al. (1992) supported the previous findings. The former study investigated a set of 23 reasons for drinking among 515 undergraduates of whom the men were the most likely to report drinking for negative reinforcement and to experience the most alcohol-related problems. The latter study used two drinking motive scales entitled "negative personal" and "positive social" to predict alcohol consumption and alcohol-related problems in two separate samples of 553 students and 293 students. Negative personal reasons predicted heavy drinking and related problems. However, this study also found that both negative personal and positive social reasons contributed independently to the overall prediction of problems.

In an evaluation of the relationship between drinking motives and problems among 139 college students, Carey and Correia (1997) used the two-dimensional Reasons for Drinking Questionnaire (RFDQ; Farber et al., 1980). There were three main findings of this evaluation. First, drinking motives of both types predicted alcohol-related problems over and above the number of problems explained by the level of alcohol consumption. Second, both negative and positive reinforcement motives directly and indirectly influenced the occurrence of problems, but negative reinforcement motives contributed more greatly. Finally, gender differences in drinking motives were not found, in contrast to the studies by Ratliff and Burkhardt (1984) and Klein (1992). Carey and Correia (1997) concluded that the students who were most likely to drink heavily and to experience alcohol-related problems were those who drank for negative-

reinforcement motives.

Another study of college student drinking aimed to evaluate the relative merits of drinking motives and alcohol expectancies as predictors of alcohol use and related problems (Cronin, 1997). It was hypothesised that drinking motives would predict alcohol use better than expectancies because motives are more proximally related to both the decision to drink and the actual behaviour, a point that has been endorsed by others (e.g., Cooper, 1994; Leigh, 1990). Cronin (1997) factor analysed the responses of 426 Australian undergraduates to a set of 35 reasons for drinking that had been derived from previous research (Billingham, Parillo, & Gross, 1993; Cronin, 1993; Goodwin, 1990; Haden & Edmundson, 1991; Johnston & O'Malley, 1982; Klein, 1992). A three-factor solution was chosen, and the scales were called "social camaraderie", "mood enhancement", and "tension reduction". Further analyses showed that, indeed, reasons for drinking were better predictors of all the alcohol measures used in the study than were alcohol expectancies. Specifically, it was found that positive, social reinforcement reasons (social camaraderie) were the best predictors of alcohol consumption, whilst positive, affective reasons (mood enhancement) best predicted alcohol-related problems.

A three-dimensional questionnaire was also used to examine drinking motives among 266 Canadian students (Stewart, Zeitlin, & Samoluk, 1996). This study used the Drinking Motives Questionnaire, developed by Cooper et al. (1992), which comprised three subscales: Social Motives (affiliative reasons), Coping Motives (reduction/regulation of negative affect), and Enhancement Motives (enhancement of positive affect). Students were asked to indicate their frequency of drinking in response to each item on the questionnaire, and the resulting data were factor analysed to determine whether a one-, two-, or three-dimensional model of drinking motives provided the best fit. The three-dimensional model was confirmed as a better fit than the other two, although the authors noted that a better explanation of the underlying structure remained to be found. Overall, it was found that students reported greater frequency of drinking for Social Motives than for Coping Motives. Males

drank more often than females for Enhancement Motives, and also younger students (20 years old and younger) drank more often than older students (21 years old and older) for Enhancement Motives.

The final study of drinking motives to be cited here was conducted by MacLean and Lecci (2000) with a sample of 298 American students. The Drinking Motives Questionnaire again was used, this time to test the four-dimensional measure developed by Cooper (1994). In addition to the three subscales (Social Motives, Coping Motives, and Enhancement Motives), this version of the questionnaire included items that expressed the use of alcohol to avoid social censure or rejection, and the dimension was labelled Conformity Motives. MacLean and Lecci (2000) found that factor analysis confirmed their hypothesis that four dimensions would fit the data better than both two and three dimensions both for the whole sample and men and women separately. Furthermore, three dimensions still proved a better fit for the data than either of the two-dimensional models that were tested. It was concluded that the most appropriate drinking motives model of students' alcohol use was a four-dimensional one, and that two-dimensional models should be used with caution.

Table 3.1 summarises the various dimensions of drinking motives that have been identified. It is possible, therefore, to detect a common thread running through the results of research into the reasons students give for drinking. The main finding concerns the distinction between positive reinforcement motives (Enhancement Motives and Social Motives) and coping motives in their association with heavy drinking and alcohol-related problems. Namely, both types of motives predict heavy drinking which, in turn, is associated with problems. However, drinking to reduce negative affect appears to be the most problematic pattern of use because these motives represent the strongest, direct influence on alcohol-related consequences. The influence of both age and gender on students' drinking motives has attracted research interest, but has produced mixed results to date.

Table 3.1

The Various Dimensions of Drinking Motives

<u>Source</u>				
2 Dimensions	Internal	External	Internal	External
<u>Valence</u>				
2 Dimensions	Positive Reinforcement	Positive Reinforcement	Negative Reinforcement	Negative Reinforcement
3 Dimensions	Enhancement Motives	Social Motives	Coping Motives	N/A
4 Dimensions	Enhancement Motives (Drinking to enhance positive affect)	Social Motives (Drinking to obtain social rewards)	Coping Motives (Drinking to reduce negative affect)	Conformity Motives (Drinking to avoid social censure/rejection)

3.2 Drinking Situations

The immediate social context in which an individual consumes alcohol has been identified as an influential factor in the amount and pattern of alcohol use (Senchak, Leonard, & Greene, 1998). Situational factors include the attributes and characteristics of the physical setting, the number and status of drinking companions, and the drinker's individual characteristics including her/his attitudes and expectations about alcohol use (Abrams & Niaura, 1987; McCarty, 1985; O'Hare, 1990). In short, the social context of alcohol consumption incorporates both the social and the motivational aspects of drinking (Beck, Summons, & Thombs, 1991).

The social context in which college students consume alcohol has been the subject of a number of studies. Perkins and Berkowitz (1986) found that students drank most frequently at large social functions, while O'Hare (1990) recorded students' most preferred drinking situations as parties and other social gatherings. Other studies (Harford, Wechsler, &

Rohman, 1981; Senchak et al., 1998) investigated social drinking contexts in the form of size and gender composition of social groups. Both of these studies found that, in small social drinking groups only, the presence of the opposite gender was associated with lower alcohol consumption and less drunkenness among males. However, the studies also found that overall both women and men drank more in a large, mixed-gender setting than the small, mixed-gender situation.

There has been much research into drinking situations which was aimed at preventing relapse among alcoholics seeking and/or having completed treatment (see Marlatt & Gordon, 1985). The relapse-prevention approach to alcoholism treatment identified eight types of situations that represent potentially high risks for the occurrence of heavy drinking. High-risk situations were classified as either intrapersonal, in which drinking appears to be prompted by a psychological or physical response to an event, or interpersonal, which refers to situations that involve other people. The identification of two kinds of situations resulted from content analysis of interviews with male chronic alcoholics who described the circumstances related to their relapse following treatment (Marlatt, 1979; Marlatt & Gordon, 1980, 1985).

The Inventory of Drinking Situations (IDS; Annis, 1982) was developed on the basis of the findings from the relapse prevention research. It was designed to measure alcohol consumption in five categories of intrapersonal situations (Unpleasant Emotions, Physical Discomfort, Pleasant Emotions, Testing Personal Control, and Urges/Temptations), and three categories of interpersonal situations (Conflict with Others, Social Pressure to Drink, and Pleasant Times with Others). The psychometric properties of the IDS and its clinical utility in alcoholic samples have been tested in a number of studies (e.g., Annis, Graham, & Davis, 1987; Cannon, Leeka, Patterson, & Baker, 1990; Isenhardt, 1991, 1993; Solomon & Annis, 1989).

However, only four studies have used the IDS with non-clinical samples. One of these tested the recall of emotionally charged statements by 42 male social drinkers aged between 18 and 34 years old (Bruce & Pihl,

1997). A positive relationship was found between the number of errors in recall and the frequency of alcohol use in situations involving Unpleasant Emotions, but not in those situations related to Pleasant Emotions. From this result, Bruce and Pihl (1997) suggested that individuals who frequently drink in situations involving negative affect may be drinking in order to forget unpleasant things. A further finding of this study was that individuals reported drinking most frequently in situations that offered positive reinforcement.

The last mentioned result had also been found in a previous study (Carey, 1993) which investigated situational determinants of excessive alcohol use among 78 undergraduates. The results showed that heavy-drinking students (those drinking an average of more than six standard drinks daily over the previous 30 days) more so than moderate drinking students (average daily consumption of four to six standard drinks) endorsed situations involving Pleasant Emotions, Social Pressure to Drink, Pleasant Times with Others, and Physical Discomfort as contexts for excessive drinking. Heavy drinking students also differed from light drinking students (average daily consumption of three or fewer standard drinks) in situations related to Conflict with Others. In addition, Carey (1993) highlighted the finding that although there were no differences between heavy, moderate, and light drinkers in situations related to Unpleasant Emotions, Testing Personal Control, and Urges and Temptations, moderate consumers drank excessively, in contrast to light drinkers, in situations involving Pleasant Emotions. It was concluded that students who were heavy drinkers were at risk for excessive consumption in all of the interpersonal situations but in only two of the intrapersonal contexts showing that the IDS could prove useful in identifying situational determinants of excessive drinking among students.

Another study by Carey (1995b) used the IDS to explore the relationship between heavy drinking situations and alcohol-related problems among 139 undergraduates who were classified as either abstainers/infrequent drinkers, light/moderate drinkers, or heavy drinkers. It was reasoned that the IDS would represent a more valuable



screening instrument if it was found that particular scales were associated with negative alcohol-related consequences rather than simply excessive consumption.

The results showed a similar pattern to those found by Carey (1993), in that three of the IDS scales (Social Pressure to Drink, Pleasant Times with Others, and Pleasant Emotions) differentiated heavy from light/moderate drinkers, whereas two scales (Unpleasant Emotions and Testing Personal Control) failed to differentiate heavy drinking students from light/moderate drinkers. However, contradictory results were found in respect of the Physical Discomfort scale which no longer differentiated heavy drinkers from light/moderate drinkers, and the Urges and Temptations scale which now did differentiate between heavy and light/moderate drinkers. Carey (1995b) attributed these conflicting results to the lower reliability in a college student sample of the two scales (Physical Discomfort and Urges and Temptations) which are the least internally consistent ones on the IDS.

With regard to the association between alcohol-related problems and the IDS scales, Carey (1995b) found a strong, positive relationship between the number of problems reported and four scales (Social Pressure to Drink, Pleasant Times with Others, Conflict with Others, and Urges and Temptations), a pattern that held good even when other heavy drinking measures were partialled out. Carey (1995b) concluded that heavy drinking students who were at risk for alcohol-related problems tended to consume alcohol in interpersonal situations as well as in contexts that involved Urges and Temptations.

The final study to be described here was a factor analytic examination of the IDS among 396 Canadian university students (Carrigan, Samoluk, & Stewart, 1998). The IDS was found to be a sound psychometric tool for identifying the situations in which university students consume alcohol. The factor analysis confirmed that the eight scales of the IDS represented a better fit to the data than a three factor model comprising negatively-reinforcing situations (Conflict with Others, Unpleasant Emotions, Physical Discomfort), positively-reinforcing

situations (Social Pressure to Drink, Pleasant Emotions, Pleasant Times with Others), and temptation situations (Testing Personal Control, Urges and Temptations). However, further analyses showed that this three factor model constituted the best-fitting higher-order structure compared to a number of other second-order factor models. Interestingly, Carrigan et al. (1998) used the three-dimensional Drinking Motives Questionnaire developed by Cooper et al. (1992) to validate their analysis of the IDS and found that approximately half of the variance in motives was explained by IDS subscales. They concluded that student drinking can be described as occurring in three higher-order contexts, namely positively-reinforcing situations, negatively-reinforcing situations, and temptation situations. However, students tended to consume alcohol most frequently in positively-reinforcing situations. The question of whether the IDS represents a useful instrument for identifying problematic drinking patterns among students remains to be answered.

It appears, then, that although the IDS was developed for use with alcoholic samples, it is a valid instrument for investigating heavy drinking situations among college students. The one consistent finding from the small number of studies of student drinking situations was that students consumed alcohol most frequently in situations that were positively-reinforcing. However, Carrigan et al. (1998) highlighted the need for further research to determine the utility of the IDS both for detecting potential drinking problems and for designing interventions aimed at reducing excessive, problematic consumption. Carey (1995b) recommended that, in order to increase the value of the IDS in these respects, research should aim to discover reliable associations between the scales of the IDS and negative alcohol-related consequences.

### 3.3 Relationship of Motives and Situations

One obvious way to address the above issues is to draw upon the findings of the research into motives for drinking and to use them in tandem with the IDS. This is indicated because there appears to be considerable overlap between motives and situations, in that the items on

the IDS variously describe the antecedents to drinking in terms of the reasons why people drink, the emotions and thoughts that immediately precede drinking, and the settings in which drinking occurs. As Carrigan et al. (1998) stated, drinking situations and drinking motives are conceptually similar. However, drinking situations may represent a more proximal measure of an individual's motivation to drink than reasons for drinking. This is because the IDS operationalises the circumstances specific to consuming alcohol in terms of responses to both physical or psychological events (including emotions, thoughts, and urges) and the conflict, pressure, and pleasant times related to interactions with other people. The complementary nature of the two domains, motives and situations, can be exemplified as follows. A person drinks frequently 'when I felt that I had let myself down' (situation) because 'drinking helps me cheer up' (reason). Combining motives and situations, therefore, should increase the ability to detect both actual and potential problematic patterns of alcohol use among students.

Both reasons for drinking and drinking situations, therefore, can be conceptualised as acting in a complementary way when motivating students to drink alcohol. Determining the precise influence the two domains have on problematic alcohol consumption among students was the aim of the present study. This question was addressed first by examining the factor structure of both domains and then by relating those structures, in conjunction with alcohol use measures, to an index of alcohol-related problems. In line with previous research it was expected that either two-, three-, or four-factor models would best express reasons for drinking, whilst eight first-order factors and three second-order factors would best define drinking situations. As Cooper et al. (1992) stated, both theory and research indicate that alcohol is used for two primary reasons, to cope with negative affect and to enhance positive affect. On that basis, it was expected that such a two-factor model would emerge as the best solution for the data. It was further expected that a similar clear distinction would be found regarding drinking situations.

Using the resulting factor structures, the relationship between

alcohol-related problems and both motives and situations was examined whilst evaluating the contribution of alcohol consumption measures. It was hypothesised that negative-reinforcement motives and situations would best predict the occurrence of alcohol-related problems over and above the amount of alcohol consumed. On the other hand it was expected that positive-reinforcement motives and situations would best predict the level of alcohol use. In this way the contribution of both motives and situations to drinking and alcohol-related problems could be evaluated leading to an improvement in the utility of both instruments to detect problematic drinking patterns among students.

### 3.4 Method

#### 3.4.1 Participants

The participants were selected from 729 second year undergraduates (females 59.5%; males 40.5%; mean age = 21 years old, SD = 5.7) who completed the Alcohol Use Questionnaire (AUQ) described in Chapter 2. The screening procedure identified 212 students (females 53.8%; males 46.2%; mean age = 19.9 years old, SD = 2.4) who reported weekly alcohol consumption of at least 24.5 units. These students were contacted with an invitation to participate in further research. Of those contacted, 111 students (females 56.8%; males 43.2%; mean age = 19.9 years old, SD = 2.5) responded to the invitation and agreed to take part in the study.

#### 3.4.2 Instruments

Rutgers Alcohol Problems Index (RAPI). (Appendix B, p. 254). The RAPI (White & Labouvie, 1989) is a 23-item self-report screening tool for assessing adolescent problem drinking. Respondents indicate how many times they have experienced particular problems while drinking alcohol or as a result of their drinking. The response options to each problem range from zero to four, where zero = never; one = 1 to 2 times; two = 3 to 5 times; three = 6 to 10 times; and four = more than 10 times. Students were asked to indicate how many times each problem had occurred during the previous three years. The RAPI assesses the extent of alcohol-related problems by providing an index of the negative consequences of drinking.

The items describe a range of consequences that occur as a direct result of drinking alcohol. The consequences occur in five areas, according to Dimeff, Baer, and Marlatt (1994); concern about drinking, irresponsibility and neglect, symptoms of alcohol dependence, interpersonal conflict, and family conflict. The RAPI problems are shown in Table 3.2.

Table 3.2

The Items on the Rutgers Alcohol Problems Index (RAPI)

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Please refer to the original text to see this material.

Reasons for Drinking Scale (RFD). (Appendix C, p. 255). The RFD (Cronin, 1997) was developed through exploratory factor analysis of 35 reasons for drinking that were gathered from previous research (Billingham, Parillo, & Gross, 1993; Cronin, 1993; Goodwin, 1990; Haden & Edmundson, 1991; Johnston & O'Malley, 1982; Klein, 1992). A principal components analysis with Varimax rotation was conducted, yielding a four-factor solution. The fourth factor was found to be of poor internal consistency and was discarded leaving three factors, which were called Social Camaraderie, Mood Enhancement, and Tension Reduction. The RFD items are answered on a six-point scale, where zero represented 'never' and five represented 'frequently'.

Inventory of Drinking Situations (IDS). (Appendix D, p. 256). The IDS (Annis, Graham, & Davis, 1987) measures drinking in eight situations; Unpleasant Emotions, Physical Discomfort, Pleasant Emotions, Testing Personal Control, Urges and Temptations, Conflict with Others, Social Pressure to Drink, and Pleasant Times with Others. The version of the IDS used in this study was the short-form, which comprised 42 items to which respondents indicated their "frequency of drinking" on a four-point scale: one = 'never', two = 'rarely', three = 'frequently', and four = 'almost always'. Scores were recorded in the manner recommended by the authors; namely, 'never' = zero, 'rarely' = one, 'frequently' = two, and 'almost always' = three. A profile illustrating areas of greatest risk for heavy drinking and a problem index in each type of situation can be drawn for each respondent.

Alcohol Use Questionnaire (AUQ). (Appendix A, p. 253). The alcohol measure used in the study was an amended version of the Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992). The AUDIT is a ten-item composite measure comprising three questions about alcohol consumption, three questions related to alcohol dependence, and four questions regarding alcohol-related problems. The amendments that were made ensured that detailed quantity and frequency measures could be derived (see Chapter 2, p. 33-36 for a full description of the AUQ).

### 3.4.3 Procedure

During the screening procedure described in Chapter 2, 212 students were identified who consumed at least 24.5 units of alcohol per week. Of these students, 111 attended an assessment session during which they completed a number of questionnaires including the RAPI, IDS, and RFD. These sessions took place in a quiet room in the School of Psychology on certain days and between certain hours. On arrival at the designated room, students read and signed a consent form (Appendix E, p. 257) before completing the questionnaires in the presence of the researcher.

### 3.4.4 Plan of Analysis

There were two phases of the statistical analysis. In the first, data collected on the IDS and the RFD were explored in two separate factor analyses. In the second phase, multiple regression analysis was employed to determine significant predictors of alcohol-related problems.

Exploratory factor analysis rather than confirmatory factor analysis was used to assess the factor structure of the IDS and RFD. As Kline (1994) explained, the aim of exploratory factor analysis is to discover the main constructs underlying a complex set of data. On the other hand, confirmatory factor analysis involves specifying an a priori, factor structure and testing whether that model fits the data better than an alternative model. There are a number of disadvantages with confirmatory factor analysis (for a fuller discussion of these issues see Kline, 1994). The major disadvantages are that (a) specifying factor loadings a priori can be extremely difficult, (b) large sample sizes are needed to yield reliable results, and (c) significance tests show only that one hypothesised factor structure better fits the data than an alternative one, implying that another, unspecified model may fit the data better than those that were hypothesised. Therefore, exploratory factor analysis was chosen as the appropriate method of analysis in the present study. This kind of analysis would allow the present results to be compared with those of previous studies.

The factor analyses were conducted according to guidelines provided by Kline (1994). To obtain a simple structure, which is the goal of

factor analysis, the design should meet certain technical criteria as follows. First, a factor must be designated by at least three variables. Second, heterogeneous samples should be used in exploratory factor analysis because the amount of variance in such samples will ensure higher factor loadings. Third, a minimum sample size of 100 participants is necessary to obtain reliable factors. Fourth, the ratio of participants to variables should be at least 2:1. Fifth, principal factor analysis or maximum-likelihood method should be used. Sixth, a scree test or statistical test should be used to obtain the best number of factors to extract. Finally, the factors extracted should be rotated to a simple structure by either the Varimax or Direct Oblimin procedure whichever is the easiest to interpret.

Factor scores were obtained from the factor solutions for both the IDS and the RFD. Following the results of bivariate correlations, the factor scores were entered as predictor variables in two separate multiple regression analyses. One to identify significant RFD factors and the other to determine significant IDS factors in the prediction of alcohol-related problems. In each analysis, average weekly alcohol consumption was controlled by entering this variable into the model first followed by the other predictor variables and testing the significance of the change in  $R^2$ . Finally, significant RFD and IDS factors were entered into a regression analysis to predict alcohol-related problems, controlling for alcohol use by entering average weekly alcohol consumption first and testing the significance of the change in  $R^2$ . All statistical procedures were conducted on SPSS version 6.1.1 for Apple Macintosh

### 3.5 Results

There were no significant differences in age in years between the students who responded to the invitation to participate and completed the assessment questionnaires ( $M = 19.89$ ,  $SD = 2.45$ ,  $n = 111$ ), and those who did not respond to the invitation ( $M = 19.85$ ,  $SD = 2.38$ ,  $n = 98$ ),  $t(207) = 0.13$ ,  $p > .05$ . Neither did they differ in gender,  $\chi^2(1, n = 212) = 0.83$ ,  $p > .05$ , nor in average weekly units of alcohol, participants' consumption ( $M = 45.67$ ,  $SD = 19.52$ ,  $n = 111$ ) and non-participants' consumption ( $M = 41.43$ ,



$SD = 18.62, n = 101, t(210) = 1.62, p > .05.$

### 3.5.1 Factor Analysis of Reasons for Drinking

The sample size of 111 was deemed statistically appropriate for a factor analysis of the RFD. Frequency distributions and normality plots of all the items were examined to detect any serious deviations from normality. Three items ('I am more aware of what I say and do when I am drinking', 'I drink to get rid of a hangover', and 'I am powerless in the face of alcohol') showed a severe degree of skewness and kurtosis because most students did not endorse these items. Three other items ('I drink to be sociable', 'Drinking adds a certain warmth to social occasions', and 'I have more self-confidence when drinking') showed a severe degree of kurtosis because they were highly endorsed by students as reasons for frequent drinking, a result that would be expected from any group of young students. One other item ('I like the taste of alcohol') showed a severe degree of kurtosis due to a prevalence of high scores. The latter outcome may have arisen simply because these students were excessive consumers who would be expected to agree with such a statement.

The seven items examined above showed serious deviations from normality which indicated that in response to these items the sample was homogenous. However, the sample was considered a representative one and heterogeneous for the remaining 28 items. Homogeneity of the sample in respect of seven items possibly resulted from either of two reasons. First, there are some reasons for drinking, such as those related to self-confidence, sociability, and the taste of alcohol, that are shared by the majority of young students who drink excessively which is indicated by low variance and high scores. Second, the other items related to powerlessness over alcohol, having more self-awareness, and drinking to 'cure' a hangover are not applicable to this sample as indicated by low variance and low scores. Despite the problem that the low variance of some items may have affected the factor solution, there was enough evidence from inspecting the correlation matrix to confidently proceed with the factor analysis.

The correlation matrix for the 35 reasons for drinking was examined

to determine whether the items shared common factors. The matrix was too large to reproduce here but showed that 39 percent of the coefficients were greater than .2, which indicated a relationship between items that would produce an appropriate factor model. Bartlett's test of sphericity (1521.51,  $p < .0001$ ) supported this view, because the test is a measure of whether each item is related only to itself and unrelated to any other item. In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was computed and a medium to high value (.74) was obtained. This result showed that correlations between pairs of items were explained by the other items indicating that underlying factors would explain the correlations observed in the matrix and, therefore, the factor analysis could proceed with confidence.

Principal-axis factoring was used to obtain the initial solution. Principal-axis factoring is the usual method for the initial condensation of variables into factors, principally because in contrast to principal components analysis, the procedure eliminates error variance from the resultant factors and, therefore, does not aim to explain all the variance in a given correlation matrix (see Kline, 1994, for a full discussion of these issues).

The initial solution extracted 11 factors with eigenvalues greater than one, whilst the scree plot of the eigenvalues showed that the slope of the large factors tapered between two and three. On this basis, the two-factor model was compared to the three-factor solution and the former one was selected as the easiest to interpret. Therefore, the two-factor model was rotated to simple structure by both Varimax and Direct Oblimin procedures as recommended by Kline (1994). As with the type of extraction used, there are issues to consider in the choice of rotation. Varimax rotation produces orthogonal factors, and it would be surprising if the dimensions of such a psychological phenomenon as reasons for drinking alcohol proved to be uncorrelated. On that basis, an oblique rotation such as Direct Oblimin, in which the factors are correlated, would seem to be the correct choice. However, in practice orthogonal and oblique rotations produce virtually identical solutions because of negligible correlations

between the factors, so the two rotated solutions were compared.

The oblique factor solution produced by Direct Oblimin rotation proved a better model than the orthogonal Varimax solution because it maximised the distinction between the factors in terms of high and low loadings. Table 3.3 displays the factor loadings above an absolute value of .3 for each item. Loadings above .3 are considered to be moderately high whereas high loadings are those above .6 and these are presented in bold type. It can be seen that Factor 1 was defined by 17 items, Factor 2 by 10 items, and that eight items were redundant and could be ignored. To confirm the soundness of the factor model, the analysis was repeated after deleting the redundant items, and the solution remained unaltered. The two rotated factors account for 25.7 percent of the variance in the sample. Factor 1 explains 19.3 percent of the variance and factor 2 accounts for 6.4 percent. Alpha reliability was computed for the 17 items that defined Factor 1 ( $\alpha = .85$ ) and the 10 items that defined Factor 2 ( $\alpha = .78$ ).

Factor 1 was entitled Positive Affect because the thread running through the reasons for drinking that defined this factor was one of enhanced positive mood associated with social activities. Drinking was heavily linked, in this factor, to sociability, increased self-confidence, friendliness, warmth, and contentment as well as celebration, relaxation, and less inhibition. On the other hand, Factor 2 was labelled Negative Affect because the defining reasons for drinking expressed coping with negative affect in terms of reducing tension, forgetting worries, and cheering up.

Of the seven items that deviated from normality, two of them ('I like the taste of alcohol' and 'I am more aware of what I say and do when I am drinking') contributed no weight to either factor. The three negatively skewed items ('I drink to be sociable', 'Drinking adds a certain warmth to social occasions', and 'I have more self-confidence when drinking') load Factor 1 showing that they contribute heavily to the definition of Positive Affect. The remaining two positively skewed items ('I drink to get rid of a hangover' and 'I am powerless in the face of alcohol') showed moderate to high loadings on Factor 2, Negative Affect.

Table 3.3

Direct Oblimin factor loadings of the Reasons for Drinking scale (RFD)

35 items of the RFD	Factor 1 Positive Affect	Factor 2 Negative Affect
Drinking makes me feel outgoing and friendly	<b>.74</b>	
Drinking adds a certain warmth to social occasions	<b>.70</b>	
Social activities are more boring if alcohol is not involved	<b>.66</b>	
Drinking makes me happy and content	<b>.58</b>	
I have more self-confidence when drinking	<b>.57</b>	
I am less concerned about my actions when I'm drinking	<b>.57</b>	
I drink to be sociable	<b>.55</b>	
Drinking makes me think more about sex	<b>.54</b>	
If I am drinking it is easier to express my feelings	<b>.50</b>	
Drinking makes me more sexually responsive	<b>.50</b>	
Drinking makes me feel less inhibited	<b>.48</b>	
I feel powerful when I drink, as if I can really influence others to do as I want	<b>.47</b>	
I drink to get drunk	<b>.44</b>	
I drink to celebrate	<b>.37</b>	
People I know drink	<b>.35</b>	
I drink to relax	<b>.31</b>	
Drinking alcohol is usually connected with other activities	<b>.31</b>	
Drinking enables me to fall asleep more easily		
I am more romantic when I drink		
I get better ideas when I am drinking		
I control my temper more easily when I am drinking		
I like the taste of alcohol		
I drink due to the pressure by others		
I need to drink when I am tense		<b>.69</b>
I drink to forget something		<b>.63</b>
I am powerless in the face of alcohol		<b>.56</b>
Drinking helps me forget my worries		<b>.56</b>
Drinking helps me cheer up	<b>.40</b>	<b>.49</b>
Drinking helps me put my life on the right track		<b>.46</b>
I drink because there is nothing else better to do		<b>.40</b>
I drink to get rid of a hangover		<b>.38</b>
Drinking makes me feel calm	<b>.33</b>	<b>.35</b>
Drinking increases my aggressiveness		<b>.34</b>
I am more aware of what I say and do if I am drinking		
Little things annoy me less when I am drinking		

Note. High loadings are in bold, the rest are moderately high loadings. The items with no loading do not contribute to the factor model but are included for the reader's information.

It should be noted that Table 3.3 displays eight redundant items that did not contribute to the definition of either factor. In addition, the table shows two items ('Drinking helps me cheer up' and 'Drinking makes me feel calm') that load on both factors. Possibly the two items contribute

to the definition of both factors because they are non-specific in terms of affective change. In other words, both items might equally apply to someone's drinking for social reasons, because feeling calm and cheering-up are by-products of drinking socially as well as to someone drinking specifically to cheer up when unhappy or to feel calm when agitated.

### 3.5.2 Factor Analysis of the Inventory of Drinking Situations

The sample size was adequate for a factor analysis of the IDS which consisted of 42 items. Inspection of the frequency distributions and normality plots of all the items identified 16 items that deviated from normality. All these were positively skewed and involved situations related to Conflict with Others, Physical Discomfort, Unpleasant Emotions, Testing Personal Control, and Urges and Temptations. This may simply be because these items do not apply to a young student sample as the IDS was developed from the relapse situations of chronic alcoholics. However, this seems unlikely because Carrigan et al. (1998) found the IDS to be a psychometrically sound measure of at-risk drinking situations among college students. As with the RFD, the possibility that inclusion of items showing low variance may confound the factor solution should be borne in mind when selecting a factor model.

Inspection of the correlation matrix of the 42 items on the IDS showed that 57 percent of the coefficients were greater than .2 representing an adequate basis for a valid factor model. Bartlett's test of sphericity (2588.31,  $p < .0001$ ) and the Kaiser-Meyer-Olkin value (.83) confirmed that the factor analysis could proceed with confidence. The initial solution from principal-axis factoring of the IDS extracted 10 factors with eigenvalues greater than one. However, three factors emerged as the most suitable model according to the scree plot. The three-factor model was rotated to simple structure by Varimax and Direct Oblimin procedures and the two rotations were compared. The Direct Oblimin rotation was selected as the best solution because it simplified the distinction between the three factors. Table 3.4 shows the Direct Oblimin three-factor solution listing the loadings above an absolute value of .3 for each item. Factor 1 was defined by 19 items, Factor 2 by 12 items, Factor 3 by 9 items, and 2

items were ignored. The factor analysis was repeated after excluding the two redundant items and the same solution was obtained. The three factors accounted for 41.6 percent of the variance in the sample, with Factor 1 accounting for 28.5 percent, Factor 2 explaining 9.6 percent, and Factor 3 accounting for 3.5 percent. Alpha reliability was calculated for Factor 1 ( $\alpha = .95$ ), Factor 2 ( $\alpha = .84$ ), and Factor 3 ( $\alpha = .81$ ).

Factor 1 was labelled Negative Affect Situations because the items that loaded this factor had to do with Unpleasant Emotions, Conflict with Others, and Physical Discomfort. Almost half the items mention an affective state such as anger, tension, unease, fear, and confusion, whilst the remainder describe interpersonal situations and actual physical discomfort both of which would give rise to negative affect. Factor 2, on the other hand, was defined by those items that described Pleasant Times with Others, Social Pressure to Drink, and Pleasant Emotions. Thus, it was labelled Positive Affect Situations. The third factor was dominated by items that represent Testing Personal Control and Urges and Temptations.

The items that loaded Factor 3 appeared to catalogue the level of preoccupation with alcohol that an individual showed. Therefore, this factor was entitled Alcohol Involvement. One item related to Pleasant Times with Others ('When I wanted to heighten my sexual enjoyment') loaded highest on Alcohol Involvement rather than contributing to Positive Affect Situations which might have been expected. Only one item ('When I suddenly had an urge to drink') loaded above .3 on two factors. This item loaded highest on Alcohol Involvement but also showed a moderately high loading on Positive Affect Situations.

Table 3.4

Direct Oblimin factor loadings of the Inventory of Drinking Situations(IDS)

	Factor 1	Factor 2	Factor 3
	Negative Affective Situations	Positive Affective Situations	Alcohol Involvement
22. When I was angry at the way things had turned out	.92		
40. When other people treated me unfairly	.85		
12. When I was afraid that things weren't going to work out	.83		
39. When I felt under a lot of pressure	.83		
31. When I felt confused about what I should do	.75		
21. When there were problems with people at work	.74		
30. When pressure built up at work because of the demands of my supervisor	.72		
42. When I was not getting along well with others at work	.69		
27. When someone criticized me	.69		
6. When I had an argument with a friend	.68		
36. When other people around me made me tense	.67		
1. When I felt that I had let myself down	.67		
9. When other people didn't seem to like me	.66		
32. When my stomach felt like it was tied in knots	.65		
20. When other people interfered with my plans	.60		
17. When I felt uneasy in the presence of someone	.59		
2. When I had trouble sleeping	.52		
23. When I felt nauseous	.39		
10. When there were fights at home	.33		
18. When I was at a party and other people were drinking		.75	
38. When I wanted to celebrate with a friend		.67	
28. When I was in a restaurant and the people with me ordered drinks		.66	
11. When I was relaxed with a good friend and wanted to have a good time		.66	
33. When something good happened and I felt like celebrating		.60	
29. When I was out with friends "on the town" and wanted to increase my enjoyment		.59	
41. When I was enjoying myself at a party and wanted to feel even better		.59	
37. When I met a friend and he/she suggested that we have a drink together		.58	
7. When I was out with friends and they stopped by a bar for a drink		.49	
3. When I felt confident and relaxed		.34	
24. When I felt satisfied with something I had done		.33	
14. When everything was going well		.31	
34. When I wanted to prove to myself that I could take a few drinks without becoming drunk			.73
25. When I started to think that just one drink could cause no harm			.60
4. When I convinced myself that I was a new person and could take a few drinks			.53
15. When I wondered about my self-control over alcohol and felt like having a drink			.46
35. When I suddenly had an urge to drink		.31	.43
5. When I remembered how good it tasted			.42
16. When I passed by a liquor store			.38
26. When I unexpectedly found a bottle of my favorite booze			.35
8. When I wanted to heighten my sexual enjoyment			.33
19. When I wanted to feel closer to someone I liked			
13. When I felt drowsy and wanted to stay alert			

### 3.5.3 Multiple Regression Analyses

Factor scores were calculated for oblique solutions to both the RFD and the IDS. Before entering the factor scores and average weekly alcohol consumption into multiple regression analyses predicting alcohol-related problems the data were inspected to check that the assumptions necessary for a reliable analysis were not violated. Scatterplots revealed a potential problem with average weekly alcohol consumption and IDS Factor 1 (Negative Affect Situations). Both of these variables showed a mild degree of positive skewness, and average weekly alcohol consumption showed signs of non-linearity. Further investigation was carried out by plotting standardised residuals against standardised predicted values as recommended by Gray and Kinnear (1998). These plots, together with cumulative probability plots, suggested that the linearity assumption was not seriously violated. However, in the case of average weekly alcohol consumption it appeared that the spread of residuals decreased with increasing values of alcohol-related problems, indicating a violation of the equality of variance assumption. On this evidence, a logarithmic transformation of average weekly alcohol consumption was used, in order to stabilise the variance. Re-examining the data showed that logarithmic transformation removed skewness and marginally improved inequality of variance.

Table 3.5 shows the intercorrelations between the variables entered into regression models. It can be seen that there was a potential difficulty related to multicollinearity when entering all of the variables into a regression model. Both sets of factor scores and average weekly alcohol consumption were significantly related to alcohol-related problems. Unexpectedly, none of the factor scores was related to average weekly alcohol consumption, but they were intercorrelated to varying degrees. IDS Factor 3 (Alcohol Involvement) was strongly related to both of the other IDS factors, Negative Affect Situations and Positive Affect Situations. Negative Affect Situations and Positive Affect Situations were significantly related to each other but to a lesser degree. RFD Factor 1 (Positive Affect) was significantly related to RFD Factor 2 (Negative Affect).



Table 3.5

Intercorrelations among alcohol-related problems, average weekly alcohol consumption, IDS factors, and RFD factors

Variable:	RAPI	QxF	IDS1 Negative Affect Situations	IDS2 Positive Affect Situations	IDS3 Alcohol Involvement	RFD1 Positive Affect	RFD2 Negative Affect
RAPI							
QxF	.21*						
IDS1	.37***	ns					
IDS2	.27**	ns	.26**				
IDS3	.36***	ns	.52***	.44***			
RFD1	.26**	ns	ns	.33**	ns		
RFD2	.31**	ns	.63***	ns	.41***	.31**	

Note. RAPI = Rutgers Alcohol Problem Index; QxF = Average weekly alcohol consumption (in Units).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Correlations between the two sets of factor scores provided support for the construct validity of both factor models. Negative Affect Situations was both strongly related to Negative Affect reasons for drinking and unrelated to Positive Affect reasons. Similarly, Positive Affect Situations was both related to Positive Affect reasons for drinking and unrelated to Negative Affect reasons. In addition, Alcohol Involvement was significantly related to Negative Affect reasons whilst unrelated to Positive Affect reasons.

In view of the effect of multicollinearity on regression models, three separate analyses were conducted in order to clarify the results. First, alcohol-related problems was regressed on to average weekly alcohol consumption and the three IDS factors. Second, alcohol-related problems was regressed on to average weekly alcohol consumption and the two RFD factors. From these two analyses, the significant variables were selected and a final model constructed which was tested in the third and final analysis. Age and gender were not controlled in the analyses because both variables were not correlated with alcohol-related problems, and 90 percent of the sample were aged 19 or 20 years old. The results of all three

analyses are shown in Table 3.6.

Analysis 1 showed that average weekly alcohol consumption significantly predicted alcohol-related problems, accounting for five percent of the variance. The addition of the set of IDS factors (Negative Affect Situations, Positive Affect Situations, and Alcohol Involvement) produced a significant change in  $R^2$  which showed that drinking situations accounted for 19 percent of the variance in alcohol-related problems independent of average weekly alcohol consumption. IDS Negative Affective Situations ( $t = 2.82, p < .005$ , one-tailed) was found to be the only significant predictor among the IDS factors.

Analysis 2 showed that average weekly alcohol consumption significantly predicted alcohol-related problems, accounting for four percent of the variance. Adding the two RFD factors, Positive Affect and Negative Affect, into the regression equation produced a significant increase in  $R^2$ . RFD Positive Affect and Negative Affect accounted for 13 percent of the variance in alcohol-related problems over and above that portion already explained by average weekly alcohol consumption. RFD Negative Affect ( $t = 2.90, p < .005$ , one-tailed) was found to be a significant predictor, whereas RFD Positive Affect was found to be non-significant.

The final analysis comprised three variables in the prediction of alcohol-related problems, namely average weekly alcohol consumption, IDS Negative Affect Situations, and RFD Negative Affect. The selection of these variables conformed to the theory that drinking to reduce negative affect directly influences the occurrence of alcohol-related problems. Analysis 3 showed that IDS Negative Affect Situations accounted for 15 percent of the variance in alcohol-related problems over and above the five percent of variance explained by average weekly alcohol consumption. The addition of RFD Negative Affect produced a non-significant change in  $R^2$ , which showed that it did not contribute uniquely to the prediction of alcohol-related problems.

Table 3.6

The Results of Three Hierarchical Multiple Regression Analyses of the Ability of Alcohol Use, Reasons For Drinking, and Inventory of Drinking Situations to Predict Alcohol-Related Problems

Dependent variable	Independent variables in order of entry	$\Delta R^2$	$\beta$ in final equation
<u>Analysis 1</u>			
RAPI	1. Avg. alcohol/week	.05*	.24**
	2. IDS Pos. Affect Sits	.19***	.16
	IDS Neg. Affect Sits		.29**
	IDS Alc. Involvement		.11
<u>Analysis 2</u>			
RAPI	1. Avg. alcohol/week	.04*	.21*
	2. RFD Pos. Affect	.13***	.16
	RFD Neg. Affect		.27**
<u>Analysis 3</u>			
RAPI	1. Avg. alcohol/week	.05*	.26**
	2. IDS Neg. Affect Sits	.15***	.28*
	3. RFD Neg. Affect	.02	.17

Note. RAPI = Rutgers Alcohol Problems Index. IDS factors = Negative Affect Situations; Positive Affect Situations; Alcohol Involvement. RFD factors = Positive Affect; Negative Affect. Howell's (1997, p. 541) formula was used to test the significance of  $R^2$  changes resulting from the addition of predictor variables.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

A mediational analysis was carried out to determine whether IDS Negative Affect Situations had direct effects on alcohol-related problems or indirect effects that are mediated by average weekly alcohol consumption. According to Baron and Kenny (1986), three conditions are necessary to establish full or partial mediation. First, IDS Negative Affect Situations must significantly predict the hypothesised mediator--in this case average weekly alcohol consumption. Second, IDS Negative Affect Situations must significantly predict alcohol-related problems. Third, the

mediator (average weekly alcohol consumption) but not IDS Negative Affect Situations must significantly predict alcohol-related problems when alcohol-related problems are regressed on IDS Negative Affect Situations and average weekly alcohol consumption. Using these rules, it could be determined which of the two models shown in Figure 1 better represents the causal relationships between IDS Negative Affect Situations, average weekly alcohol consumption, and alcohol-related problems. Model 1, which illustrates full mediation, was rejected because the first condition necessary for mediation was not satisfied, namely IDS Negative Affect Situations did not significantly predict average weekly alcohol consumption. Model 2 better represents the relationship between the variables than Model 1, because both IDS Negative Affect Situations and average weekly alcohol consumption directly predicted alcohol-related problems.

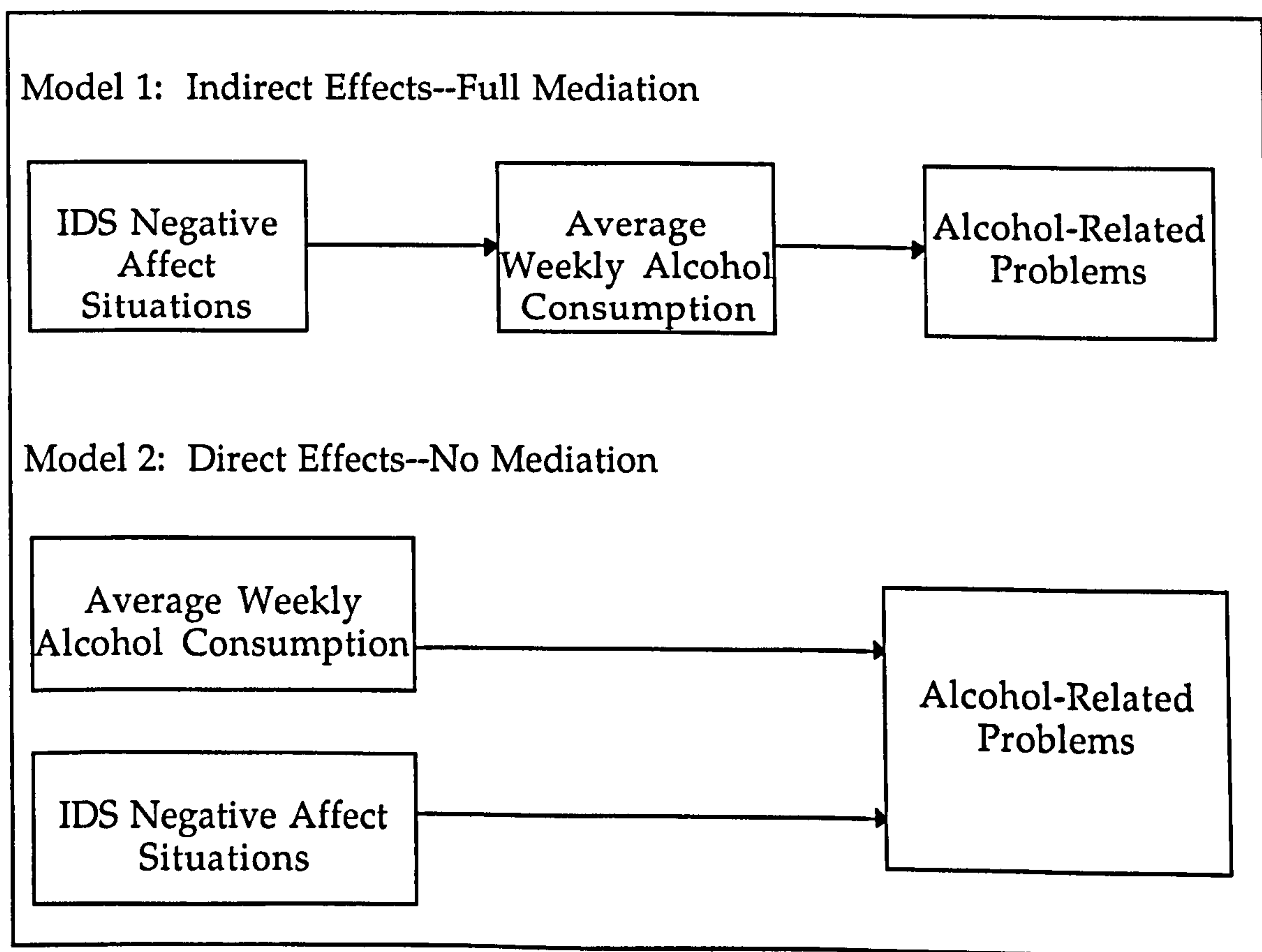


Figure 3.1. Two hypothesised models describing the effects of IDS Negative Affect Situations and average weekly alcohol consumption on alcohol-related problems.

### 3.6 Discussion

The results of the factor analyses provided varying degrees of support for the findings of previous research. In respect of reported reasons for drinking, a two-factor solution was found which described the use of alcohol either to enhance positive affect or to cope with negative affect. This result, therefore, failed to replicate Cronin's (1997) factor analysis of college students' responses to the same set of reasons which produced a three-factor solution. Neither did the results support the findings of factor analyses conducted by Stewart et al. (1996), in which a three-factor model was determined the best solution, and MacLean and Lecci (2000), in which four factors were deemed the best solution in comparison to two- and three-factor models. However, the use of a two-dimensional scheme has been the feature of much research conducted over the last 30 odd years (e.g., Cahalan, et al., 1969. Farber, et al., 1980. Carey & Correia, 1997) despite the consistent finding of factor analytic studies that there are three separate, but intercorrelated, types of drinking reasons (e.g., Connors, O'Farrell, Cutter, & Thompson, 1987. Cutter & O'Farrell, 1984. Snow & Wells-Parker, 1986).

The analysis conducted here produced two distinctive factors that were moderately correlated with each other. The distinction was explained in terms of the affective change that an individual desires to obtain or expects to result from consuming alcohol. Factor 1 (Positive Affect) was defined by items related both to obtaining positive social rewards and to enhancing positive affect, two dimensions that have constituted two separate factors in other studies. Criticism of Positive Affect as a reliable, meaningful factor, therefore, would be based on the suggestion that two distinct dimensions have been erroneously combined and, further, that two different types of social motives (obtaining social rewards and avoiding social censure) were confounded by such a combination. From this point of view, MacLean and Lecci (2000) warned against the use of two-factor solutions, arguing that they are incomplete and yield misleading results. However, the preceding warning was based on confirmatory factor analyses which compared a selection of factor

models but did not for example test hypothesised factors against independent measures of alcohol use. In other words if derived factors are meaningful then it will be possible to find significant relationships with other measures.

The two-factor solution to the RFD items was selected because of its simple structure and clear distinction in terms of the affective change resulting from the consumption of alcohol. Although Positive Affect included items that could be construed as expressing both positive social rewards and the enhancement of positive affect, it was meaningful to subsume such reasons into one underlying factor because obtaining positive social rewards should give rise to positive affect. Factor 2 (Negative Affect) clearly expressed drinking to reduce negative affect and included possible indicators of emerging alcohol dependency such as 'I drink to get rid of a hangover' and 'I drink because there is nothing else better to do'.

The factor analysis of the IDS produced a three-factor solution consistent with the best-fitting, higher-order model found by Carrigan et al. (1998). That study used confirmatory factor analysis first to identify eight factors as the best-fitting, lower-order model, and then to confirm a three-factor model as the best higher-order solution to the eight lower-order factors, in comparison to an alternative three-factor model and two two-factor models. The present analysis yielded a three-factor solution to the individual items almost identical to Carrigan et al. (1998) in which the scale scores were analysed. Only one item ('When I wanted to heighten my sexual enjoyment') which related to Pleasant Times with Others seems anomalous by loading on the factor defined by items related to Testing Personal Control and Urges and Temptations.

Reconciling the results of exploratory factor analysis with those produced by confirmatory factor analysis poses certain problems because both types of analysis obtain results by different procedures making direct comparisons problematic. Confirmatory analysis tests the goodness of fit of a specified model usually in comparison to alternative models but, as Kline (1994) warned, the procedure is not as statistically powerful as it

might at first appear. Despite these problems, however, the factor analysis produced a distinctive, parsimonious structure that strongly supported the findings of Carrigan et al. (1998) among college students and the results of Cannon et al. (1990) among alcoholics. In addition, the three-factor solution was similar to the results of the only other factor analysis of the 42 item IDS among alcoholics (Annis et al., 1987), which produced two higher-order factors, Negative Affect Situations and Urges to Drink, and Positive Affect Situations and Testing Control. Urges to Drink and Testing Control were not subsumed under the other two factors but comprised a separate, identifiable factor in the present study apparently because young students' involvement with alcohol is in the process of development and, therefore, is not firmly linked with either type of situation.

Negative Affect Situations and Positive Affect Situations corresponded to the negatively and positively reinforcing situations described in the previous studies (Cannon et al., 1990; Carrigan et al., 1998). The two factors were renamed because nearly all of the items that defined each factor referred either to situations in which an individual drank to enhance positive affect or to reduce negative affect, or where the situation led to an affective state that the individual sought to enhance or reduce by drinking. The third factor was called Alcohol Involvement rather than Temptation as in previous studies, because the underlying concept that expressed these items was related to an individual's preoccupation with alcohol and drinking. It seems, that is, that this factor measures the degree of involvement an individual has with alcohol. High scores on the factor might identify those who have a level of obsessive preoccupation with alcohol which might indicate emerging psychological dependency.

The results of the factor analyses of the RFD and the IDS showed, as Carrigan et al. (1998) had suggested, that drinking situations and drinking reasons were conceptually similar. Evidence of the complementary nature of the two domains was provided by the correlations between the two sets of factors. Negative Affect reasons for drinking were strongly related to Negative Affect Situations but unrelated to Positive Affect Situations. Conversely, Positive Affect reasons for drinking were moderately related

to Positive Affect Situations but unrelated to Negative Affect Situations. There was no counterpart on the RFD of the IDS factor Alcohol Involvement, which suggested that the RFD was not a comprehensive set of reasons for drinking. However, Alcohol Involvement was related to Negative Affect reasons but unrelated to Positive Affect reasons, showing that Alcohol Involvement increases in tandem with the level of drinking to reduce negative affect but not with drinking to enhance positive affect. This finding suggests that the reciprocal relationship between Alcohol Involvement and drinking to cope with negative affect could prove to be a useful indicator of future alcohol dependency among current students if the association were found to be predictive of alcohol-related problems.

The significant relationship between Alcohol Involvement and both IDS Negative Affect Situations and IDS Positive Affect Situations shows that an individual's preoccupation with alcohol increases as the level of drinking in both types of drinking situations increases. Nevertheless, the stronger of the two relationships was the one between Alcohol Involvement and Negative Affect Situations. On the other hand, the relationship between Alcohol Involvement and only Negative Affect reasons, rather than both types of reasons, possibly shows that reasons and situations are not synonymous despite their conceptual similarity. In other words, it is possible that situations better measure a person's motivation to drink than reasons for drinking in general, and the RFD items in particular. In the depiction of why people drink, situations may be more informative than reasons because situations link the interaction between the setting, the event, and the reactions to other people that influence a person's decision to drink. Of course, other factors will have an influence including expectations about the outcome of taking a drink, the reasons given for drinking, and a range of other background factors. However, situations are possibly more meaningful because they are closest to the actual drinking behaviour. In addition, responses to the scenarios offered on the IDS would include information regarding reasons and expectations held by an individual, because many of the items incorporate both aspects in the described situation.



The correlations between the three IDS factors, the two RFD factors and average weekly alcohol consumption and alcohol-related problems produced the surprising result that none of the factors were related to average weekly alcohol consumption. It was expected, at the least, that both positive and negative reasons for drinking would be related to alcohol consumption. The results ran contrary to the findings of previous research which suggested that positive social and affect enhancement reasons and positive affective situations were associated with heavy drinking among college students (Bradley et al., 1992. Carey, 1993, 1995b. Carey & Correia, 1997. Cronin, 1997. Klein, 1992. Ratliff & Burkhart, 1984). Although previous studies used a variety of different indices of alcohol use, the reason that no relationships were found in the current study could have been simply because this particular sample of students were excessive consumers, whose drinking at this time was indiscriminate in terms of situations and reasons. In other words, a constricted range of drinking behaviour was assessed.

The correlational results also provided only partial support for the findings of the only other study to examine the relationship between the 42 item IDS and alcohol-related problems measured by the RAPI (Carey, 1995b). The earlier study found relationships between some scales of the IDS and problems, whereas the present study found a relationship between all IDS scales, albeit in the form of factors, and alcohol-related problems.

In contrast, the results of the regression analyses revealed a clear picture of the relationship between alcohol-related problems and the set of predictor variables, alcohol consumption, reasons for drinking, and drinking situations. First, average weekly alcohol consumption significantly predicted the occurrence of alcohol-related problems, accounting for four to five percent of the variance. Second, both drinking situations and reasons for drinking significantly predicted the occurrence of alcohol-related problems over and above the influence of average weekly consumption. Third, from each set of factors one significant predictor was identified, namely Negative Affect reasons for drinking and Negative Affect Situations. Finally, Negative Affect Situations

significantly predicted alcohol-related problems independent of average weekly alcohol consumption, explaining 15 percent of the variance, whilst Negative Affect reasons contributed nothing more to the prediction of alcohol-related problems.

It is clear then that, even among a sample of heavy drinking students, the amount of alcohol consumed directly predicted the occurrence of alcohol-related problems. That is, the more a student drank the more likely she/he experienced problems regardless of the reasons for drinking and the situations in which drinking took place. In addition, both drinking reasons and drinking situations contributed directly to the prediction of alcohol-related problems, but only those reasons and situations related to negative affect proved to be significant predictors. It appears, therefore, that, as expected, drinking to reduce negative affect and in reaction to negative affective situations directly predicts the occurrence of alcohol-related problems.

Despite this consistency, combining the two variables in the final analysis cast doubt on the utility of reasons for drinking, and any complementary influence the two domains might exert, in the prediction of alcohol-related problems. Negative Affect reasons ceased to be a significant predictor of problems, possibly because the predictive power of this factor had been due to the correlation between Negative and Positive Affect reasons, although collinearity did not seem to be a problem in the analysis. A more likely explanation is that Negative Affect Situations better conveyed the information represented by Negative Affect reasons, thereby making the factor redundant in the prediction of alcohol-related problems.

As hypothesised, drinking in response to negative affect situations, and by extension drinking to reduce negative affect, was found to be a strong predictor of alcohol-related problems among students, independent of the level of alcohol consumption. From this result, it appears that students who drank predominately in reaction to situations related to conflict with other people and unpleasant emotions experienced the most problems, as long as they consumed a certain amount of alcohol. It might

be assumed, therefore, that the reaction to such situations was to drink alcohol in an effort to alleviate the negative affect that had arisen. The circularity of such a pattern of alcohol use is apparent in the relationship between the adverse consequences of drinking and the type of situations that predicted them. For example, a student who feels under pressure in class and confused about what to do to resolve the problem might drink in an effort to cope with the situation. The drinking, in turn, might result in a serious argument with a friend or family member, a situation which then prompts further drinking. In other words, conflict with others would lead to unpleasant emotions, motivating the person to drink to reduce the negative affect, which, in turn, leads to conflict with others and unpleasant emotions, and so on. In addition, once such a pattern of drinking becomes established, drinking to counter the physical discomfort and unpleasant emotions related to hangovers and symptoms of emergent dependency provides further potent motivation to drink.

What factors could account for why students who drink in response to negative affect situations experience more problems than others who consume even more alcohol. Cooper (1994) stated that consuming alcohol "to avoid aversive experience" denoted a maladaptive, pathological pattern of drinking and, possibly, individuals who use alcohol primarily to cope with negative affect have learned this strategy in the absence of other more adaptive ways of managing their emotions. It may well be, as Cooper et al. (1992) suggested, that because the experience of negative affect has strong motivational consequences, individuals who drink to cope develop a psychological dependence on alcohol. Certainly those who show this pattern are more likely than others to report problems that indicate serious or prolonged abusive drinking. Therefore, these individuals are strongly motivated to drink in order to cope with the wide range of situations in daily life that are capable of producing negative affect, the bulk of which arise from problems in interpersonal relationships.

It appears safe to assume that individuals who drink to cope with negative affect have difficulty dealing with interpersonal conflict. Possibly,

they are susceptible to conflict with others because they lack the social skills that constitute more adaptive coping strategies. Possibly they are more sensitive to conflict with others, in as much as their experience of negative affect in those circumstances is more intense than that of other people. Under these conditions, discovering that drinking will readily alleviate negative affect represents powerful motivation to drink despite the adverse consequences related to drinking. In addition, people who drink primarily to cope with negative affect might be expected to drink more often and be more preoccupied with alcohol because of its reinforcing properties for them. However, the results of this study did not support these last expectations.

### 3.6.1 Limitations and Recommendations

Although the factor analysis of the RFD produced a clear, easily interpretable solution to the data, there were difficulties in comparing the results with those of previous studies. The two-factor model produced here did not conform to the results of the previous study that used the same set of items (Cronin, 1997). On the other hand, the results conformed to the well established two-factor model that was developed from different sets of reasons (Farber et al., 1980). To add to the confusion, other research (MacLean & Lecci, 2000) using a further set of reasons concluded that a four-factor model was a better fit than a two-factor positive/negative model. However, the last results were from confirmatory factor analysis testing goodness of fit which, as Kline (1994) pointed out, indicated that one model was less of a good fit than another but not that a particular model was wrong. Overall, the mixed results question the reliability of the RFD which may be due to pooling sets of reasons collected from a variety of different studies rather than deriving a set in a systematic way.

Further research in this area would benefit from the use of a reliable, standardised set of reasons for drinking in conjunction with the IDS. Furthermore, as Cooper (1994) recommended, it would be useful to identify commonalities and differences among the types of reasons along the two underlying dimensions, positive/negative and internal/external,

proposed by Cox and Klinger (1988, 1990). In any event, results can be strengthened by using prospective and longitudinal designs because, as Cooper (1994) pointed out, cross-sectional data alone does not provide an adequate test of the assumption that reasons and situations are causally antecedent to behaviour and outcomes related to alcohol use.

### 3.7 Conclusion

The exploratory factor analyses of both the RFD and IDS produced clearly interpretable solutions that conformed to Cox and Klinger's (1988, 1990) framework, reflecting the valence of motivation in terms of whether a person drinks to obtain a positive outcome or to avoid a negative outcome. Both sets of factors were associated with alcohol-related problems but not related to the amount of alcohol a student consumed on average per week. However, the RFD factor model failed to yield reliable predictive relationships with alcohol-related problems which cast doubt on the utility of this particular set of reasons for drinking. On the other hand, drinking to alleviate negative affect mainly resulting from interpersonal conflict predicted the incidence of negative consequences over and above the average weekly amount of alcohol consumed.

Therefore, the findings of the present study suggested that, at a given level of consumption, students who drink primarily to cope with negative affect often resulting from conflict with other people, are at risk for experiencing more adverse consequences than other students. It can be concluded, therefore, that the IDS represents a valuable screening tool because it can be used to identify students with an emerging pattern of problematic drinking. As Carey (1995b) recommended, assessment measures are of optimal value in primary and secondary prevention initiatives when they lead to therapeutic intervention. Possibly then students identified from the IDS could be targeted for preventive intervention. This would be aimed at reducing the motivation to drink in order to alleviate negative affect by offering alternative, adaptive strategies both for coping with negative affect and improving interpersonal relationships.

## Chapter 4

### Concurrent Predictors of Students' Alcohol Consumption and Alcohol-Related Problems

There is a great deal of evidence to suggest that a range of biopsychosocial factors influence the development of problematic alcohol use. As Schall, Kemeny, and Maltzman (1992) stated, the use of alcohol, excessive alcohol consumption, and alcohol dependency are all a consequence of biopsychosocial determinants which lead, in turn, to a variety of biopsychosocial consequences that include a well-documented range of physical, psychological, and social problems. Thus far, no single etiological process has been identified that describes and explains the sequence, found in some individuals, in which initiation of alcohol use eventually culminates in alcohol dependency (La Grange, Jones, Erb, & Reyes, 1995).

What has proved fruitful in this sphere of understanding is research efforts aimed at identifying the major factors that constitute an individual's risk for developing alcohol problems. Clayton (1992) explained that risk factors in the form of individual characteristics and attributes, situational conditions, and environmental contexts increase the likelihood of alcohol abuse and dependency. As important, Clayton (1992) continued, are the individual, situational, and environmental factors that serve a protective function in that they inhibit, reduce, or buffer the likelihood of alcohol abuse and dependency.

Much research has aimed to identify the role that individual factors, or clusters of factors, play in the initiation of alcohol use and the development of alcohol problems. Examining the way in which risk factors combine is important because an individual's vulnerability to alcohol-related problems may be increased by different levels of different factors or combinations of factors. In addition, the onset of alcohol use may be influenced by factors different from those that maintain further use or affect the occurrence of problems (Dimeff, Baer, Kivlahan, & Marlatt, 1999).

The search for risk factors has yielded a list of possible candidates.

Poikolainen (2001) described the five factors most consistently implicated in the risk for alcoholism/alcohol dependence: positive family history of alcoholism/alcohol dependence (e.g., Sher, Walitzer, Wood, & Brent, 1991); lack of alcohol-induced facial flushing (e.g., Whitfield, Nightingale, Bucholz, Madden, Heath, & Martin, 1998); low responsivity to alcohol (e.g., Schuckit & Smith, 1996); antisocial behaviour (e.g., Miller, 1991); and cultural background (e.g., Vaillant & Milofsky, 1982).

Other possible risk factors have been suggested as follows. Lack of social support (Ohannessian & Hesselbrock, 1993), low social desirability (Yoshino & Kato, 1995), and left-handedness (McNamara, Blum, O'Quin, & Schachter, 1994) have all been found to be associated with problematic alcohol use. Trait anxiety predicted alcohol dependence (Heath, Bucholz, Madden, et al., 1997) and was related to heavy drinking among adolescents (Colder & Chassin, 1993). Anxiety disorders demonstrated a reciprocal causal relationship with alcohol dependence (Kushner, Sher, Erickson, & Darin, 1999). Personality factors including rebelliousness, impulsivity, and sensation-seeking predicted alcohol consumption (Brook, Whiteman, Cohen, Shapiro, & Balka, 1995), and high external locus of control was found to predict the development of heavy drinking (Steele, Forehand, Armistead, & Brody, 1995). The role that these factors play, individually and in combination, remains to be determined (Poikolainen, 2001).

#### 4.1 Personality Factors

Focusing on personality factors, research has identified nonconformity, independence, impulsivity, hyperactivity, and antisocial behaviour as individual characteristics that reliably predict future alcohol problems. Although no evidence has been found to support the concept of a unique alcoholic personality, a variety of different research methods has established a set of personality characteristics predating the onset of alcohol problems, as well as differentiating alcoholics from nonalcoholics (for a review see Cox, 1987; Cox, Yeates, Gilligan, & Hosier, 2001).

In early archival studies (Hoffmann, Loper, & Kammeier, 1973; Loper, Kammeier, & Hoffmann, 1973), data collected from first-year

undergraduates at the University of Minnesota who received treatment for alcoholism 13 years later, were examined. Loper et al. (1973) compared Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943) characteristics of 32 male first-year students, later hospitalised for alcoholism treatment, with 148 of their male classmates. It was found that the pre-alcoholic students scored significantly higher on three standard scales (F, Pd, and Ma) of the MMPI than other students. It was inferred from the comparisons on these scales that the students who later developed alcohol dependence were more impulsive, nonconforming, and gregarious than their classmates. In a further study Hoffmann et al. (1973) compared the MMPI scores of 25 first year students with their scores collected on average 13 years later when they received hospital treatment for alcoholism. It was concluded from the results of both studies that the above-mentioned personality characteristics differentiated pre-alcoholics from non-alcoholics and that the development of alcoholism was accompanied by increasing depression, health concerns, guilt, and feelings of low self-esteem.

Personality characteristics such as those identified in the above study were the subject of research that investigated the stress response dampening effect of alcohol among 96 students at Indiana University (Sher & Levenson, 1982). In two experiments it was discovered that those with pre-alcoholic characteristics (outgoing, aggressive, impulsive, and antisocial) measured by the MacAndrew Alcoholism Scale (MAC; MacAndrew, 1965) obtained a greater stress dampening effect from drinking alcohol in comparison with other students. This finding was supported, albeit to a reduced degree, in a further study by Sher and Walitzer (1986) among 96 male college students. It was concluded, however, that although there was a relationship between personality factors and the action of alcohol on a stress response, it appeared to be less important than was first thought.

Other studies have investigated the association between personality characteristics and student drinking, finding a relationship between impulsivity and alcohol use and/or alcohol-related problems (Adams &



Nagoshi, 1999; Berkowitz & Perkins, 1986; Camatta & Nagoshi, 1995; Nagoshi, 1999; Nagoshi, Wood, Cote, & Abbit, 1994; Schall, Kemeny, & Maltzman, 1992). Schall et al. (1992) surveyed 598 undergraduates to investigate the association between personality factors, amongst others, and alcohol consumption. They used three personality measures, the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975), the Sensation-Seeking Scale (Zuckerman, 1979), and the Socialization (SO) Scale of the California Psychological Inventory (Gough, 1960), and concluded that extraverted, sensation-seeking students with low inhibitory control were the most likely to drink heavily especially in the university context.

In a study of participation in 'drinking games' among 151 students at Arizona State University, Nagoshi et al. (1994) found that impulsivity, measured by the Eysenck I.7 Scale (Eysenck, Pearson, Easting, & Allsop, 1985), predicted the frequency of getting drunk and the level of alcohol-related problems. Sensation-seeking, called venturesomeness on the Eysenck I.7 Scale, was not related to alcohol consumption or alcohol problems. Different results were obtained in a similar study of 135 students at the same university when Camatta and Nagoshi (1995) found that both impulsivity and venturesomeness were related to the average amount of alcohol consumed per month, but not to the level of alcohol-related problems experienced by students. In a more recent study of 142 students, Nagoshi (1999) showed that impulsivity predicted alcohol use and alcohol-related problems, whereas venturesomeness was related to the frequency of heavy drinking but did not predict the occurrence of problems.

The overall results from the series of studies conducted by Nagoshi and colleagues, despite some inconsistencies, suggest that the more impulsive students are more likely than others to experience alcohol-related problems. Sensation-seeking, on the other hand, showed a consistent relationship to heavy drinking measures but was not an independent predictor of problems. Therefore, it appears that sensation-seeking students are more likely to drink heavily than others, which will

increase the likelihood of problems, but impulsive students will experience more problems than others over and above the level associated with heavy drinking.

Other studies of the relationship between personality and alcohol use among students have yielded similar results to the above research using different measures of personality. For example, Alterman, Bridges, and Tarter (1986) found that sensation-seeking independently predicted frequency of drinking among 34 male students designated as either at high- or low-risk for alcoholism according to their family history of alcohol problems. A later study (La Grange et al., 1995) which investigated biochemical and personality factors among 88 student drinkers, used the Sensation-Seeking Scale Form V (SSSV; Zuckerman, 1979) and the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1977). These authors found that the disinhibition subscale of the SSSV was the best predictor of frequency of alcohol use. More recently Cox and Blount (1998) used the MacAndrew Alcoholism Scale (MAC; MacAndrew, 1965) and the Socialization scale of the California Psychological Inventory (Gough, 1960) to assess the personality characteristics of reward seeking, socialization, and punishment avoidance among 154 students. They found that punishment avoidance, defined by MacAndrew (1965) as drinking to counteract negative affect and late onset of heavy drinking, negatively predicted the amount of alcohol students drank in the previous year. It was concluded from this unexpected result that punishment-avoiding students seemed to protect themselves from problems related to excessive drinking.

Another study (Johnson & Cropsey, 2000) used the SSSV to examine the relationship between sensation seeking and drinking game participation among 256 undergraduates. The results showed that disinhibition predicted frequency of playing drinking games and the typical amount of alcohol consumed when playing, for both male and female students. It was found also that male students, but not female students, experienced a higher level of negative consequences during or following the playing of drinking games. Johnson and Cropsey (2000)

concluded that their results did not support the proposal (Johnson, Wendel, & Hamilton, 1998) that the differences in frequency of drinking game participation among heavy drinking students would conform to Cloninger's (1987b) prominent theoretical model of alcohol abuse and alcoholism. From this perspective heavy drinking male students who frequently played drinking games should evidence the personality characteristics, including high sensation seeking, associated with Cloninger's (1987b) Type II alcoholism. On the other hand, heavy drinking male students who seldom or never played drinking games should manifest the characteristics, including low sensation seeking, of Type I alcoholism. Johnson and Cropsey (2000) found that sensation seeking was not higher in frequent game players relative to nongame players.

Cloninger's (1987b) neurobiological learning model proposes that three distinct dimensions of personality (Novelty Seeking, Harm Avoidance, and Reward Dependence) underlie an individual's risk for alcohol abuse and dependence. The model links personality with heritable differences in neurochemical factors and is applied to a typology of alcoholism which is assessed with the Tridimensional Personality Questionnaire (TPQ; Cloninger, Przybeck, & Svrakic, 1991). Type II alcoholism principally features early onset of alcohol-related problems, antisocial behaviour, and a continuous drinking pattern. It is defined by high scores on Novelty Seeking (NS), and low scores on both Harm Avoidance (HA) and Reward Dependence (RD). Type I, on the other hand, is characterised by low scores on NS and high scores on HA and RD, and is defined by later onset of alcohol-related problems, loss of control, and binge drinking.

Cloninger's (1987a, 1987b) tridimensional theory of personality has received a great deal of research attention that has produced mixed results possibly due to inconsistencies in the variables studied (see Cox et al., 2001). Relatively few studies have examined tridimensional personality factors among college students. In one study, Nixon and Parsons (1989) gave the TPQ to 225 students in order to test its validity. Correlational analyses showed that the three dimensions of the TPQ were mainly

independent except for a negative relationship between HA and NS among male students. In addition, female students scored higher than males on HA which indicated construct validity of the TPQ.

Another study (Sher, Walitzer, Wood, & Brent, 1991) examined personality differences among 490 students at either high- or low-risk for alcoholism defined by a history of paternal alcoholism. It was found that students who had a history of paternal alcoholism scored higher on NS and lower on RD than students with no such history, whilst female students scored higher than males on HA and RD regardless of risk status. Sher et al. (1991) concluded that their results showed that personality differences were present in persons at varying risk for alcohol problems in line with previous theory (Cloninger, 1987a).

However, the findings of a study by Earlywine, Finn, Peterson, and Pihl (1992) cast doubt on this particular view. The research aimed to test the validity of the TPQ in relation to other personality measures and indices of alcohol use. The MacAndrew Alcoholism Scale (MAC; MacAndrew, 1965), the Sensation-Seeking Scale (SSS; Zuckerman, 1971), the Socialization Scale of the California Psychological Inventory (SO; Gough, 1960), as well as alcohol quantity and frequency measures were completed by 198 American students. NS was positively correlated with all the personality measures and the indices of alcohol use. HA was negatively correlated with the Sensation-Seeking Scale and the MAC Scale, but was not related to the alcohol measures. RD was positively correlated only with the SO Scale. Although these results provided convergent validity for the TPQ, Earlywine et al. (1992) proceeded to conduct a factor analysis of the data provided by the 198 American students and 100 Canadian students, to confirm the three dimensions of the instrument. The hypothesised three-factor model failed to fit the data, leading Earlywine et al. (1992) to point out the obvious difficulty in testing tridimensional theory in the absence of a reliable measure that can provide proper assessment.

Although, as Howard, Kivlahan, and Walker (1997) stated, the utility of the TPQ for prevention or clinical purposes has not been well

established, overall results suggest that use of the instrument can contribute to the identification of potential problem drinking among students. In particular, the role of NS in alcohol use and alcohol-related problems is worthy of further consideration, as is the difference in HA between female and male students.

Another aspect of personality that has received research attention in relation to alcohol use is Locus of Control (LOC; Rotter, 1966). One concept in Rotter's social learning theory of personality, locus of control, refers to a generalised expectancy an individual holds regarding the extent to which chance governs the outcome of her/his actions. Individuals who credit success and failure to their own actions and abilities are described as having an internal locus of control. On the other hand, individuals said to have an external locus of control attribute outcomes to fate, luck, or outside agents.

The concept of locus of control has been applied to problematic alcohol use in a variety of studies. Donovan and O'Leary (1978) assessed a locus of control measure specific to alcohol use (Drinking Related Internal-External Locus of Control Scale, DRIE; Keyson & Janda, unpublished), and found that alcohol dependent individuals, in comparison to nondependent drinkers, had a more external locus of control which, in turn, was related to more physical and psychosocial impairment as a result of drinking. Other studies have found that internal locus of control was related to longer periods of sobriety (Mariano, Donovan, Walker, Mariano, & Walker, 1989; Strom & Barone, 1993), that individuals became more internal during the course of treatment, and that external individuals were more likely to leave treatment before completion (Jones, 1985; Prasadarao & Mishra, 1992). In addition, Koski-Jannes (1994) showed that following treatment internal individuals were less likely to relapse, drink less and for a shorter period of time if they did relapse, and have a better outcome than external individuals. Further research found that high externality in adolescence predicted heavy drinking in young adulthood (Steele, Forehand, Armistead, & Brody, 1995), and that high externality was a risk factor for alcohol dependence among women (Poikolainen, 2001).

Few studies have investigated the influence of locus of control on drinking patterns among students. Two early studies (Cox & Baker, 1982a, 1982b) examined this subject. In the first of these, 99 students completed the Internal-External Locus of Control Scale (I-E LOC; Rotter, 1966) and a measure of problem drinking, the Michigan Alcoholism Screening Test (MAST; Selzer, 1971). It was found that female students were more external than male students, but that increased externality was related to problem drinking among males only. The second study of 97 students found that consumption of wine was related to internal locus of control among male students but not female students. Cox and Baker (1982a, 1982b) concluded that different psychological processes underlie heavy drinking and alcohol-related problems, and pointed out the importance of measuring gender differences in this area.

Two other studies have investigated aspects of alcohol use among university students in relation to locus of control. Bensley (1991) gave the DRIE (Keyson & Janda, unpublished) to 429 social-drinking students and found that restrained drinkers were more external than unrestrained drinkers. Finally, Jones and Kinnick (1995) investigated the characteristics of Adult Children of Alcoholics (ACOAs) among 319 students, 105 of whom were identified as ACOAs. In respect of locus of control it was found that ACOA students who were members of "honor societies" had a more internal locus of control than other ACOA students.

Clearly research investigating the relationship between locus of control and alcohol use has produced consistent results with alcohol-dependent individuals. However, the same cannot be said of the few studies that focused on university students. It appears that there is a strong link between externality and alcohol dependence, and that locus of control is an unstable factor, prone to change during the course of treatment. On this basis, therefore, it cannot be determined whether locus of control is an influential precursor of alcohol problems or whether it is affected by chronic problematic drinking.

The present study investigated the relationships between personality and alcohol use and alcohol-related problems among students.

It was expected, therefore, that externality would be associated with both increased drinking and the occurrence of alcohol-related problems. A similar association was expected between high novelty seeking and measures of alcohol use, whereas both low harm avoidance and low reward dependence were expected to be related to increased drinking and alcohol-related problems. Apart from the above relationships, three specific gender differences found in previous research among college students (Cox & Baker, 1982; Sher et al., 1991) were tested, namely that female students would be higher on harm avoidance, reward dependence, and locus of control than male students.

#### 4.2 Relationship of Personality and Motivation

In addition, the relationship between personality factors and motivational variables were explored in order to identify the role they played in students' drinking and their alcohol-related problems. Motivational structure is said to be a critical influence on drinking patterns because the way in which individuals formulate goals in their life will affect their motivation to consume alcohol (Cox, Schippers, Klinger, Skutle, Stuchlikova, King, & Inderhaug, in press). For example, if a person expects to derive a high degree of emotional satisfaction from the achievement of certain goals in life then she/he would be less likely to drink to obtain positive affect or to reduce negative affect. In other words people will be more motivated to consume alcohol for an emotional reward if they do not expect to obtain emotional satisfaction from other, non-drinking areas of their life.

The achievement of goals will depend on a variety of factors including the level of commitment the person has, the expected likelihood of success, the amount of control a person perceives over the outcome, and so on. Obviously the extent to which drinking is expected to help or hinder the achievement of goals also will play an important role. For instance, students may derive a great deal of positive affect by drinking regularly with their peers and therefore be highly motivated to continue this pattern. However, if this pattern begins to interfere with their

obtaining a university degree (a goal to which a student is likely to be highly committed and from which she/he expects strong emotional satisfaction), then it is likely that these students' drinking habits will change.

It is possible to measure the perceptions surrounding individuals' current incentives in life in terms of their ability to realise goals that will enhance positive affect and/or reduce negative affect. The Personal Concerns Inventory (Cox, Klinger, & Blount, 1999), developed within the framework of the motivational model of alcohol use (Cox & Klinger, 1988, 1990), assesses an individual's motivational structure, identifying maladaptive motivational patterns which will increase the likelihood of problematic alcohol use. In a recent cross-cultural study (Cox, Schippers et al., in press), the motivational structure of 137 American students, 100 Czech students, 78 Dutch students, and 55 Norwegian students was assessed. In all four countries an adaptive motivational structure inversely predicted alcohol use among students who reported alcohol-related problems. It was concluded that adaptive structures reduced the likelihood of students who experienced problems to seek emotional satisfaction from drinking alcohol.

Apart from investigating the relationships between personality factors and alcohol use and alcohol-related problems, the present study also assessed the role played by motivational structure. It may be thought of in this way. Personality factors might affect motivational structure which, in turn, would influence the use of alcohol and the incidence of alcohol-related problems. For example, an impulsive, novelty-seeking person may be committed to achieving unrealistically short-term goals from which she/he expects to derive maximum, emotional satisfaction. When such a goal is not achieved, the person may well turn to drinking alcohol as an alternative source of emotional satisfaction. Furthermore, a propensity to act impulsively and to seek new experiences will render the person more vulnerable to experience problems when drinking.

Locus of control also would influence motivational structure. In the case of this factor, people who have an external locus of control feel



they have little personal control over the outcome of important concerns in their lives. Therefore, the commitment to resolving important concerns and the likelihood of achieving goals would be low for such a person. Under these conditions the person would be more likely to drink alcohol to derive emotional satisfaction than to pursue the resolution of important concerns. In addition, the person may hold the maladaptive belief that excessive drinking is not interfering with the achievement of goals because outcomes in life are dictated by external influences such as luck or the authorities.

The present study sought to evaluate the following predictions. An adaptive motivational structure, in terms of the realistic perception of the components necessary to achieve goals, was not expected to be related to an impulsive, novelty-seeking orientation and, in turn, was not expected to predict the occurrence of alcohol-related problems. On the other hand, a maladaptive motivational structure was expected to be positively related to novelty seeking and alcohol-related problems. An individual with the latter orientation would be more concerned with drinking alcohol for the immediate enhancement of positive affect despite the related negative consequences that would tend to interfere with the achievement of his or her goals in life. In addition, an external locus of control would strengthen unrealistic perceptions regarding the achievement of goals. For example, a novelty-seeking, external person is more likely to be pessimistic about resolving concerns in her/his life, which would promote greater drinking that would hamper the resolution of concerns and so on. On the other hand, harm avoidance was expected to be positively related to an adaptive motivational structure unless associated with an external locus of control that would indicate an unrealistic, over-cautious, and pessimistic orientation. Finally, low, rather than high, reward dependence was expected to be related to an adaptive motivational structure. The relationship was expected because Cloninger (1987b) described low reward-dependent individuals as practical and emotionally cool which are qualities that would facilitate effective resolution of current concerns in life.

## 4.3 Method

### 4.3.1 Participants

Following the screening procedure that was described in Chapter 2, 212 second-year students were identified as excessive drinkers. This subset of students was contacted with an invitation to participate in further research as described in Chapter 3. Just over 50 percent of these students responded and took part in the study. The final sample consisted of 111 students (Females 56.8%, males 43.2%), with an average age of 19.9 years ( $SD = 2.5$ ), who reported consuming 24 or more units of alcohol per week.

### 4.3.2 Instruments

Alcohol Use Questionnaire (AUQ). (Appendix A, p. 253). The AUQ, that was described in detail in Chapter 2 (p. 33-36), was used to identify students who were excessive consumers of alcohol. As indicated previously, the AUQ provides three indices of alcohol consumption. These indices, usual frequency of drinking per week, typical amount of alcohol consumed per day, and average weekly alcohol consumption, were used as variables in the present study. In addition, the AUQ is an amended version of the Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992) which provides a possible total score of 40. According to a validation study (Saunders et al., 1993) a total score of eight or more provides the most sensitivity whereas a score of ten produces the highest specificity. The AUDIT is composed of three items regarding hazardous alcohol use, three items concerning alcohol dependence, and four items relating to harmful alcohol use (see Chapter 2 for a full explanation of the composition of the AUQ).

Personal Concerns Inventory. (Appendix F, p. 258). The Personal Concerns Inventory (PCI), which was used to measure motivational structure, was an amended version of the Motivational Structure Questionnaire (MSQ; Klinger, Cox, & Blount, 1995). On the PCI respondents are invited to consider the concerns they have in 12 named areas of life. The 12 areas of life are: Family; Home; Friends and Acquaintances; Marriage, Dating, and Intimate Relationships; Physical

Health and Health Maintenance; Mental and Emotional Health; Self Changes; Employment and Finances; Education; Organizations; Hobbies and Recreation; and Illegal Activities. After thinking carefully about their concerns and how they would like these concerns to be resolved, respondents are asked to list the number of different goals for resolving their concerns in each life area. They are then asked to focus on the most important concern in each life area and supply ratings that describe the goal that will resolve that particular concern. Respondents then use the following 11 rating scales to depict each potential resolution: (1) Whether the goal is something that the individual wants to get, obtain, or accomplish, or whether it is something that the person wants to get rid of, prevent, or avoid (Goal Valence), (2) How important it is to reach the goal (Importance), (3) How likely it is to occur (Likelihood), (4) How much control the person has over the outcome (Control), (5) Whether the person knows what to do to reach the goal (Know What To Do), (6) How much joy is expected if the goal is achieved (Joy), (7) How much unhappiness is expected if the goal is achieved (Unhappiness), (8) How committed the person is to achieving the goal (Commitment), (9) How far away in time will the goal be achieved (Goal Distance), (10) Whether drinking alcohol will help in achieving the goal (Alcohol Helpful), (11) Whether drinking alcohol will interfere in achieving the goal (Alcohol Interferes).

The PCI was abridged for use with university students in the present study. Therefore, participants were asked to consider their current concerns in five, rather than 12, life areas: (1) Self Changes, (2) Relationships, (3) Education and Training, (4) Finances, and (5) Leisure and Recreation. These were selected because they represented the areas of life most important to young students. Participants were then asked to indicate the number of concerns they had in each of the five life areas. They then supplied a rating from zero to ten on each of the 11 scales listed above to portray the resolution of their goals. Scores on each of the 11 rating scales for each life area were summed to produce a total score. The total score was then divided by the number of areas the student endorsed

in order to yield an average rating for each scale. Average ratings on the eleven scales together with the total number of concerns and the number of areas out of five endorsed by students were used as motivational variables in the present study.

Tridimensional Personality Questionnaire (TPQ). (Appendix G, p. 259). The questionnaire used was an amended version of the Temperament and Character Inventory (TCI; Cloninger, Przybeck, Svrakic, & Wetzel, 1994). Three scales of the TCI corresponding to the three major personality dimensions hypothesised by Cloninger (1987b) were used in the present study. Novelty seeking, harm avoidance, and reward dependence are each assessed by 20 items that consist of short statements to which participants answer true or false, and the scales are formed by adding the item scores. Cloninger et al. (1994) suggested that the three scales are independent apart from a small negative correlation between novelty seeking and harm avoidance.

Cloninger's (1987b) neurobiological learning model proposes that three personality traits are distinctively associated with problematic alcohol use. A typology of alcoholism is described in terms of the extremes of the three personality traits. Specifically, the passive-dependent type is characterised by high reward dependence (described as eager to help others, emotionally dependent, warmly sympathetic, sentimental, sensitive to social cues, and persistent); high harm avoidance (cautious, apprehensive, pessimistic, inhibited, and shy); and low novelty seeking (rigid, reflective, loyal, orderly, and attentive to details). The antisocial type, however, is characterised by the opposing extremes of low reward dependence (socially detached, emotionally cool, practical, tough-minded, and independently self-willed), low harm avoidance (confident, relaxed, optimistic, uninhibited, carefree, and energetic), and high novelty seeking (impulsive, exploratory, excitable, disorderly, and distractible).

The psychometric properties of the TPQ have received much attention that has produced mixed results. For example, Earlywine et al. (1992) provided evidence of convergent validity whereas Nixon and Parsons (1990) raised serious doubts concerning the construct validity of

the TPQ, a view endorsed by Zaninelli et al. (1992). Others have provided some evidence for construct validity of the novelty seeking scale (Cannon, Clark, Leeka, & Keefe, 1993), overall construct validity (Howard, Cowley, Roy-Byrne, & Hopfenbeck, 1996), and predictive validity related to relapse in that high novelty seeking predicted relapse in detoxified male alcoholics (Meszaros et al., 1999). However, as Howard et al. (1996) concluded, further examination of Cloninger's influential theory is necessary and warranted.

Internal-External (I-E) Locus of Control Scale (LOC). (Appendix H, p. 260). The LOC (Rotter, 1966) is a 29 item questionnaire that measures generalised expectancies for the internal versus external control of reinforcement. Each item presents a choice between two statements, with 23 of the items being scored and six filler items. Respondents are asked to indicate the statement that more closely matches their personal belief. The questionnaire is scored in the positive direction with higher scores indicating an external locus of control.

Rotter (1966) proposed that locus of control was a generalised expectancy that will influence the way different individuals approach tasks and situations. Internal individuals expect that they can affect the outcome of an event by their own behaviour, whereas external people expect the outcome to be affected by influences beyond their control, such as luck, other people, or a higher power. Internality, therefore, indicates perceived, personal control over the outcome of events in life. Externality, on the other hand, indicates the perception that events in life are controlled by outside influences such as luck, fate, or powerful people.

Rutgers Alcohol Problems Index (RAPI). (Appendix B, p. 254). The RAPI (White & Labouvie, 1989) was described in detail in Chapter 3 (pp. 72-73). It is a 23-item screening instrument on which individuals indicate how many times they have experienced particular problems while drinking alcohol or as a result of their drinking.

#### 4.3.3 Procedure

In accordance with the procedure described in Chapter 3 (p. 75), students, who were identified as excessive consumers of alcohol, attended an assessment session at which they were invited to complete a number of

questionnaire measures including the RAPI, TPQ, PCI, and LOC. Students completed the questionnaires in a quiet, private room after signing a consent form (see Appendix E, p. 257).

#### 4.4 Results

Table 4.1 presents the means and standard deviations of the scales of the TPQ, LOC, RAPI, AUDIT, and the measures of weekly alcohol consumption separately for male and female students. Female students scored higher than males on all the personality measures: novelty seeking, harm avoidance, reward dependence, and locus of control. Male students reported more problems than female students as well as higher AUDIT indices, drinking more frequently, and consuming more alcohol per week than female students. Hypothesised gender differences in three of the personality variables were tested using a Bonferroni correction of alpha for the multiple tests. On this basis, there were no significant differences between female and male students on HA [ $t(109) = -1.23, p = .22$ ], RD [ $t(109) = -2.09, p = .04$ ], and LOC [ $t(109) = -1.77, p = .08$ ], contrary to expectations.

##### 4.4.1 Factor Analysis

The indices derived from the PCI were subjected to exploratory factor analysis in order to identify participants' motivational structure. Exploratory factor analysis was used instead of confirmatory factor analysis because of Kline's (1994) guidelines that were discussed in Chapter 3 (p. 75). The resulting factor solution was used to categorise students as having either an adaptive or a maladaptive motivational structure. On this basis, significant differences between the two types of motivational structure on the personality and alcohol measures could be identified.

The 13 motivational indices from the PCI were inspected to identify any deviations from normality that would seriously threaten the validity of the factor analysis. Two variables, number of concerns and number of life areas, showed a high enough degree of skewness to cast doubt on their inclusion in the analysis. The number of life areas was severely, negatively skewed because 93 percent of students responded that they had

concerns in all five life areas that were listed in the PCI. Therefore, the number of life areas was excluded as a variable from the analysis. The number of concerns indicated by students ranged from 2 to 58 with a mean of 11, and 69 percent reported having 12, or fewer, concerns among the five life areas. The distribution of this variable, therefore, was positively skewed, possibly indicating that some students had made a very broad estimate when they had a large number of concerns. The variable was excluded from further analysis.

Table 4.1

Mean Scores on the TPQ scales, LOC, RAPI, AUDIT, and Weekly Alcohol Measures for Male and Female Students

Variable	Males (n = 48)		Females (n = 63)	
	Mean	SD	Mean	SD
TPQ				
Novelty Seeking	10.92	3.22	11.05	4.09
Harm Avoidance	7.58	4.08	8.70	5.19
Reward Dependence	12.21	3.92	13.76	3.83
LOC	11.83	3.68	13.13	3.91
RAPI	22.75	12.41	19.89	13.15
AUDIT Dependency	2.19	2.05	1.79	1.71
AUDIT Problems	5.38	3.80	4.17	2.98
AUDIT Total	17.35	5.48	15.13	4.70
Drinking Frequency	5.15	1.63	4.83	1.20
Drinking Quantity	10.75	3.63	8.62	2.74
Drinking QxF	53.36	24.09	39.80	12.46

**Note.** TPQ, Tridimensional Personality Questionnaire. LOC, Locus of Control. RAPI, Rutgers Alcohol Problem Index. AUDIT, Alcohol Use Disorders Identification Test. AUDIT Dependency, items 4, 5, & 6 with a possible maximum score of 12. AUDIT Problems, items 7, 8, 9, & 10 with a possible maximum score of 16. AUDIT Total, 10 items with a possible maximum score of 40. Drinking Frequency, usual frequency of drinking days per week. Drinking Quantity, typical amount of alcohol consumed on drinking days. Drinking QxF, average weekly amount of alcohol consumed in units (Drinking Quantity multiplied by Drinking Frequency).

The sample was considered representative and heterogeneous for the remaining 11 motivational indices as well as being large enough for the factor analysis to proceed with confidence. Therefore, a correlation matrix of the variables was produced and inspected. It was found that 43 percent of the coefficients were greater than 0.2 indicating adequate inter-variable relationships on which to base a factor analysis. Bartlett's test of sphericity (401.19,  $p < .00001$ ) supported this finding. In addition, the KMO measure (.75) showed that the sample was adequate, and the analysis could proceed with confidence.

Initial extraction of factors was carried out using both principal components analysis and principal-axis factoring, and the two solutions were compared. Both techniques extracted three factors with eigenvalues greater than one, but a scree plot indicated a two-factor solution would best fit the data. Extraction of two factors by principal components analysis was found to be a better solution than that produced by principal-axis factoring. Therefore, the principal components, two-factor model was rotated to simple structure by both Varimax and Direct Oblimin procedures, and the two solutions were compared. The two rotated solutions were virtually identical and easily interpretable, but the Direct Oblimin solution was selected because this procedure allows the factors to correlate with each other. Correlated factors are desirable from a theoretical standpoint because, as Kline (1994) pointed out, in psychological phenomena such as motivation the factors would be expected to correlate.

The oblique two-factor solution is presented in Table 4.2, which shows factor loadings above  $\pm .21$ . The two factors were entitled Adaptive and Maladaptive Motivation. Commitment, Importance, Joy, Likelihood, and Goal Valence were the variables loading highest on Factor 1, Adaptive Motivation. The indices Control, Know What To Do, Unhappiness, Alcohol Helpful, and Goal Distance were the major contributors to Factor 2, Maladaptive Motivation.

Table 4.2 shows that four indices contributed to the definition of both factors. Likelihood of Success had a high positive loading on Factor 1 but a moderate negative loading on Factor 2. Both Control over Outcome



and Know What To Do have high negative loadings on Factor 2 but also moderate, positive loadings on Factor 1. Unhappiness positively loaded on Factor 2 whilst it negatively loaded on Factor 1. Although Alcohol Interference loaded on both factors at a level below what is generally regarded as salient (Kline, 1994), the loadings were large enough to be noteworthy and, therefore, were included in the table. The two factors together accounted for 48 percent of the variance, with Factor 1 explaining 33 percent and Factor 2 explaining 15 percent. Cronbach's alpha was high for Factor 1 ( $\alpha = .81$ ) but low for Factor 2 ( $\alpha = .27$ ).

Table 4.2

Direct Oblimin Factor Loadings of the 11 Motivational Indices of the Personal Concerns Inventory (PCI)

Motivational Dimensions	Factor 1 Adaptive Motivation	Factor 2 Maladaptive Motivation
Commitment	.89	
Importance	.86	
Joy	.82	
Likelihood	.72	-.38
Goal Valence	.45	
Control	.35	-.73
Know What To Do	.36	-.61
Unhappiness	-.31	.56
Alcohol Helpful		.54
Goal Distance		.48
Alcohol Interferes	.22	.28

The factors were entitled Adaptive and Maladaptive Motivation because one set of indices expressed an appropriate, useful orientation, whereas the other set described an inappropriate, ineffectual approach to the resolution of concerns in a person's life. High Commitment, Importance, Joy, and Likelihood in relation to goals that are desired, coupled with moderate Control and Know What To Do constitute requirements necessary for the satisfactory, effective achievement of goals in life. On the other hand, low Control, Know What To Do, and Likelihood with high Unhappiness, Alcohol Helpful, and Goal Distance represent poor qualities for resolving concerns and can be described as maladaptive.

The results of the factor analysis of the PCI made it possible to categorise students in terms of their motivational structure. Using the median of both factors as a cut-off point, Adaptive Motivational Structure was defined as high Factor 1 and low Factor 2, while Maladaptive Motivational Structure was defined as low Factor 1 and high Factor 2. By these criteria 34 students showed an Adaptive Motivational Structure and 34 students displayed a Maladaptive one. Differences between the two groups on the other variables were tested and the results are shown in Table 4.3. Students with a Maladaptive Motivational Structure scored higher than those with an Adaptive Motivational Structure on all variables except Reward Dependence. However, after Bonferroni correction for multiple t-tests only two differences were significant, namely that students with a Maladaptive Motivational Structure scored lower on Reward Dependence and higher on LOC than students with an Adaptive Motivational Structure. There were no significant differences for Harm Avoidance, Novelty Seeking, and RAPI scores, contrary to predictions.

Table 4.3

Mean Scores on the TPQ, LOC, and RAPI for Students with Different Motivational Structure

Variable	Motivational Structure				t	p
	Adaptive		Maladaptive			
	Mean	SD	Mean	SD		
TPQ						
NS	10.47	3.36	11.47	4.85	1.11	.272
HA	7.03	4.62	9.68	4.85	2.30	.024
RD	14.03	3.62	11.29	4.09	2.92	.005
LOC	11.18	3.03	13.79	3.90	3.09	.003
RAPI	19.15	11.68	24.65	14.38	1.73	.088

**Note.** TPQ = Tridimensional Personality Questionnaire. NS = Novelty Seeking. HA = Harm Avoidance. RD = Reward Dependence. LOC = Locus of Control. RAPI = Rutgers Alcohol Problem Index. Bonferroni adjusted significance level,  $p < .01$ . Exact p values are shown in the table for comparison.

#### 4.4.2 Multiple Regression Analyses

Correlational analysis was carried out as the first stage in a multiple regression procedure. Table 4.4 shows the intercorrelations between the personality, motivational, and alcohol-use variables. None of the variables was significantly related to students' average weekly alcohol consumption, a result that contradicted predictions. There were three significant positive correlations with the RAPI index, namely average weekly alcohol consumption, TPQ Novelty Seeking, and PCI Factor 2 (Maladaptive Motivation). These results support expectations for Novelty Seeking but were contrary to predictions concerning LOC, Harm Avoidance, and Reward Dependence. Maladaptive Motivation was also significantly, positively related to Harm Avoidance and LOC. On the other hand, PCI Factor 1 (Adaptive Motivation) was correlated with only one other variable, Reward Dependence, in contradiction of the hypothesised negative relationship between these two variables. Among the personality variables, two significant correlations were found. Harm Avoidance and

Novelty Seeking were negatively related whilst LOC was positively related to Harm Avoidance. The negative relationship between Harm Avoidance and Novelty Seeking is consistent with Cloninger's (1987b) theory and the findings of previous research both with college students (Nixon & Parsons, 1989) and with sons of alcoholics (Howard et al., 1996).

Table 4.4

Intercorrelations among Personality Variables, Motivational Factors, Alcohol-Related Problems, and Average Weekly Alcohol Consumption

Variable:	RAPI	QxF	NS	RD	HA	LOC	Factor 1	Factor 2
RAPI	–							
QxF	.21*	–						
NS	.28**	ns	–					
RD	ns	ns	ns	–				
HA	ns	ns	-.26**	ns	–			
LOC	ns	ns	ns	ns	.29**	–		
Factor 1	ns	ns	ns	.26**	ns	ns	–	
Factor 2	.20*	ns	ns	ns	.26**	.30**	ns	–

Note. RAPI = Rutgers Alcohol Problem Index; QxF = Average weekly alcohol consumption (in Units). NS, Novelty Seeking. HA, Harm Avoidance. RD, Reward Dependence. LOC, Locus of Control. Factor 1, Adaptive Motivation. Factor 2, Maladaptive Motivation. \* $p < .05$ . \*\* $p < .01$ .

The correlation matrix was inspected in order to select a regression model to predict alcohol-related problems. There were no problems of multicollinearity between the selected predictor variables, therefore three separate multiple regression analyses were carried out. The results of the analyses are displayed in Table 4.5. The first analysis tested the predictive power of TPQ Novelty Seeking over and above the influence of average weekly alcohol consumption on RAPI scores. Average weekly alcohol consumption significantly predicted RAPI scores, explaining four percent of the variability, whilst Novelty Seeking independently accounted for eight percent more of the variability in RAPI scores. The second analysis

showed that PCI Factor 2 Maladaptive Motivation significantly predicted RAPI scores accounting for five percent of the variability over and above that portion explained by average weekly alcohol consumption. In the third analysis the predictive influence of Maladaptive Motivation fell below significance, whereas average weekly alcohol consumption and Novelty Seeking were significant, independent predictors of RAPI scores.

Table 4.5

The Results of Three Hierarchical Multiple Regression Analyses of the Ability of Alcohol-Use, Motivational, and Personality Variables to Predict Alcohol-Related Problems

Dependent variable	Independent variables in order of entry	$\Delta R^2$	$\beta$ in final equation
<u>Analysis 1</u>			
RAPI	1. Avg. alcohol/week	.04*	.22*
	2. TPQ Novelty Seeking	.08***	.29**
<u>Analysis 2</u>			
RAPI	1. Avg. alcohol/week	.04*	.22*
	2. Maladaptive Motivation	.05**	.21*
<u>Analysis 3</u>			
RAPI	1. Avg. alcohol/week	.04*	.23*
	2. TPQ Novelty Seeking	.08***	.26**
	3. Maladaptive Motivation	.03***	.17

Note. RAPI = Rutgers Alcohol Problems Index. Independent variables used in the analyses were average weekly alcohol consumption, TPQ Novelty Seeking, and PCI Factor 2 Maladaptive Motivation. Howell's (1997, p. 541) formula was used to test the significance of  $R^2$  changes resulting from the addition of predictor variables.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

As in Chapter 3 (pp. 87-88), Baron and Kenny's (1986) guidelines for testing for mediation effects were used to determine which of the two

models shown in Figure 2 better represents the causal relationships between TPQ Novelty Seeking, average weekly alcohol consumption, and alcohol-related problems. Model 1 was rejected because the first condition necessary for mediation was not satisfied, namely TPQ Novelty Seeking did not significantly predict average weekly alcohol consumption. Because there was no evidence for mediation, Model 2 better represents the relationships among the variables, inasmuch as both TPQ Novelty Seeking and average weekly alcohol consumption directly predicted alcohol-related problems.

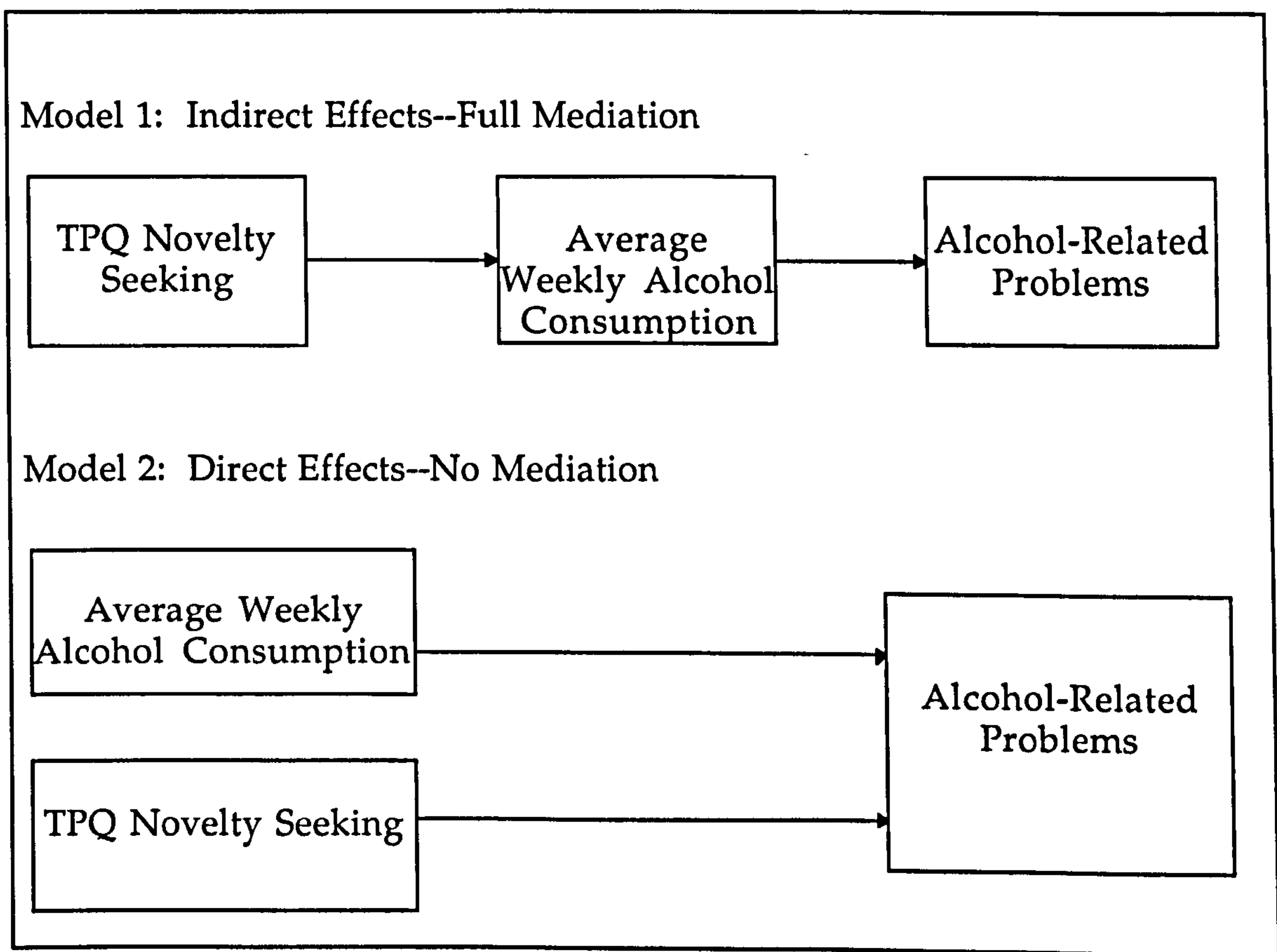


Figure 2. Two hypothesised models describing the effects of TPQ Novelty Seeking and average weekly alcohol consumption on alcohol-related problems.

#### 4.5 Discussion

Although female students scored higher than male students on all three variables, the results of the present study provided no support for the hypothesised gender differences in LOC, Harm Avoidance, and Reward Dependence suggested by previous research (Cox & Baker, 1982; Nixon & Parsons, 1989; Sher et al., 1991). Possible reasons for the failure to replicate previous gender differences include cultural differences between British and American students, changes over time since the earlier studies, and larger sample sizes in two of the studies (Nixon & Parsons, 1989; Sher et al., 1991).

The pattern of correlations among the personality and alcohol variables provided mixed support for the results of previous research. To begin with, the scales of the TPQ were found to be unrelated to each other, with the exception of a moderate, negative relationship between Novelty Seeking and Harm Avoidance. The relationship between Novelty Seeking and Harm Avoidance supported Cloninger's (1986) original findings with medical students, Nixon and Parsons' (1989) study of college students, and Howard et al. (1996) investigation of sons of alcoholics. However, unexpectedly neither Novelty Seeking, Harm Avoidance, nor Reward Dependence was related to average weekly alcohol consumption among students. This result contradicted Earleywine et al. (1992) who found that Novelty Seeking was positively related to both the average number of drinks consumed per occasion and the average number of times per week that alcohol was consumed. Although Cloninger has not specified how the TPQ dimensions should relate to alcohol use, his theory implies that Type II alcoholism (high NS, low HA, and low RD) should be associated with the quantity and frequency of alcohol consumed. From Cloninger's description that a characteristic feature of Type II is the inability to abstain from drinking, it was expected that all three TPQ dimensions would be related to alcohol consumption. Specifically, Novelty Seeking should be positively related to consumption whilst both Harm Avoidance and Reward Dependence should be negatively related to alcohol use.

The obtained pattern of correlations between the TPQ dimensions

and alcohol-related problems also produced mixed results. A positive relationship between Novelty Seeking and alcohol-related problems conformed to Cloninger's (1987b) theory, research by Cannon et al. (1993) with alcohol dependent males, and the finding by Earleywine et al. (1992) that Novelty Seeking was related to an index of alcohol abuse. However, both Harm Avoidance and Reward Dependence were unrelated to alcohol-related problems which did not support hypotheses or the tridimensional theory. Even when acknowledging that the TPQ dimensions may be distributed differently among different samples, inconsistent results such as these indicate, as Cannon et al. (1993) pointed out, that the complexity of the TPQ scales has not been fully investigated.

One potentially fruitful avenue of investigation may be to determine the exact contours of the Novelty Seeking dimension in view of its relationship to alcohol-related problems and suitability as a risk factor for emergent alcohol dependency. Inconsistent results with this scale may have arisen because it combines impulsivity and sensation seeking in the one dimension of Novelty Seeking. Research conducted by Nagoshi and colleagues (Camatta & Nagoshi, 1995; Nagoshi, 1999; Nagoshi et al., 1994) provides support for this view. It will be recalled that the overall results of Nagoshi and colleagues' research, which used the Eysenck I.7 Scale (Eysenck et al., 1985), suggested distinctive relationships between alcohol measures and the two personality dimensions, impulsivity and sensation seeking. The distinction was apparent in the general finding that impulsivity was related to the incidence of alcohol-related problems whereas venturesomeness was associated with heavy drinking.

The other personality variable, locus of control, was not related to alcohol use, alcohol-related problems, Novelty Seeking, and Reward Dependence as expected. On the other hand, locus of control was positively related to Harm Avoidance. The positive relationship provided convergent validity for Harm Avoidance inasmuch as low Harm Avoidance would correspond to an internal orientation whereas high Harm Avoidance would correspond to an external locus of control. For



example, an individual with low Harm Avoidance would be confident, relaxed, and optimistic, all of which are qualities that would be expected of someone who perceives personal control over the outcome of events in her/his life. On the other hand, an individual with high Harm Avoidance would be cautious, apprehensive, and pessimistic--attributes that would appear to reflect an external orientation in which the person expects events in life to be controlled by outside influences such as luck, fate, or powerful people.

The factor analysis of the PCI identified a distinctive motivational structure. The adaptive and maladaptive components that comprise an individual's strategy for resolving the current concerns in her/his life were plainly evident. Specifically, Adaptive Motivation took the form of high commitment to goals that are likely to be obtained and will bring great joy when accomplished. Maladaptive Motivation, on the other hand, involved little commitment, importance, and joy regarding any goals the individual has for resolving current concerns in life.

In addition, even though the two factors were uncorrelated they were defined also by individual motivational indices that spanned both factors in terms of a positive loading on one factor and a negative loading on the other. The likelihood of accomplishing a goal, for example, was highly positive on Adaptive Motivation but moderately negative on Maladaptive Motivation. Unhappiness showed a reverse pattern, being moderately negative on Adaptive Motivation, whilst highly positive on Maladaptive Motivation. Control and Know What to Do were different again in that both dimensions were moderately positive on Adaptive Motivation but highly negative on Maladaptive Motivation.

Taken separately, then, the two motivational factors can be described in the following way. Adaptive Motivation is characterised by perceived high likelihood of obtaining goals to which the person is highly committed and regards as important. Adaptive Motivation also featured an adequate knowledge of how to accomplish goals, a perception of adequate control over the outcome, and the expectation that accomplishing the goal would bring great joy and little unhappiness.

Maladaptive Motivation, on the other hand, is characterised by lack of personal control over the accomplishment of goals that the person has little idea of how to achieve. There is little likelihood of achieving goals and their accomplishment is fairly distant in the future and would bring a fairly high degree of unhappiness. Crucially, the person perceives the consumption of alcohol as helpful in the accomplishment of goals. Interestingly, it is worth noting that Alcohol Interference loaded just below criterion for inclusion in the Maladaptive Motivation factor. This suggests an ambivalent attitude toward alcohol among those with Maladaptive Motivation, in which an individual recognises that drinking interferes with the achievement of goals, but that such interference is outweighed by the perception that drinking is helpful on some level.

Although the two motivational factors were unrelated and could be employed as separate dimensions, the fact that four indices showed loadings on both factors suggests that motivational structure may be best understood with reference to the level of both factors. On this basis, students with a maladaptive motivational structure were less reward dependent and more external than students with an adaptive motivational structure. As expected locus of control varied across the two types of motivational structure. Clearly, externality is more likely to be related to maladaptive perceptions concerning the amount of control a person has over the resolution of concerns, the knowledge of what to do in order to achieve goals, and the likelihood of achieving them when the person believes that outcomes in her/his life are mainly a matter of chance. Unexpected, however, was the result that reward dependence was higher among students with an adaptive motivational structure than with a maladaptive one. Individuals who are eager to help others, emotionally dependent, and sensitive to social cues might not be expected to evidence a positive, confident orientation to resolving important concerns in their life. On the contrary, such people should be more likely to view the outcomes in their lives to rely heavily on the actions of other people.

Explaining why reward dependence was higher among students with an adaptive motivational structure than those with a maladaptive

motivational structure is somewhat difficult. Possibly, high reward dependent students provided socially desirable answers that reflected the conventional way of resolving important concerns in life because they were conforming to perceived social norms. Alternatively, perhaps such individuals are more likely to learn effective strategies to resolve concerns because they are socially dependent and, therefore, readily adopt strategies that are successful in obtaining social rewards. Applied to low reward dependent students, therefore, these individuals are less likely to learn or develop adaptive strategies for resolving concerns in life because they are socially detached and less dependent on social rewards.

Interrelationships between the motivational factors, personality variables, and alcohol-related problems provided construct validity for the factor solution. Externality and high harm avoidance were associated with Maladaptive Motivation, suggesting that an apprehensive, pessimistic orientation would have an effect on an individual's perception of her/his chances of successfully resolving current concerns in life. In addition, as hypothesised, the occurrence of alcohol-related problems was positively related to Maladaptive Motivation but not related to Adaptive Motivation.

Intercorrelations provided mixed support for the hypothesised relationships. As expected, Adaptive Motivation was not related to either novelty seeking or alcohol-related problems. However, the hypothesised relationship between Maladaptive Motivation and novelty seeking was not supported, whilst both Maladaptive Motivation and novelty seeking were associated with alcohol-related problems, as predicted. In the case of harm avoidance, the predicted relationship with Adaptive Motivation was not found, but this personality dimension was positively related to Maladaptive Motivation. Finally, the hypothesised, negative relationship between reward dependence and Adaptive Motivation was not supported; instead there was a positive relationship between the two dimensions.

It is possible that the hypothesised positive relationship between Maladaptive Motivation and Novelty Seeking was not found simply because the two factors were incompatible. For example, Maladaptive Motivation described a pessimistic, apathetic attitude toward resolving

goals in life. On the other hand, novelty seeking individuals may be thought of as enthusiastic and confident although they may be unrealistic in overestimating the likelihood of achieving goals and underestimating the time needed to resolve concerns in their lives. In the case of Harm Avoidance, the positive relationship with Maladaptive Motivation was unexpected but clearly conformed to Cloninger's (1987a, 1987b) description of that personality dimension. High Harm Avoidance, according to Cloninger, included certain traits (apprehension, pessimism, and inhibition) that would be associated with Maladaptive Motivation. Finally, Reward Dependence was positively, rather than negatively, related to Adaptive Motivation. It was expected that the characteristics of low Reward Dependence (practicality, tough-mindedness, social detachment, and emotional coolness) would constitute excellent qualities with which to successfully resolve important concerns in life. However, the unexpected relationship between high Reward Dependence (eagerness to help others, sensitivity to social cues, emotional dependence, sentimentality, and persistence) and Adaptive Motivation possibly indicated the importance that social rewards represent to this type of individual. The need for social acceptance and approval, therefore, aids in the learning of adaptive strategies for the person who is highly reward dependent.

The relationships that were found between personality and motivation are worthy of further attention. Reward dependence, harm avoidance, and locus of control all appear to have a complementary influence on motivational structure that warrants further investigation. For example, although the findings of research by Cannon et al. (1993), Earleywine et al. (1992), and Nixon and Parsons (1990) have cast doubt on Cloninger's assertion that TPQ dimensions can distinguish types of alcoholics, possibly the TPQ dimensions and locus of control can be used both to distinguish different types of motivation, and to determine how they affect motivational structure.

The final results showed that the number of alcohol-related problems experienced by students was predicted by average weekly alcohol

consumption, novelty seeking, and maladaptive motivation. Entering each variable in separate analyses, both novelty seeking and maladaptive motivation significantly predicted the level of alcohol-related problems over and above the proportion explained by average weekly alcohol consumption. Therefore, novelty seeking students and students with maladaptive motivation experienced a significant level of problems regardless of the amount of alcohol consumed on average per week.

The distinguishing characteristics of novelty seeking, according to Cloninger (1987b), include impulsivity, risk taking, disorderliness, and the incidence of negative consequences. It is unsurprising, therefore, to find that, compared to other students, novelty seeking students experience more problems than would be expected from the amount of alcohol that they consume. For example, if two students drank the same amount of alcohol the one who scores high on novelty seeking would be more likely to experience problems. Unsurprisingly, too, it was found that students with maladaptive motivation reported a level of alcohol-related problems over and above that associated with the amount of alcohol consumed. Such individuals might be expected to experience more problems related to their alcohol use than others because they would lack the basic qualities necessary to derive emotional satisfaction from resolving current concerns in life.

#### 4.6 Conclusion

The present study identified relationships between personality characteristics and motivational factors that constituted a promising avenue of further research. Apart from gaining understanding of how motivational structure develops, future research might take the form of tailoring interventions aimed at changing maladaptive motivation on the basis of different personality types. The benefit of changing maladaptive motivational patterns would be seen in the reduction of problematic alcohol use that should result from the increased degree of emotional satisfaction that a person would obtain from the successful resolution of current concerns. A question that could be addressed, then, is whether the combination of personality characteristics and motivational structure

moderates the occurrence of negative consequences related to drinking alcohol.

Among the personality characteristics, novelty seeking showed promise as a risk factor in problematic alcohol use. However, although some support for Cloninger's model was found, the utility and construct validity of the TPQ scales was not well established in the present study, a conclusion that was reached by the authors of previous investigations of tridimensional theory (Cannon et al., 1993; Earleywine et al., 1992; Nixon & Parsons, 1990). Cannon et al. (1993), in particular, emphasised that there was a factorial complexity of the TPQ scales which, if overlooked, would result in the loss of significant relationships between subscales and criterion variables. Novelty seeking, in particular, warrants close inspection because the combination in this scale of different underlying constructs, principally impulsivity and sensation seeking, may result in the loss of predictive power.

In the case of motivational structure, Maladaptive Motivation showed the greatest potential for identifying problematic alcohol use among students. The result was not as clear-cut as expected because Maladaptive Motivation just failed to reach significance when predicting problems independent of average alcohol use and novelty seeking. However, further research into the relationships between motivational structure and alcohol use is warranted because of its potential applications for changing problematic drinking.

To summarise, students' motivational structure was distinguished by personality factors. That is, externality and high harm avoidance were associated with maladaptive motivation, whilst high reward dependence was related to adaptive motivation. The occurrence of alcohol-related problems was directly influenced both by a novelty seeking personality characteristic and by a maladaptive motivational profile. The implications for future research principally concern the reduction of alcohol-related negative consequences by targeting students with a maladaptive motivational profile, the task being informed by a full understanding of the role played by personality characteristics.

## Chapter 5

### Brief Interventions

There exist a variety of definitions and descriptions of brief interventions for alcohol problems. The National Institute of Alcohol Abuse and Alcoholism (NIAAA; 1997) supplied five criteria to distinguish brief interventions from other treatments for alcohol problems. Namely, brief intervention is generally restricted to four or fewer sessions, delivered to those at risk for alcohol dependence/serious consequences, usually in a primary health care setting, by persons not specialised in the treatment of alcohol problems, and with moderate drinking, rather than abstinence, as the goal of the intervention.

The above criteria were endorsed in recent research into brief interventions for alcohol problems (Aalto, Seppa, Mattila, Mustonen, Ruuth, Hyvarinen, Pulkkinen, Alho, & Sillanaukee, 2001; Aalto & Sillanaukee, 2000). In these studies brief intervention was defined as, "any therapeutic or preventive activity of short duration undertaken by a health care professional...who is not a specialist in addiction treatment". Furthermore, the intervention was delivered in a non-treatment setting and usually comprised one to five sessions aimed at moderating alcohol consumption.

Others have contributed variations to the broad definition of brief interventions. For example, Brown (2001) stated that brief interventions varied in length from a few minutes up to three sessions of assessment and feedback aimed at a range of goals such as reducing alcohol consumption, providing skills training, facilitating problem recognition, and enhancing commitment to change. Sanchez-Craig and Wilkinson (1993) argued that brief interventions comprised two essential components, advice and counselling. Advice should take the form of both general and specific information that recommends changing behaviour and provides health education and sensible drinking guidelines. The counselling component should combine advice with information designed to achieve the specific goals of the intervention.

Clearly, descriptions of what constitutes a brief intervention vary

sufficiently to make a precise definition problematic (Heather, 1995). Brief interventions vary in terms of duration and type of information delivered, and by whom, in relation to the aim of the intervention and the type of drinker at which the intervention is aimed. For example, an intervention may be delivered to a heavy drinker in order to reduce the likelihood of alcohol-related problems developing later if the individual continues to drink at the same level. On the other hand, a different intervention of higher intensity may be delivered to a problem drinker with a high level of dependence in order to facilitate this type of drinker's entry into specialist alcohol treatment. Not only does this variation make definitions a problem but it also makes evaluation of the effectiveness of different types of brief interventions potentially misleading (Heather, 2001).

The way to circumvent the above problems is to distinguish between two separate types of intervention that have been subsumed under the umbrella term brief interventions. Heather (2001) clarified the issue by classifying brief interventions in terms of two domains, namely brief treatment and opportunistic brief intervention. These two domains are defined essentially by their respective target populations. Hence, brief treatment is appropriately delivered to individuals actively seeking assistance for their alcohol problems, whereas an opportunistic brief intervention is aimed at heavy drinkers who are not seeking help and are assumed to be unaware of the potential problems related to their alcohol use.

The settings in which brief treatment and opportunistic brief interventions are delivered represent another defining feature of the two domains. Brief treatment was described by Heather (1995) as an agency-based intervention because it would be delivered by addiction specialists in hospital-based clinics or units, private alcohol treatment agencies, or voluntary counselling services. On the other hand, opportunistic brief interventions were described as community-based interventions offered in diverse medical and non-medical settings such as General Practitioners' surgeries, General Hospital wards, community health screening



programmes, and Probation Service offices. Therefore, the personnel who deliver opportunistic brief interventions would be non-specialists in the field of alcohol problems such as General Practitioners, nurses, social workers, and probation officers. In addition, self-help manuals and information booklets can be provided in health centres, hospital waiting rooms, and pharmacies, as well as being distributed to people who respond to media advertisements offering advice for excessive drinking.

Returning to the issue of which groups of drinkers are targeted by what type of intervention, it is clear that opportunistic brief interventions are appropriate for excessive drinkers with a low-to-moderate level of alcohol dependence and a relatively low incidence of alcohol-related problems. For this type of drinker, the intervention could be as brief as a few minutes of advice but probably would not exceed three sessions, and would be aimed at reducing alcohol consumption to a moderate level. Brief treatment, however, would be provided to drinkers with high levels of both dependence and alcohol-related problems, although the levels would be lower than those found in drinkers receiving specialist alcohol treatment. In comparison to opportunistic brief interventions, brief treatment would be longer and more intensive, although briefer than that offered by specialist alcohol agencies, and the goal of treatment would be total abstinence from alcohol.

Let us now consider whether brief interventions actually reduce excessive alcohol use and the related problems. (A number of literature reviews have addressed this issue and their general conclusion was that brief interventions are effective in reducing excessive alcohol consumption) (Bien, Miller, & Tonigan, 1993; Heather, 1995; Kahan, Wilson, & Becker, 1995; Miller, Brown, Simpson, Handmaker, Bien, Luckie, Montgomery, Hester, & Tonigan, 1995; Poikolainen, 1999; Wilk, Jensen, & Havighurst, 1997). However, as Heather (2001) warned, these reviews evaluated the results of studies of both domains of brief interventions, and it should be noted that evidence of effectiveness is different for brief treatments and opportunistic brief interventions. Specifically, brief treatment is compared to a more intensive form of

treatment, and no difference between the two is taken as evidence of the former's greater effectiveness. Opportunistic brief interventions, on the other hand, are compared to no intervention, or a more minimal intervention, and greater reductions in the outcome measure for opportunistic brief interventions are taken as evidence of their effectiveness.

The most notable of the above reviews (Bien, Miller, & Tonigan, 1993) meta-analysed 32 controlled studies of the effectiveness of brief interventions employed in three contexts--general health care settings, with self-referred drinkers, and in specialist treatment settings. Of the studies reviewed, two (Elvy, Wells, & Baird, 1988; Kuchipudi, Hobein, Fleckinger, & Iber, 1990) used a brief intervention to motivate problem drinkers to accept specialist treatment rather than directly targeting a reduction in drinking. The first study found that those who were first referred to and then accepted one session of alcohol counselling did better on outcome measures at a one-year follow-up than controls, but the difference in improvement disappeared by the time of a further follow-up at 18 months. The other study (Kuchipudi et al., 1990) was unsuccessful in motivating problem drinkers to accept alcoholism treatment.

The remaining studies reviewed by Bien et al. (1993) were a mixture of brief treatments and opportunistic brief interventions. Of these, ten were opportunistic brief interventions in health-care settings. Arguably the most important study (Babor & Grant, 1992) was carried out in ten different countries world-wide and evaluated two types of brief intervention, five minutes of advice, or advice plus 15 minutes counselling and a self-help manual (in some countries another group was added which received a further three sessions counselling). It was found that, for men, all types of intervention reduced alcohol consumption. For women, a similar result was found except that female control participants showed comparable reductions. In other words, men benefited as much from five minutes advice as from either brief or extended counselling, whereas women gained no additional benefit from advice and counselling over that obtained from a 20-minute health interview (i.e., the control

condition).

Bien et al. (1993) also reviewed five studies of self-referred drinkers recruited through the media. Two of these opportunistic brief interventions (Miller, Benefield, & Tonigan, 1993; Miller, Sovereign, & Krege, 1988) used the Drinker's Check-up (Miller & Sovereign, 1989) (which consists of a single assessment and a feedback session lasting three hours) to facilitate greater reductions in consumption among problem drinkers in comparison to a waiting-list control group. The three other studies (Heather, Kisson-Singh, & Fenton, 1990; Heather, Robertson, MacPherson, Allsop, & Fulton, 1987; Heather, Whitton, & Robertson, 1986) all reported reductions in drinking as well as other positive outcomes resulting from a self-help manual mailed to self-referred drinkers.

To complete the review, Bien et al. (1993) examined 15 studies that focused on the effectiveness of brief treatment in comparison to more intensive treatment. Two of these (Bien, 1992; Brown & Miller, 1993) evaluated the utility of a brief intervention as motivational preparation for formal treatment. It appeared that the interventions improved participation in formal treatment and reduced alcohol consumption. The other 13 studies contrasted brief treatment with more intensive treatment. Beginning with the earliest of these studies (Edwards, Orford, Egert, Guthrie, Hawker, Hensman, Mitcheson, Oppenheimer, Taylor, 1977), the overall results of this body of research has shown that brief treatment is as effective as more intensive treatment.

The findings of reviews subsequent to that of Bien et al. (1993) have generally supported the effectiveness of opportunistic brief interventions. However, the most recent of these reviews (Poikolainen, 1999), which meta-analysed seven studies of opportunistic brief interventions in primary health care settings, concluded that effectiveness varied across duration of the intervention and gender of the drinker. The results of the meta-analysis showed that extended brief intervention (i.e., several sessions) was effective for women only. Very brief interventions (5-20 minutes) were ineffective for both men and women alike. In view of this finding, Heather (2001) stressed the need for rigorous and consistent

methodology in future research.

Obviously, questions remain to be answered. The most pressing of these concern the optimal duration, intensity, and form of the most successful interventions and whether different interventions are more effective for women than men, and for different types of drinkers. In addition, both Poikolainen (1999) and Heather (2001) highlighted the need to determine whether the effectiveness of interventions varies across contexts. In particular, are interventions as effective in routine primary health care settings as the research suggests?

Two recent studies partially answered this question. The first study (Israel, Hollander, Sanchez-Craig, Booker, Miller, Gingrich, & Rankin, 1996) used a non-obtrusive screening method carried out by a general practitioner, in the physician's private practice, to identify 105 problem drinkers who were randomly assigned to one of two conditions, advice or brief counselling. The advice condition consisted of a short meeting with a nurse during which the drinker was informed of the significance of a blood enzyme test value, recommended to reduce consumption, and given a pamphlet containing guidelines on how to achieve abstinence or an acceptable level of drinking. The brief counselling group received the same pamphlet and 30 minutes of counselling on how to achieve abstinence or acceptable drinking by using cognitive behavioural techniques. Drinkers in this group were offered six further counselling/monitoring sessions during the following year, with an average four sessions being completed. The results showed that giving problem drinkers simple advice was followed by a significant reduction in their alcohol consumption. However, problem drinkers who received 30 minutes of counselling plus an average of four follow-up counselling sessions showed the greatest reductions in consumption and significant reductions in psychosocial problems and blood enzyme levels.

The second recent study (Aalto et al., 2001) which aimed to test the effectiveness of brief interventions in a routine primary health care setting produced different results. In this randomised controlled study lasting three-years, 296 male heavy drinkers received either advice to reduce

drinking (the control condition), seven 10-20 minute feedback/advice sessions (average attendance rate of six sessions), or three 10-20 minute feedback/advice sessions (average attendance rate of 2.7 sessions). The feedback/advice sessions imparted information regarding the negative consequences of drinking and the benefits of reduced drinking, comparisons of individuals' reported consumption with recommended limits, blood test results for certain biological markers of alcohol dependence/recent consumption, encouragement to drink less alcohol, and a self-help booklet (given at baseline only).

The results showed that only one outcome measure, namely mean corpuscular volume (MCV), was significantly reduced at three-year follow-up for all the groups but did not significantly differentiate among the groups. MCV is a biological marker for alcohol dependence and excessive alcohol use that is also affected by anaemia and nicotine intake, which makes its significance difficult to assess (for a fuller discussion of biological markers see Whitfield, 2001). It appeared that no advantage overall was gained over simple advice by delivering further sessions of brief intervention. However, it should be noted that participants in the control group were seen by a GP on two occasions during which they received feedback concerning their blood test results and self-reported alcohol consumption as well as advice to reduce their drinking. Therefore, control participants could be better described as a group who received a very brief intervention consisting of individual alcohol-related feedback and advice. On this basis, it can be concluded that delivering further intervention sessions did not increase the effectiveness of a very brief intervention. Similar results were found when analysing female problem drinkers separately from males (Aalto, Saksanen, Laine, Forsstrom, Raikaa, Kiviluoto, Seppa, & Sillanaukee, 2000). In both studies, the authors inferred that opportunistic brief interventions, in a natural environment, were less effective than those used under special research conditions in which participants were recruited by mailed questionnaires for example (Agostinelli, Brown, & Miller, 1995).

Whether or not the established benefits of opportunistic brief

interventions can be found when applied to routine health care settings is one question that remains to be clarified. Heather (2001) recommended that further trials of the effectiveness of opportunistic brief interventions applied to the routine health care context should be conducted. A similar recommendation may be made regarding the effectiveness of brief treatments relative to longer, more intensive ones. There is certainly enough evidence to show that brief treatments are effective for certain types of problem drinkers (Bien et al., 1993; Heather, 2001; Project MATCH Research Group, 1998). The findings of Project MATCH in particular have strongly supported this view. This research found that four sessions of Motivational Enhancement Therapy (MET) was as effective as 12 sessions of Cognitive-behavioural Coping Skills Therapy (CBT). In addition, levels of alcohol dependence and problem severity did not affect MET's effectiveness, and certain pre-treatment characteristics (high anger/resentment and low readiness to change) were related to a better outcome than CBT. However, how brief the treatment can be made and continue to be effective remains another issue to be clarified.

A special population who would benefit from interventions because of their well-established levels of hazardous and harmful alcohol consumption is university students (Dimeff, Baer, Kivlahan, & Marlatt, 1999). Substantial efforts to reduce alcohol-related problems among college students have been made in the United States for a number of years. A wide variety of approaches for prevention have been instituted. These have ranged from environmental interventions such as changing the legal drinking age, increasing taxes on alcohol, and alcohol bans in specific settings, to community based prevention initiatives featuring mass educational programmes, alcohol-server training, and drink-driving campaigns (Hingson, Berson, & Dowley, 1997). In a recent review of 811 alcohol prevention programmes on American university campuses, Anderson and Milgram (1996) found that the majority of such initiatives included several components--alcohol awareness activities, designated sites where alcohol information could be obtained, having an alcohol abuse specialist on campus, and incorporating alcohol education into

undergraduate courses. College students have also been the target of prevention programmes in the form of brief interventions. These programmes will be reviewed in the following section.

### 5.1 Brief Interventions with College Students

Hingson et al. (1997), in a review of individually oriented interventions aimed at reducing student drinking and related problems, cited the results of early research by Dennison (1977) and Rozelle (1980). These two early studies, despite their methodological weaknesses, provided enough evidence to warrant further investigations into the use of preventive interventions among students. Results from a range of subsequent studies have justified that early promise.

The High Risk Drinker Project developed at the University of Washington initiated a programme of study to test the effectiveness of alcohol skills training in moderating student drinking (Marlatt, Larimer, Baer, & Quigley, 1990). In the first evaluation of the programme, Kivlahan, Marlatt, Fromme, Coppel, and Williams (1990) recruited students through university media advertisements, class announcements, and so forth. A screening procedure identified 43 students who met the criteria of at least one negative consequence on an alcohol-related problems questionnaire, mild physical dependence or less according to the Alcohol Dependence Scale (ADS; Skinner & Horn, 1984), and either medium volume/high maximum or high volume/high maximum drinkers on the basis of an alcohol quantity/frequency measure. The suitable candidates were randomly assigned to one of three groups--alcohol skills training, alcohol information, or a control condition. The first two groups received eight weekly sessions of either cognitive-behavioural skills training or general alcohol information lectures. The control group received no intervention, completing the assessment measures only. All of the participants monitored their daily drinking throughout the eight weeks and were re-tested at four, eight, and twelve months post-intervention.

The results showed that students significantly reduced their alcohol

consumption during the 12 months regardless of the group to which they had been assigned, but the trend favoured the alcohol-skills training group. It was concluded that the overall pattern of reduction in alcohol-related risk among students was encouraging, although this finding was not corroborated by a significant reduction in alcohol-related problems. It is worth noting in addition that even though skills training was the most effective intervention, the assessment-only group who also self-monitored their alcohol use for eight weeks also significantly reduced drinking. The latter, therefore, actually amounted to a type of brief intervention.

In a replication of the previous study, Baer, Marlatt, Kivlahan, Fromme, Larimer, and Williams (1992) recruited 134 students for an evaluation of three types of alcohol risk reduction programme. Students who reported at least one alcohol-related problem and a rate of alcohol use of at least two days per week and sufficient consumption to produce an estimated blood alcohol level of .10 percent, were randomly assigned to one of three groups. The first group participated in six weekly sessions lasting 90 minutes each and which consisted of cognitive-behavioural alcohol-skills training. The second group received a self-help manual that contained six reading and homework units that paralleled the six alcohol-skills training sessions. The third group completed a one-hour motivational interview at which individual feedback and advice based on the alcohol-skills training programme were communicated, and also received a two-page summary of the main points. All of the students were asked to keep a daily drinking record for the six week intervention period.

A high level of noncompliance to programme requirements in the self-help manual group led to the abandonment of this intervention. Noncompliance in this condition possibly reflected the unwelcome demands of written assignments extra to students' current course work suggesting that this type of intervention is inappropriate for students. The other two groups showed a significant reduction in alcohol consumption across the six-week intervention period, and these reductions were maintained at one- and two-year follow-ups. It was concluded that both a six-week alcohol-skills training programme and a one-hour individual



feedback session reduced alcohol consumption among high-risk student drinkers.

A further evaluation of the efficacy of a brief intervention among high-risk student drinkers improved on previous studies, notably by including a control condition. In this study (Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley, Somers, & Williams, 1998), 348 students at high-risk for problematic alcohol use were randomly assigned to an intervention group or an assessment-only control group. High-risk was defined as either drinking monthly and consuming at least five drinks on one occasion in the previous month or experiencing three alcohol-related problems three to five times in the previous three years on the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). All participants attended an assessment session which included a one-hour interview about their drinking habits, followed by completion of a number of alcohol-related questionnaires. The intervention consisted of individualised feedback concerning the students' drinking patterns, risks, beliefs about the effects of alcohol, and comparisons with normative drinking in college, and was delivered by an interviewer using motivational interviewing techniques (Miller & Rollnick, 1991). The control group received assessment only and both groups were followed up at six, twelve, and twenty-four months following the intervention. At the twelve-month follow-up point the intervention group were sent personalised graphic feedback sheets compiled from information provided at the follow-up sessions (for an example see Dimeff et al., 1999).

The main finding of the study was that high-risk students who received brief personalised feedback, followed by mailed graphic feedback in subsequent years, showed significantly lower levels of alcohol use and alcohol-related problems in comparison to high-risk students who completed the assessment only. Furthermore, as Kivlahan et al. (1990) had found earlier, the assessment-only control group significantly reduced their alcohol consumption and reported a significantly lower incidence of alcohol-related problems. As Marlatt et al. (1998) suggested, these findings may reflect the "maturing-out" process that occurs among young heavy

drinkers (see Gotham, Sher, & Wood, 1997), and that brief intervention accelerates the process. The results also indicate the importance of determining which is the most effective type of information to feedback to students in order to facilitate a reduction in risk.

Following the previously reviewed study, another one investigated the clinical significance of the reductions in drinking and alcohol-related problems that were found among high-risk students (Roberts, Neal, Kivlahan, Baer, & Marlatt, 2000). To this end, a functional (low-risk) comparison group of 77 students was contrasted with 153 high-risk treatment condition students and 160 high-risk control group students. By using a cut-off score for risk, an index of reliable change was calculated that enabled each student to be categorised as a case who was either resolved, had no change, was reliably worse, was reliably improved, or was a 'new' case. 'New', in this instance, was defined as scoring below cutpoint at baseline but above cutpoint at follow-up two years later. The results showed more favourable outcomes in terms of cases that were resolved or reliably improved for the high-risk students who had received a brief intervention compared to a high-risk control group.

The most recent in the series of studies among high-risk students at the University of Washington piloted a brief intervention in a primary health-care setting (Dimeff & McNeely, 2000). To test the feasibility of such a scheme, 41 students identified as high-risk by computer-based assessment were randomly assigned to receive either a brief intervention or treatment-as-usual from their doctor. Results from the 33 students who returned to follow-up 30 days after the intervention showed that reductions in the number of binge drinking episodes and alcohol-related problems favoured the brief intervention group.

The series of studies conducted by Marlatt and colleagues at the University of Washington, like those just reviewed, have provided a wealth of valuable information regarding the effectiveness of brief interventions with college students. In recent years, studies by other investigators have contributed to the body of evidence. One of these (Darkes & Goldman, 1993) tested 50 students (consuming at least six but

not more than 40 drinks per week at assessment) in one of three conditions--expectancy challenge, alcohol knowledge, and assessment only. The expectancy challenge intervention consisted of three weekly group sessions lasting 90-120 minutes featuring activities designed to decrease students' positive expectancies about alcohol use. The three alcohol knowledge sessions presented alcohol-related material typically used in primary prevention programmes. The assessment-only group received no information but met once a week over three weeks for 20 to 30 minutes in order to collect data.

The results of the post-intervention assessment, which took place four weeks after the pre-intervention assessment and two weeks after the last session, showed that decreasing alcohol-related expectancies was successful in reducing average weekly alcohol consumption. It was found also that heavy drinkers (drinking between 16 and 40 drinks per week, on average) showed the greatest reductions. Students in the other two conditions did not significantly reduce their drinking. Darkes and Goldman (1993) concluded that expectancy challenge offered an effective component for brief intervention strategies despite the small sample and short follow-up period.

The effectiveness of individualised feedback has been attested to elsewhere and was demonstrated to great effect by Agostinelli, Brown and Miller (1995). In this study, 26 first-year students at the University of New Mexico were identified as heavy drinkers and randomly assigned to receive or not to receive personalised information by post. This feedback consisted of details regarding each student's own average weekly consumption of alcohol compared to U.S. population norms, peak blood alcohol levels, and personal risk for alcohol-related problems in terms of peak blood alcohol concentration and family history of alcohol problems. At follow-up, six weeks after the assessment, 23 students provided data which indicated that those students who received personalised feedback showed a greater reduction in usual intoxication levels (expressed as blood alcohol concentration) as well as reduction in average weekly number of standard drinks in comparison to students who received no feedback.

Despite the small sample size and short follow-up period, which as the authors acknowledged amounted to a pilot study, the results suggested the potential utility of intervening by post with heavy drinking students. Moreover, it appeared that feedback to students emphasising the non-normative nature of their typical drinking and personal risk for alcohol problems showed distinct promise in developing effective brief interventions.

Another brief intervention designed to reduce risk for alcohol-related problems used a novel approach by focusing on high-risk time periods rather than high-risk drinkers. In this study (Cronin, 1996), 128 undergraduates were randomly assigned to one of two conditions. One group completed a questionnaire indicating both the quantity of alcohol they intended to drink and the negative consequences they might experience as a result of their alcohol consumption during the impending spring vacation. Immediately on their return from the spring break, students reported their actual consumption and incidence of alcohol problems during the vacation. The other group served as a control condition in supplying similar post-vacation information. There were no differences in alcohol consumption between the groups, but the intervention group reported a lower incidence of alcohol-related problems than the control students. Cronin (1996) concluded that the results obtained raised the question of possibly targeting high-risk events or periods of time in an effort to reduce the adverse consequences typically associated with college students' drinking.

The final evaluation of a brief intervention described here employed a one-session brief motivational intervention with college students at a large university in the north-eastern United States (Borsari & Carey, 2000). On the basis of binge drinking (five or more drinks for men, four or more for women on one occasion at least twice in the previous month), 60 students were selected and assigned to one of two groups, assessment only or brief intervention. All of the students completed a baseline assessment of alcohol use, alcohol-related problems, perceived drinking norms, and alcohol-related expectancies. The brief intervention

procedure was based on that used in previous research (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999). During this procedure each student received personalised information regarding perceptions of normative drinking, comparisons with normative consumption, the occurrence of alcohol-related problems, the influence of expectancies on personal drinking, and recognition and avoidance of high-risk situations.

At follow-up assessment six weeks after baseline, in comparison to students who had received assessment only, students who had received the brief intervention reported significantly fewer binge drinking episodes, lower average number of drinks per week, and lower frequency of drinking in the previous month. There were no significant differences between the two groups in the occurrence of alcohol-related problems. Further analyses were conducted to determine which components of the intervention mediated the reductions in alcohol use. It was found here that perception of student drinking norms mediated the relationship between brief intervention and reductions in drinking. In other words, as students' perceptions of what constituted normative drinking decreased so too did students' actual consumption. The other components that were evaluated, namely perception of friends' drinking levels and both positive and negative expectancies of heavy drinking, were not influential mediators. It was concluded, therefore, that brief motivational intervention continued to show promise as an effective way to reduce heavy drinking by students, and further research should seek to identify the active components of such interventions (Borsari & Carey, 2000).

From a review of the available evidence, it is clear that, as Dimeff and McNeely (2000) stated, brief interventions represent the most practical and effective prevention approach for use with high-risk college-student drinkers. Successful interventions have ranged in duration from a single 1-hour session to an 8-week course. They have varied in mode of delivery (individual or group settings), and have even been transmitted by post (Agostinelli et al., 1995). Whatever the mode of delivery or duration, effective interventions have generally fulfilled four functions. They have increased participants' knowledge about the effects of alcohol, increased

their awareness of personal risk, enhanced their motivation to reduce problematic drinking, and increased their capability to reduce drinking (Linehan, 1999).

That these four functions are sufficient for a successful intervention was illustrated to good effect by the work of Marlatt and colleagues at the University of Washington reviewed above. During their research programme, the initial 8-week course of the Alcohol Skills Training Program (ASTP; Fromme, Marlatt, Baer, & Kivlahan, 1994) was developed and distilled into the 2-to-50 minute sessions of the present Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff et al., 1999) without apparent loss of effectiveness. However, this is not say that brief interventions of longer duration and intensity have no part to play in the reduction of high-risk drinking among students. As Marlatt et al. (1998) suggested, longer, more intensive interventions may be incorporated into a stepped-care approach for students with more serious alcohol problems and/or higher levels of dependence for whom a briefer intervention was not successful.

### 5.2 Common Elements of Successful Brief Interventions

Others have identified the common elements of brief interventions that have been successful in reducing problematic alcohol use (Bien et al., 1993. Miller, 1995), describing them as critical for motivating change (Miller & Sanchez, 1994). These elements are summarised by the acronym **FRAMES** which refers to the following components: Feedback, Responsibility, Advice, Menu, Empathy, and Self-efficacy. Each of these components will be described in more detail. Personal risk status based on the results of assessment is presented to the individual in the form of written and/or verbal feedback. The type of information collected during assessment may vary, but typically includes drinking habits in comparison to others, incidence of alcohol-related problems, level of dependence, family history and other risk factors. Responsibility for change is an important element because individuals are most likely to attempt to change and persevere with the course of action when they choose to do so

(Miller, 1995). Advice that is clear and direct, recommending change mainly but not exclusively for health reasons has been described as essential to brief interventions (Orford & Edwards, 1977). Menu refers to the provision of alternative strategies, to accomplish change, from which the recipient may select the one that is best for her/him. Empathy is an important characteristics of the style in which the counsellor or therapist delivers information. Unsurprisingly, an aggressive, confrontational style of delivery has been found to be counter-productive (Miller, 1995). Finally, self-efficacy appears vital in determining the individual's decision to change because clearly if an individual believes that changing behaviour is possible then it is more likely to occur. It appears that different combinations of the above elements have constituted successful brief interventions, leading Bien et al. (1993) to conclude that no one of them is sufficient or necessary for a favourable outcome. However, it was noted that giving advice was the only element present in all the interventions reviewed.

Arriving at a similar conclusion to Miller (1995) regarding the elements necessary for an effective brief intervention among students, Dimeff et al. (1999) listed three primary components as follows: first, a thorough assessment of alcohol use and related factors; second, feedback of personal risk factors based on the assessment; and third, providing advice about how to moderate drinking. These components are delivered via two 50-minute sessions, one that involves an assessment and the other involves feedback/advice, with the assessment session including the completion of self-report questionnaires, which takes an additional 50 minutes.

### 5.3 The Present Study

Aiming to test the effectiveness of the primary components discussed above, the present study was designed to evaluate two brief interventions intended to reduce alcohol consumption among students at a university in the United Kingdom. The two interventions consisted of

the same informational components but differed in the type of information that was delivered. Information related to heavy drinking among students, alcohol-related problems, reasons for drinking, and high-risk drinking situations comprised the component parts of both interventions, and this information was communicated as personalised or non-personalised feedback.

As mentioned above effective interventions fulfil four functions, increased knowledge about the effects of alcohol, increased awareness of personal risk, enhanced motivation to reduce drinking, and increased capability to reduce drinking (Linehan, 1999). Simply feeding back to students information regarding personal risk for alcohol problems would immediately fulfil two of these functions, namely increasing awareness of personal risk and enhancing motivation to reduce harmful or hazardous drinking. It is reasonable to suppose that individuals would be motivated to reduce drinking when presented with evidence of their personal risk status, and this rationale guided the present study to concentrate on personal feedback as the most important component in a successful intervention.

According to Linehan (1999), the other two functions served by successful interventions are increasing knowledge about the effects of alcohol and increasing capability to reduce drinking. Information concerning the effects of alcohol and the capability to reduce drinking was kept to a minimum in the present study. This was decided on the basis that both functions could be fulfilled by communicating a minimal amount of this type of information. Therefore, a minimum amount of general information regarding alcohol and its effects coupled with brief advice/recommendations prefaced the personalised feedback. This feedback utilised data concerning drinking norms, negative consequences, reasons for drinking, and drinking situations.

On the basis that the critical element in an effective intervention would be feedback of a personalised type, it was hypothesised that personalised feedback regarding the risks related to heavy drinking would lead to greater reductions in drinking than non-personalised feedback of a



similar nature. Therefore, presenting the extent of the risk for potential problems to an individual would be sufficient to motivate a change in drinking. The feedback then would raise awareness and generate motivation to change in much the same way as receiving the results of a health check for a particular ailment from a General Practitioner. In addition, presenting information about a person's heavy drinking pattern in comparison with peers, the consequences that are linked to that pattern, and the reasons and situations related to heavy drinking provides an opportunity for the person to 'map' the dimensions of her/his alcohol use and to take steps to amend drinking habits.

Of course different people react in different ways on receipt of such information. Therefore, the present study planned also to determine both the characteristics of individuals who are most successful within each of the interventions, and the characteristics of individuals who change their drinking regardless of the type of intervention. The characteristics under examination were related to personality, motivation, and drinking situations. Certain significant relationships were expected and are explained below.

First, the personality dimension of harm avoidance should be positively related to reductions in drinking regardless of the type of intervention but those who are high on harm avoidance should make the greatest reductions following feedback of personalised information. People high on harm avoidance were expected to behave in this way because feedback related to the negative aspects concerning their drinking habits would motivate them to change in order to avoid future adverse consequences. On the other hand, the personality dimension novelty seeking should be inversely related to reductions in drinking regardless of intervention. This relationship was expected because novelty seeking students would be more concerned with continuing to drink alcohol for the immediate enhancement of positive affect.

Second, another personality factor, locus of control, was expected to be significantly related to drinking following brief intervention. In this case, it was predicted that an internal, rather than external, locus of control

would be related to greater reductions in alcohol use, regardless of the type of intervention. Students with an internal orientation to life would be more likely than externals to reduce drinking because they would readily accept responsibility to change behaviour that was potentially damaging to their health, and approach the task with self-confidence. Externals, on the other hand, would be more likely to ignore the information received during the intervention, viewing it as something they could do little about. Moreover, externals would be more likely to blame their heavy drinking on outside influences, reasoning that their behaviour would change when outside influences changed.

Third, it was hypothesised that drinking in situations associated with positive affect in contrast to those associated with negative affect, would be related to a better outcome following either intervention. Students who drank primarily to enhance positive affect would be inclined to adjust their consumption levels in order to avoid potential drinking problems that would possibly lower positive affect.

The final hypothesis concerns motivational structure. A number of indices related to current concerns in life comprise a person's motivational structure. As described in more detail in Chapter 4 (pp. 110-112), respondents supply ratings that describe the goal that will resolve each concern and the resulting indices serve to characterise each resolution. The indices describing each resolution can then be used to define motivational structure. For example, the indices that describe the level of commitment to a goal, the importance of reaching a goal, the likelihood of achieving a goal, and the amount of personal control over the outcome would all differentiate an adaptive motivational structure from a maladaptive one. Therefore, according to Cox and Klinger's model (1988, 1990) a relationship between adaptive motivation and drinking among students would be expected because those with an adaptive motivational structure will be more likely than others to derive emotional satisfaction from non-drinking areas of life. These students would find it easier to give up trying to obtain emotional satisfaction by drinking alcohol. Hence, outcome in both interventions would be most favourable for students

with adaptive motivational structures.

## Chapter 6

### Methodology for Evaluating Two Brief Interventions

#### 6.1 Method

##### 6.1.1 Participants

As a result of screening second-year undergraduates for alcohol use, 212 students were identified as high-risk drinkers with low to moderate levels of alcohol dependence. High-risk drinking was defined as average weekly consumption that exceeded 24 units of alcohol. Moderate to low alcohol dependence was defined as a score of six or less on the three items of the AUDIT questionnaire that imply the presence or emergence of alcohol dependence. From the high-risk sample, 111 students took part in the evaluation.

##### 6.1.2 Power Analysis

A power analysis was conducted to determine the sample size needed for each group in the study. According to Cohen (1992), to detect a large effect when testing the difference between two independent means at an alpha level of .05, the sample size necessary for .80 power is 26 participants per group. What constitutes a large effect can be guided by reference to previous research. Evaluations of brief interventions in comparison to no-intervention control groups have found a wide variation in effect sizes. The average between-group effect size (Cohen's  $d$ ) for this type of comparison using alcohol consumption as the dependent variable was .46, whereas the average within-group effect size was much higher at .78 (Bien, Miller, & Tonigan, 1993). On the other hand, a criterion effect size for a comparison between two single-session, minimal interventions, similar to those in the present study, is difficult to determine because previous studies have mainly compared brief interventions with extended therapy often consisting of multiple sessions. However, the sample size of 37 participants per group in the present study was judged adequate, on the basis of Cohen's (1988) guidelines, to detect a within-group effect of .78, whereas 64 students per group would be necessary to detect a medium effect of .46 in contrasts between personalised

and nonpersonalised feedback and between either of the intervention groups and the controls. A group size of 37 is sufficient to detect a within-group effect size of .78, with 92 percent likelihood at  $p < .05$ , and sufficient also to detect a between-group effect size of .46 with 56 percent likelihood at  $p < .05$ .

### 6.1.3 Procedure

The 212 high-risk students were contacted by e-mail and post with an invitation to take part in a number of sessions related to students' drinking habits (see Appendix I, p. 261). The invitation informed students that they would be paid for their participation with the level of payment dependent on the number of sessions attended. Hence, students in both intervention groups earned £15.00 for three sessions; assessment, intervention, and follow-up. The control group students took part in two sessions, assessment and follow-up, for which they were paid £10.00. It was made clear that payment would be made on completion of the number of sessions to which the student was assigned.

The assessment procedure was attended by 111 students; the interventions were delivered to 74 students; and 110 students took part in the follow-up procedure (one student in the control group took the assessment but had left university by the time of the follow-up sessions). Table 6.1 summarises the groups, the number of sessions completed by each group, and the instruments used at each session.

Table 6.1

Design of the Study

Group	Assessment	Intervention	Follow-up
1. Non-personalised Feedback (n=37)	X	X	X
2. Personalised Feedback (n=37)	X	X	X
3. Control (n=37)	X		X
Instruments	RTCQ RAPI LOC TPQ RFD IDS PCI	RTCQ (PFQ 1)	RTCQ RAPI LOC AUQ A-TLFB (PFQ 2)

**Note.** Assessment sessions lasted 50 minutes on average. Non-personalised feedback took 15 minutes on average. Personalised feedback took 23 minutes on average. RTCQ = Readiness To Change Questionnaire; RAPI = Rutgers Alcohol Problem Index; LOC = Locus Of Control; TPQ = Tridimensional Personality Questionnaire; RFD = Reasons For Drinking; IDS = Inventory of Drinking Situations; PCI = Personal Concerns Inventory; AUQ = Alcohol Use Questionnaire; A-TLFB = Amended Time Line Follow Back; PFQ 1 & 2 = Participant Feedback Questionnaire.

6.1.4 Baseline Assessment

The assessment included seven questionnaires (details below), administered in a private, quiet room in the School of Psychology. Students were informed of the dates and times at which assessment sessions would take place and the location for these sessions. In most cases students indicated by e-mail message when they would attend the assessment session, while others 'dropped-in' to complete the

questionnaires. Each student was asked to read and sign a consent form (Appendix E, p. 257) before completing the seven questionnaires, which took 50 minutes on average. On completion of the questionnaires students were informed that they would be contacted by e-mail to arrange the next session. Assessment sessions were conducted over a two month period at the end of which 111 students had supplied data.

#### 6.1.5 Assessment Instruments

Rutgers Alcohol Problems Index (RAPI). (Appendix B, p. 254). The RAPI (White & Labouvie, 1989) is a 23-item self-report questionnaire that was developed to assess adolescent problem drinking. It is a psychometrically reliable and valid instrument that provides a continuous variable indicating the frequency of negative consequences related to drinking (see Chapter 3, pp. 72-73 for a fuller description).

Reasons for Drinking Scale (RFD). (Appendix C, p. 255). The RFD (Cronin, 1997) is a 35-item measure of reasons for drinking that college students reported during the course of previous research (see Chapter 3, p. 74 for a fuller description).

Inventory of Drinking Situations (IDS). (Appendix D, p. 256). The IDS (Annis, Graham, & Davis, 1987) is a measure of situation-specific drinking that can be used to identify situations in which individuals are at risk for heavy drinking (see Chapter 3, p. 74 for a fuller description).

Tridimensional Personality Questionnaire (TPQ). (Appendix G, p. 259). The TPQ (Cloninger, Przybeck, Svrakic, & Dragan, 1991) assesses three dimensions of personality, novelty seeking, harm avoidance, and reward dependence (see Chapter 4, pp. 112-113 for full details).

Internal-External (I-E) Locus of Control Scale (LOC). (Appendix H, p. 260). The LOC (Rotter, 1966) measures individuals' perceptions regarding the source of control over their behaviour (see Chapter 4, p. 113 for full details).

Personal Concerns Inventory (PCI). (Appendix F, p. 258). The PCI is an amended version of the Motivational Structure Questionnaire (MSQ; Klinger, Cox, & Blount, 1995). It provides 11 indices measuring aspects of motivation regarding the resolution of current concerns in an individual's

life (see Chapter 4, pp. 110-112 for full details).

Readiness to Change Questionnaire (RTCQ). (Appendix J, p. 262).

The RTCQ (Heather, Gold, & Rollnick, 1991) is a 12-item questionnaire that was developed for use in brief opportunistic interventions (Rollnick, Heather, Gold, & Hall, 1992). Based on Prochaska and DiClemente's (1983, 1986) stages-of-change model, the questionnaire assesses drinkers' readiness to change drinking behaviours. The stages-of-change model provides a framework for understanding the stages through which individuals progress when changing an addictive behaviour. For example, some people may be unaware that they have a problem or simply be unwilling to change the problem behaviour. Such people would be categorised as being in the precontemplation stage. On the other hand, some people may be contemplating change, but not yet acting to change, and so are in a state of ambivalence regarding the choice between changing or staying the same. Yet others may be in the action stage in which they are taking positive steps to change behaviour. Clearly, the three stages described above--precontemplation, contemplation, and action--reflect an increasing level of awareness, commitment, and motivation for change.

The RTCQ is composed of three subscales, corresponding to each of the three stages-of-change, which consist of four items each. Respondents are asked to indicate how they feel about their drinking on a five-point scale for each item ranging from strongly agree to strongly disagree. The RTCQ is a psychometrically sound instrument for use in conjunction with brief, opportunistic interventions among excessive drinkers (Heather, Rollnick, & Bell, 1993; Rollnick et al., 1992).

In order to assess effects of the interventions on students' motivation to change their alcohol consumption, a total score from the RTCQ was calculated, rather than using the conventional scoring system in which three separate scores corresponding to the three stages of change are calculated. Scoring the RTCQ as a continuous measure of readiness to change was justified by the findings of previous research (Budd & Rollnick, 1996). This study investigated the structure of the RTCQ among 174 male, heavy drinkers who were patients on general hospital wards,



and found that a unidimensional variable of readiness to change was a reliable and valid measure.

#### 6.1.6 Intervention

Students were randomly assigned to one of three groups: nonpersonalised feedback, personalised feedback, or control (no intervention). Those assigned to the two intervention groups were contacted by e-mail to arrange the date and time when the feedback session would take place. These sessions were conducted in a private, quiet room in the School of Psychology. Every student received feedback from the researcher in an individual session that lasted between 13 and 27 minutes ( $M = 19.44$ ,  $SD = 4.34$ ). Monitoring the feedback sessions in order to check that each session was delivered as planned was considered an option. The sessions could have been monitored by having an observer present or by audio- or video-taping the proceedings. However, it was thought that such actions might have led to nonparticipation as well as increasing the discomfort of those who participated if they had done so under such conditions. Therefore, no attempt was made to monitor the feedback sessions.

The intervention sessions were designed to create a nonthreatening, nonjudgemental atmosphere in which to relay alcohol-related information to students. Unlike the format recommended in Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999), interaction between researcher and student was kept to a minimum in order to control for therapist effects. However, it was still important to foster a feeling of collaboration, intended in the BASICS programme, between researcher and student by reviewing, absorbing, and reflecting together on the information that was presented. In addition, the design of the sessions was informed by the established effectiveness of motivational interviewing techniques, particularly in having the interviewer remain nonjudgemental and nonconfrontational, and posing reflective questions so as to ensure that each student would process the information (Miller, 1995; Rollnick, Heather, & Bell, 1992). Using these methods ensured that interviewer bias,

in the form of over-emphasis on a particular element of the feedback or allegiance to a particular type of feedback, was controlled. Therefore, students were not subject, during intervention, to influences on their drinking behaviour other than the information they received.

To begin the intervention sessions, each participant was greeted in a friendly manner in an attempt to put her/him at ease, and then invited into the designated room to sit at a table with the researcher. Every session began with the following verbal introduction. "During this session, no judgement or labelling of you or your lifestyle is intended, and no counselling or advice will be offered. I am going to read to you some information related to alcohol consumption. Every so often I will ask you a question about the information you have heard. I will give you a copy of the information sheets so that you can follow what I am saying." The information sheets were then read aloud by the researcher while the student followed what was being said on her/his own copy. This part of the procedure ensured that every student read the information sheet at least once.

At the end of each page of information that was read out, the researcher asked a question primarily to reduce the tedium but also to prompt the student to consider the information that she/he was hearing. At the end of the first page, the researcher asked the student, "have you any comments on what you've heard so far?" If the student made a comment the researcher responded by saying, "O.K. that's fine. We'll move on to the next sheet now," and continued reading. At the end of the second page, which contained information concerning units of alcohol and recommended limits of drinking, the student was asked, "did you know about drinking limits and units of alcohol already?" and the answer was recorded. Page three comprised a list of the consequences of excessive drinking and concluded with the question, "were you aware of this information?" Again, if the student commented the researcher responded by saying, "O.K. that's fine. We'll move on to the next sheet now," and continued reading. The final page of the nonpersonalised information ended with the question, "what do you make of this information?" When

participants responded to this question the researcher countered with a reflective statement, which generally restated what students had said and agreed with their response. For example, in many cases students responded by saying that they were already aware of the information they had just heard. The researcher then responded by saying, "O.K. you already knew most of this information. Yes I agree, most of this 'stuff' is fairly common knowledge."

The personalised feedback sessions began with exactly the same format as the nonpersonalised feedback ones. At the end of the four pages of nonpersonalised information, the researcher read a page that listed the consequences related to binge drinking among students. This page marked the transition from nonpersonalised to personalised feedback and was followed by an introductory statement as follows: "We now come to the information you provided on the questionnaires you recently filled in. Sheet 1 will deal with your drinking pattern. Sheet 2 will cover the alcohol-related consequences that have occurred to you, and sheet 3 the reasons you gave for your drinking. Finally, sheet 4 will examine your high-risk drinking situations." As with the nonpersonalised information each page concluded by posing a question and allowing students to respond or not. Thus, Sheet 1 ended with the question, "what do you think about this information?" Sheet 2 concluded with, "is what we've just read through clear to you?" Sheet 3 closed with, "is the information you've just heard clear to you?" Sheet 4 brought the feedback session to a close with the question, "can you think of any other particular situations that may contribute to your heavy drinking, or to other peoples?" Students' responses to the final question were noted.

In order to maintain a nonjudgemental, nonconfrontational approach, the researcher devised and rehearsed a set of stock answers to deal with 'awkward questions'. Dimeff et al. (1999) emphasised the importance of using students' responses to initiate further discussion aimed at increasing motivation and commitment, and developed guidelines to take full advantage of these opportunities. However, in the present study it was important to prevent supplying extra information

when replying to students' questions. Therefore, in order to respond in a neutral way to questions that were asked, the researcher compiled a set of answers that restated the information that had been read out. For example, if a student asked, "are you saying that I drink too much?", then the reply would be, "I'm not making any judgement of your drinking. Analysis of the questionnaires indicated that some students, including yourself, drink more than health professionals recommend". If a student asked a question that could not be answered by restating or paraphrasing information that had already been communicated, then it was side-stepped by replying that, "I don't have that information available. I can supply it at the next session."

The design of the feedback sessions ensured consistent delivery of feedback to students regardless of which type of intervention they received. The informational components of each type of feedback were the same for both intervention groups but students in the personalised feedback group received a longer, more intensive intervention. The differences in content between the groups were as follows.

#### 6.1.7 Content of Feedback Information for Each Group

Nonpersonalised Feedback. (Appendix K, p. 263). Students in this group were informed in a general way that their alcohol consumption was higher than recommended levels. The first page of information displayed a table and a graph of weekly alcohol consumption among second-year students, informing them that their level of consumption was higher than recommended and placed them in the top 34 percent of student drinkers at the university. The second page of information concerned the recommended daily limits of alcohol for men and women followed by definitions of units of alcohol. The third page of feedback was a list of short-term, long-term, and student-specific consequences of excessive drinking. The final page began with information concerning the risks for heavy drinking related to the reasons people give for their drinking and the situations in which they drink. The final page ended with guidelines for sensible drinking. The general alcohol information contained in the feedback sheets was adapted from public health leaflets/booklets such as,

"How to reduce your drinking for healthier living: A self-help guide" (Cox, Mardula, & Owen, 1997) and "Alcofacts: A guide to sensible drinking" (Health Promotion Wales, 1997).

Personalised Feedback. (Appendix L, p. 264). Students in this group first received the four pages of nonpersonalised feedback. In addition, they received a detailed analysis of their pattern of drinking, alcohol-related consequences, reasons for drinking, and high-risk situations in which they were likely to drink. Profiles of the results from four instruments (AUQ, RAPI, RFDQ, & IDS) provided the basis for the personalised feedback during these sessions.

Following communication of the non-personalised feedback, a page listing adverse consequences specific to binge drinking among students was presented to the student. The interviewer and student reviewed this information together as the interviewer read it aloud. This page marked the transition from nonpersonalised feedback to the personalised information sheets. Sheet one dealt with the student's drinking pattern. Similar to the format utilised in the BASICS (Dimeff et al., 1999) programme, students were informed of their average weekly consumption in comparison to other second-year students surveyed in the present study. A table displayed these comparative values and students were told the percentile rank of their usual drinking pattern in terms of how many of their contemporaries drank more and how many drank less than they did. The second sheet then informed students of the alcohol-related consequences they had experienced more than ten times, followed by those that had occurred between six and ten times, and finally those that had happened three to five times. Sheet three provided an analysis of the individual student's reasons for drinking. This informed the student of the specific reasons why she/he drank, such as to enhance mood, reduce stress, or for social/celebratory reasons, and what particular pattern of drinking and problems was associated with those types of reasons. The final section of the personalised feedback covered high-risk drinking situations. The feedback featured a graphic risk-profile displaying a problem index for each type of drinking situation measured by the IDS.

Students were informed of the situations in which they were at very high risk and high risk for heavy drinking.

Control Group. The control group consisted of students who completed the assessment questionnaires. These students did not receive an intervention but were followed-up three months after the feedback sessions had been conducted with the intervention groups.

The format of the two interventions was designed to conform largely to the six elements described as important factors in motivating change and summarised by the acronym FRAMES. It stands for Feedback, Responsibility, Advice, Menu, Empathy, Self-efficacy (Miller, 1995; Miller & Sanchez, 1994). First, the feedback element was addressed in both interventions in the ways described above. Second, advice was contained in both interventions in the form of recommended limits of alcohol consumption and guidelines for sensible drinking. Third, the guidelines also represented a minimal menu of alternative methods to reduce drinking. Fourth, an empathic style of delivering feedback was adopted by creating a nonjudgemental, nonconfrontational atmosphere and by asking reflective questions. However, the other two elements, responsibility and self-efficacy, were not explicitly addressed in the intervention sessions. Personal responsibility was not encouraged because there was little need to do so. Providing personalised feedback was intended to motivate change instead. For the same reason, explicit statements regarding self-efficacy were not included in the feedback information.

Finally, at the end of the feedback sessions, students completed the RTCQ and a 6-item participant feedback questionnaire, which can be seen at Table 6.2 below. The latter served as a debriefing sheet on which students could express opinions/concerns about the sessions they had just completed. Students were asked if there were any questions they wanted to raise, reminded that they could discuss any concerns they might have by contacting the researcher, and that they would be contacted by e-mail to arrange their final meeting. Students were then handed their feedback document to take away with them, and the session ended.

Table 6.2

Post-intervention Participant Feedback Questionnaire

Item	Questions and Response Options
1	Do you feel that the part you have played in the research has been explained to you clearly? YES/NO
2	If you answered no to Q1 please explain what you found unclear.
3	Are there any aspects of the research that have given you cause for concern? Please specify if your answer is yes.
4	Are you interested in receiving results of the research? YES/NO
5	You have just taken part in a session to discuss your own drinking habits. How do you view the experience? POSITIVE/NEGATIVE
6	Can you specify what you found either positive or negative about this session?

6.1.8 Follow-up

The follow-up sessions were conducted at least 12 weeks after the intervention sessions. All the participants were contacted by e-mail and telephone to arrange the final sessions. Of the original sample of 111 students, only one student could not be contacted. Therefore, 110 students participated in the follow-up sessions that took place in a private, quiet room in the School of Psychology.

The sessions consisted primarily of an alcohol use interview that entailed the completion of a retrospective drinking diary (see Appendix M, p. 265). The drinking diary was based on the timeline followback procedure (TLFB; Sobell & Sobell, 1992). The timeline followback method was used in order to enhance accurate reporting. Each student was invited

to sit at a table with the researcher and informed of the procedure of the session. The researcher explained the purpose of the meeting by making the following statement, which made use of the TLFB techniques (Sobell & Sobell, 1995). The following statement had been memorised and rehearsed so that each participant received the same instructions delivered in a conversational way. "The purpose of this meeting is to compile a drinking diary for each week going back to when you filled in the very first questionnaire. Of course it is difficult to recall things with 100-percent accuracy but by using memory aids you will find that the estimate you provide will be pretty close to the real picture." At this point, a calendar of the time period of interest was placed on the table for the student to use as a reference (Appendix N, p. 266). The researcher continued, "this is a calendar of the weeks we are interested in. You can see that notable dates are marked on the calendar to aid recall and you will be able to add others such as your birthday, friends' birthdays and so on. Most people have regular drinking patterns and this will help your recall as well. For example, you might go out for a drink with friends every Tuesday and Friday and drink pretty much the same each time, but on your birthday, which fell on a Friday, you drank twice as much as you normally do. You might also want to refer to a personal diary, if you have one, to help you remember. Don't worry if you are not sure about certain weeks or the amount you drank, just give it your best guess. Only when you are confident that the information you have provided is a reliable estimate of your drinking, will the figures be entered in the diary." Students were then told that most people found working backwards the easiest way to fill in the diary, but they could start wherever they wanted. A card that showed the equivalent in units of alcohol of a range of familiar drinks was provided for reference, and completion of the diary commenced. At the end of the session students were asked if the completed diary was a fair reflection of their actual drinking and, if not, then the figures could be changed. The diaries took 30 minutes on average to complete.

Following compilation of the retrospective drinking diaries, students completed a participant feedback questionnaire (see Table 6.3, p.



166) and three other questionnaires, the RAPI, RTCQ, and AUQ. Students were then paid for their participation and reminded that should they have further questions or concerns then they could contact the researcher.

#### 6.1.9 Retrospective Drinking Diary

A simplified version of the timeline followback procedure (TLFB; Sobell & Sobell, 1992) for recording detailed alcohol consumption over a designated time period, was used in the present study. The TLFB method has been shown to possess sound psychometric qualities among a range of different types of drinkers (Sobell & Sobell, 1995). It provides a retrospective estimate of a person's daily drinking up to 12 months prior to interview.

The TLFB procedure used in the present study differed from the original version in that it concentrated on students' weekly consumption rather than daily drinking. The calendar was divided into weekly segments for each month. The time period covered was from the beginning of the academic year in October until the follow-up session in May. Therefore, the information gathered spanned almost the entire academic year. However, special attention was focused on the 12-week period between intervention and follow-up session.

For each week of the calendar, students were asked to indicate on how many days they drank some alcohol, the typical amount drunk per day, the total amount per week, the most alcohol drunk on any one day, and the number of days on which the most alcohol was drunk. The amounts of alcohol reported by students were entered on to the calendar as units of alcohol.

#### 6.1.10 Participant Feedback Questionnaire

A short questionnaire consisting of nine items was presented to students at the end of the follow-up session. The primary purpose of the questionnaire was to provide an opportunity for students to express their opinions of the research in which they had participated. Two versions were made available, one for the students who had taken part in the interventions and the other for those in the control group. The former questionnaire is reproduced below in Table 6.3.

Table 6.3

Participant Feedback Questionnaire for Intervention Groups

Item	Question and Response Options
1	Did you read the Feedback Sheet again? YES/NO If YES how many times? 1 2 3 4 5 6 7 8 9 10+
2	What can you remember of the Feedback Sheet?
3	At the Feedback Session to what extent did you feel that you were being informed that you had a problem with drinking? Not at all 0---1---2---3---4---5---6---7 Very much so
4	What type of information do you think would make someone change their drinking habits? 1.....2.....3.....
5	What would you say was the major reason why people have drinking problems? 1.....2.....3.....
6	To what extent has your drinking changed since registration 1999? Increased                      About the Same                      Decreased
7	To what do you attribute this change?
8	What did you like least about your participation in this research?
9	What did you like most about your participation in this research?

The participant feedback questionnaire that was presented to students in the control group differed in the wording of the first three questions. These students did not take part in the intervention sessions so they could not comment on the feedback sheets. Instead, the students were asked first, "are you interested in receiving results of the research?" to which they could respond "yes" or "no." The second question asked, "do you feel that the part you have played in the research has been

explained to you clearly?" offering a choice between yes or no. Question three asked, "during your participation, to what extent did you feel that you were being informed that you had a problem with drinking?" to which students could supply a rating on the same scale as item three in the above table. The final six questions were the same as those given to students in the intervention groups.

## Chapter 7

### Results of Briefly Intervening with Students to Reduce Their Excessive Alcohol Consumption

#### 7.1 Results

Random assignment of participants to the three groups was successful in regard to a number of background variables. With an alpha level of .05, students in the three groups did not significantly differ in gender,  $\chi^2(2, n = 111) = .66, p = .72$ , and age,  $F(2, 108) = .86, p = .43$ . There was also no statistically significant difference between the groups in average weekly alcohol consumption at screening,  $F(2, 108) = .57, p = .57$ .

##### 7.1.1 Readiness to Change

Initial effects of the interventions were measured by the Readiness to Change Questionnaire (RTCQ; Heather, Gold, & Rollnick, 1991) that was described in Chapter 6 (p. 156). For this purpose the RTCQ was scored as a single continuous measure, which Budd and Rollnick (1996) had shown was reliable and valid. The scale was found to be internally consistent at all three measurement points; baseline, postintervention, and follow-up. At baseline, the RTCQ had an alpha coefficient of 0.85, with an average inter-item correlation of 0.32 ( $n = 110$ ), and item-total correlations ranging from 0.40 to 0.74. At postintervention, the RTCQ had an alpha coefficient of 0.82, with an average inter-item correlation of 0.27 ( $n = 74$ ), and item-total correlations ranging from 0.30 to 0.78. Finally, at follow-up, the RTCQ had an alpha coefficient of 0.86, with an average inter-item correlation of 0.30 ( $n = 109$ ), and item-total correlations ranging from 0.45 to 0.81. The results of the analysis of internal consistency supported previous findings (Budd & Rollnick, 1996) showing that the 12 items of the RTCQ can be scored on a continuous, homogenous scale.

Table 7.1 shows mean Readiness to Change scores for both intervention groups at three points in time, and for the control group at baseline assessment and follow-up. To test the hypothesis that readiness to change would be increased more by personalised feedback than nonpersonalised feedback, a two-factor mixed analysis of variance was

carried out. Before proceeding, the data were explored to ensure that the assumptions necessary for the analysis of variance were not violated. Inspection of boxplots and stem-and-leaf diagrams for each variable showed that there was no threat to the assumptions from outliers or skewed distributions. Each dependent variable was found to be normally distributed according to the evidence of normal probability plots and this finding was confirmed by a nonsignificant Shapiro-Wilks test of normality. The results of Levene tests for equal variances showed that group variances were homogenous.

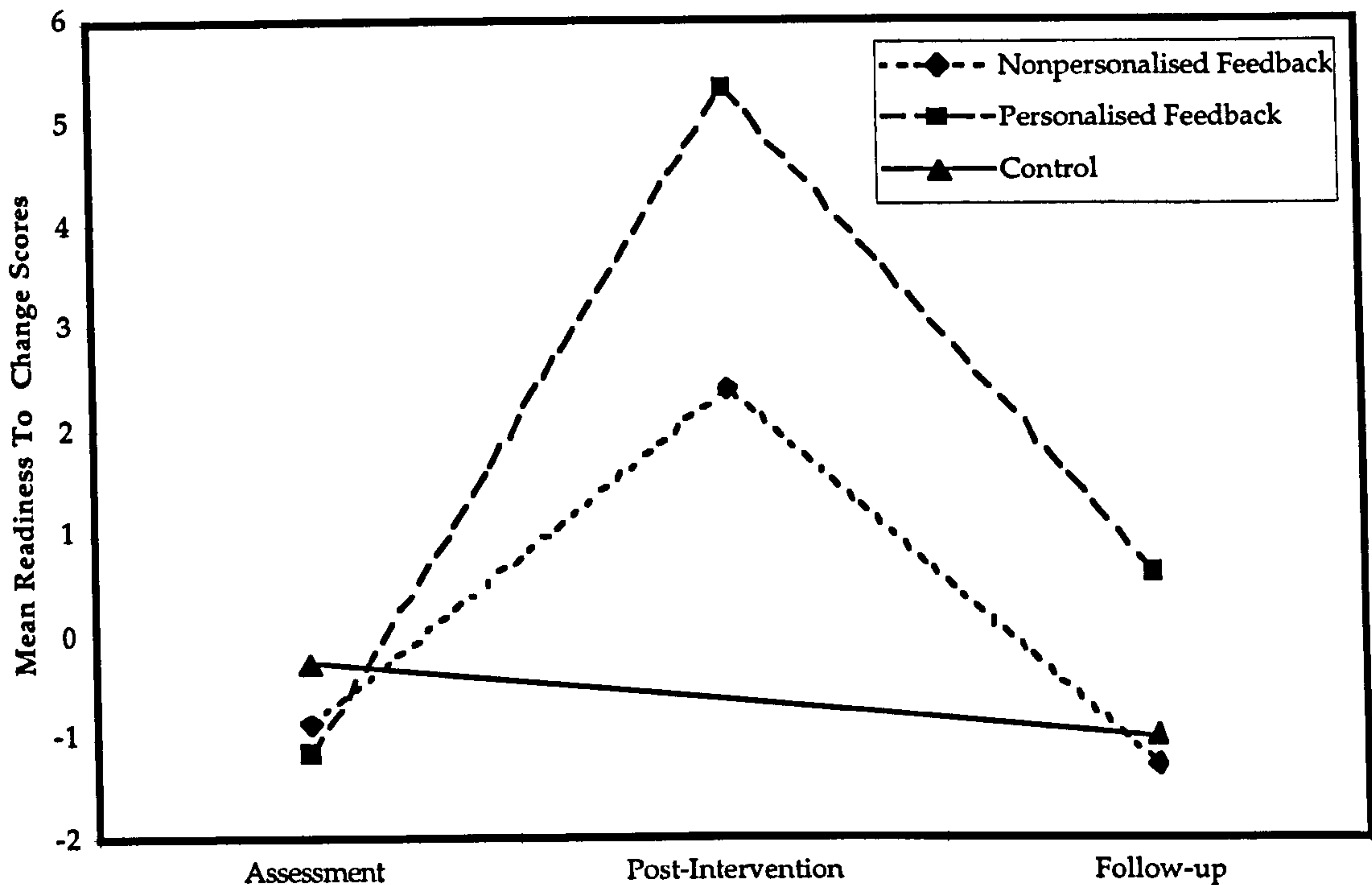
The results of the mixed analysis of variance showed no significant main effect for the type of intervention,  $F(1, 72) = 1.20, p = .28$ . However, there was a significant main effect for time (assessment, postintervention, and follow-up) showing that intervention increased students' readiness to change their drinking,  $F(2, 144) = 30.16, p < .001$ . The interaction between group and time closely approached significance,  $F(2, 144) = 2.97, p = .054$ . Multiple a priori comparisons were carried out using Bonferroni corrected  $t$  tests to identify significant increases or reductions in readiness to change. For the four planned comparisons the observed significance level was corrected to .0125 to achieve an alpha level of .05. All four comparisons were found to be significant. First, there was a significant increase in mean readiness to change scores from baseline assessment to postintervention for nonpersonalised feedback,  $t(36) = 4.19, p < .001$ , and for personalised feedback,  $t(36) = 5.89, p < .001$ . Second, there was a significant decrease in mean readiness to change scores from postintervention to follow-up for nonpersonalised feedback,  $t(36) = -3.82, p = .001$ , and for personalised feedback,  $t(36) = -5.59, p < .001$ .

Table 7.1

Mean Readiness to Change Scores for the Nonpersonalised Feedback, Personalised Feedback, and Control Group

Group	Assessment		Postintervention		Follow-up	
	M	SD	M	SD	M	SD
Nonpersonalised Feedback	-.86	7.42	2.38	6.63	-1.24	7.05
Personalised Feedback	-1.16	7.08	5.32	6.31	.62	6.17
Control	-.24	7.94	-	-	-.97	8.68

The changes in readiness to change reported by each group at the three points in time can be seen in Figure 7.1. In order to compare readiness to change scores of both intervention groups with the control group from baseline assessment to follow-up, a two-factor mixed analysis of variance was conducted. The results showed that there was no significant main effect for group,  $F(2, 106) = .13, p = .88$ , or for time,  $F(1, 106) = .22, p = .64$ . The interaction between group and time also was not significant,  $F(2, 106) = 1.61, p = .21$ . Therefore, neither type of intervention affected students' readiness to change from baseline assessment to follow-up. However, comparing the difference in readiness to change scores from baseline to postintervention showed that the students who received personalised feedback increased their readiness to change ( $M = 6.49, SD = 6.70$ ) by a greater degree than those who received nonpersonalised feedback ( $M = 3.24, SD = 4.71$ ),  $t(72) = 2.41, p = .019$ .



**Figure 7.1.** Mean readiness to change scores for nonpersonalised feedback, personalised feedback, and control groups across three points in time, assessment, postintervention, and follow-up.

Multiple regression analyses were conducted to determine whether any variables, other than the type of feedback students received, were related to changes in readiness to change scores from baseline assessment to postintervention. Changes in readiness to change across time were evaluated by regressing RTCQ scores at baseline assessment on RTCQ scores at postintervention. The following baseline measures were then entered one variable at a time into the regression analysis; motivational factors (PCI Adaptive Motivation and PCI Maladaptive Motivation), personality variables (TPQ Novelty Seeking, TPQ Harm Avoidance, TPQ Reward Dependence, and LOC), reasons for drinking (RFD Positive Affect and RFD Negative Affect), drinking situations (IDS Positive Affect, IDS Negative Affect, IDS Alcohol Involvement), and alcohol-related problems (RAPI). Gender was also included in the analysis. No significant relationships were found when taking both intervention groups together. On the other hand, two variables were significantly related to increases in readiness to change when analysing each intervention group separately.

First, in the personalised feedback group, it was found that baseline readiness to change scores predicted postintervention readiness to change scores ( $R^2 = .25$ ,  $\beta = .54$ ,  $p = .0004$ ). When entered into the regression analysis, PCI Adaptive Motivation was significantly, positively related to increases in readiness to change ( $\Delta R^2 = .11$ ,  $\beta = .33$ ,  $p = .02$ ). Second, in the nonpersonalised feedback group, baseline readiness to change scores predicted postintervention readiness to change scores ( $R^2 = .61$ ,  $\beta = .72$ ,  $p < .0001$ ). When entered into the regression analysis, TPQ Reward Dependence was significantly, negatively related to increases in readiness to change ( $\Delta R^2 = .07$ ,  $\beta = -.27$ ,  $p = .012$ ).

### 7.1.2 Changes in Drinking

The outcome variables used to measure changes in drinking were weekly alcohol consumption, number of days per week on which alcohol was consumed, and maximum amount of alcohol consumed on any one day per week. These three variables were calculated for four points in time--preintervention, and at 4, 8, and 12 weeks following the intervention. Each variable was averaged for each of the three 4-week follow-up periods. In respect of the preintervention time period, however, data for the week prior to the intervention session were used rather than the averages for the 4-week period immediately preceding the intervention. The reason for this was that the interventions were delivered at the end of January/ beginning of February, which meant that in some cases the 4-week period prior to intervention included part of the Christmas break that featured New Year's Eve. This is a traditional time for excessive drinking, the inclusion of which was liable to seriously inflate the average estimates of drinking.

Before analysing changes in drinking between the three groups, the data were examined to check for violations of the assumptions underlying analysis of variance. Inspection of boxplots of the alcohol use variables for each group identified one participant's extreme score on average weekly alcohol consumption in the nonpersonalised feedback group. This had the effect of inflating that particular group's mean and variance, thereby



threatening the assumption of homogeneity of group variances. Howell (1997) provided detailed guidance on this issue pointing out that analysis of variance is a very robust procedure that can withstand quite serious violations of the assumptions. However, there are ways of increasing the homogeneity of variances, which also should be considered. The two main alternatives are either reducing the sample or transforming the data. Trimming the sample was rejected as a remedial measure because it would involve removing one case from each tail of the distribution in each group, thereby removing perfectly good data for the sake of one outlier. A transformation of the data was considered a more satisfactory remedy because it retained all of the original data. Therefore, a logarithmic transformation was applied and the analysis of variance was conducted using the transformed data. Comparing this result with the result of the analysis of variance using untransformed data showed that there was nothing to be gained by using transformed scores. It was decided, therefore, to retain all of the original data with the knowledge that the analysis of variance could withstand the threat to homogeneity represented by the one outlier and that this participant's scores, although extreme, did not constitute a strongly inaccurate estimate of alcohol consumption.

Table 7.2 displays the means and standard deviations of the three alcohol use variables for each of the three groups. A separate 3 (group) X 4 (time: preintervention, 4, 8, and 12 weeks following intervention) analysis of variance for repeated measures was carried out on average weekly alcohol consumption, number of days per week on which alcohol was consumed, and maximum amount of alcohol consumed per week. There was no significant between-groups main effect for average weekly consumption,  $F(2, 107) = .14, p = .87$ , number of days drinking,  $F(2, 107) = .40, p = .67$ , and maximum amount of alcohol consumed per week,  $F(2, 107) = .66, p = .52$ . There was also no significant main effect for time on average weekly consumption ( $F < 1.0$ ), number of days drinking ( $F < 1.0$ ), and maximum amount of alcohol consumed per week ( $F < 1.0$ ). There were no significant interactions for any of the alcohol measures.

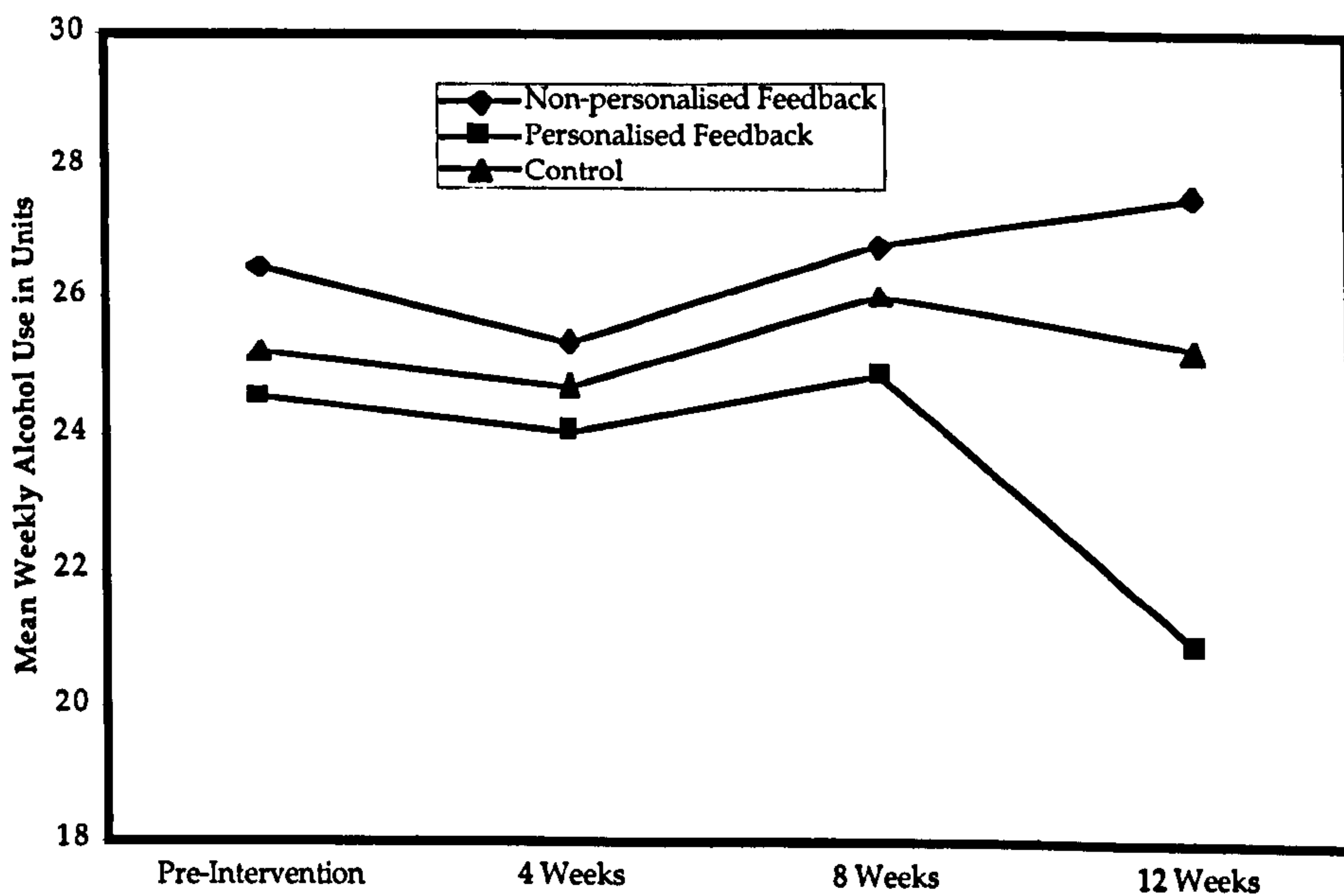
Table 7.2

Mean Scores Over Time on Three Alcohol Use Variables for the  
Nonpersonalised Feedback, Personalised Feedback, and Control Group

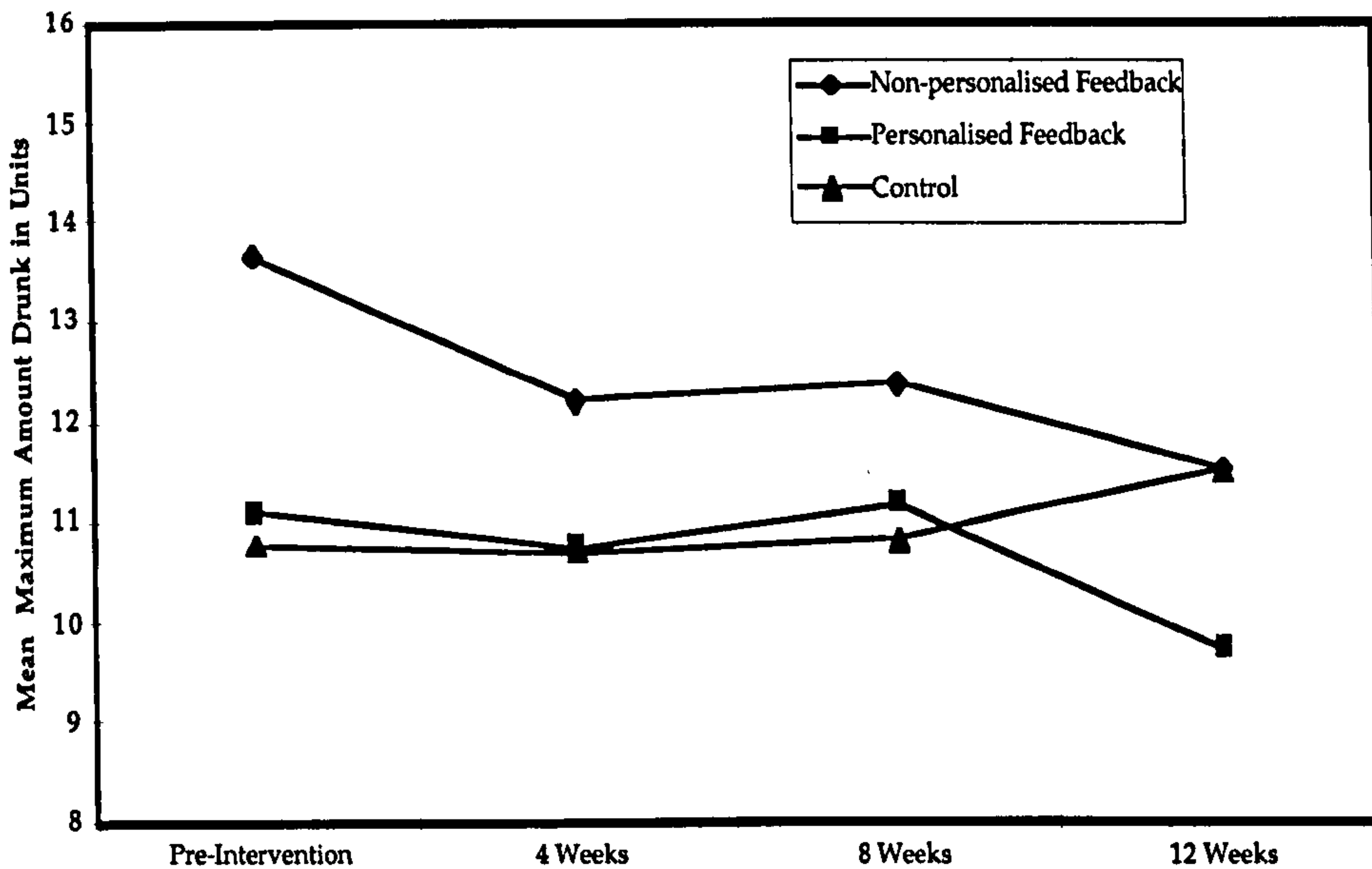
Group	Preintervention	4 weeks	8 weeks	12 weeks
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
<u>Average Weekly Consumption</u>				
Nonpersonalised Feedback	26.51 (32.42)	25.36 (31.92)	26.80 (33.31)	27.60 (45.88)
Personalised Feedback	24.54 (19.48)	24.02 (18.76)	24.87 (15.01)	20.88 (10.83)
Control	25.22 (21.46)	24.67 (18.08)	26.06 (19.04)	25.26 (16.54)
<u>Number of Days Drinking</u>				
Nonpersonalised Feedback	2.24 (1.40)	2.24 (1.38)	2.32 (1.35)	2.36 (1.48)
Personalised Feedback	2.49 (1.26)	2.53 (1.22)	2.59 (0.89)	2.45 (1.13)
Control	2.39 (1.40)	2.43 (1.22)	2.56 (1.23)	2.44 (1.08)
<u>Maximum Amount Drunk</u>				
Nonpersonalised Feedback	13.65 (12.03)	12.22 (9.60)	12.35 (10.00)	11.52 (10.08)
Personalised Feedback	11.11 (6.18)	10.74 (5.31)	11.15 (5.61)	9.75 (4.22)
Control	10.78 (6.40)	10.72 (5.68)	10.81 (6.17)	11.51 (6.33)

Note. All mean scores are in units of alcohol. Nonpersonalised and Personalised Feedback groups,  $n = 37$ ; Control group,  $n = 36$ .

Despite the finding of no significant differences among the groups over time on any of the alcohol measures, Figure 7.2 shows the trend toward an overall reduction in average weekly alcohol consumption for the personalised feedback group. Students in this group showed a 15 percent reduction in average weekly drinking from preintervention to the 12-week follow-up point. In contrast, the other two groups showed very small increases. Graphically, therefore, the personalised feedback group did change in the predicted direction, whereas the other groups showed essentially no change. Figure 7.3 displays the changes in the maximum amount of alcohol consumed per week over time for the three groups. Both intervention groups showed overall mean reductions in maximum amount of alcohol consumed, whereas the control group showed an overall increase. Specifically, the nonpersonalised feedback group showed a 16 percent reduction, the personalised feedback group a 12 percent reduction, whilst the control group had a 7 percent increase.



**Figure 7.2.** Changes in mean weekly alcohol consumption for each of the three groups.



**Figure 7.3.** Changes in mean maximum amount consumed on one day per week for each of the three groups.

### 7.1.3 Post Hoc Power Analysis

A post hoc power analysis was conducted to determine the sample size needed to detect a statistically significant effect in future evaluations of brief interventions based on personalised and nonpersonalised feedback. A between-group effect size was calculated using the combined means of average weekly alcohol consumption at follow-up for the two intervention groups in contrast to the mean of the same dependent variable for the control group. The effect size of the nonsignificant difference between the intervention groups and the control group was  $d = .04$ . In order to detect such a small effect, an unrealistically large sample size would be needed for statistical power of .80. However, a further power analysis was conducted comparing the personalised feedback group with the control group. The effect size of the nonsignificant difference between these two groups was  $d = .31$ , which approached the mean between-group effect size of similar contrasts reported in a meta-analysis of brief intervention studies (Bien, Miller, & Tonigan, 1993). On this basis, a sample size of 79 participants per group would be needed to detect a significant between-group effect size of .31, with power of .50, and a group size of 163 participants would be needed to raise statistical power to .80 to detect a similar effect. In summary, sample sizes in the present study fell

short of the optimum to attain strong statistical power to detect the observed effect size if it had been significant.

#### 7.1.4 Participant Characteristics Related to Changes in Drinking

The proportions of students in each of the three groups who reduced their alcohol use are displayed in Table 7.3. There were no significant differences between the groups in the proportions of students who reduced their drinking. However, a trend can be seen in the numbers of those who made reductions that favoured the intervention groups in comparison to the control group, with one exception. Between the interventions, a greater proportion of students who received personalised feedback reduced their average weekly consumption (57 percent) and the maximum amount consumed (54 percent) than students who received nonpersonalised feedback (51 percent for both measures). The exception to the trend was seen in reductions in the proportions of students who reduced the number of days on which they drank. The results in this case favoured the nonpersonalised feedback group (43 percent personalised feedback; 49 percent nonpersonalised feedback; 44 percent control). Overall, 51.8 percent of students reduced their average weekly alcohol consumption, 47.3 percent reduced the maximum amount consumed, and 45.5 percent reduced the number of days drinking.

Table 7.3

#### Proportions of Students Who Made Reductions in Alcohol Use Between Preintervention and Follow-Up

	Personalised Feedback %(n) (M-F)	Nonpersonalised Feedback %(n) (M-F)	Control Group %(n) (M-F)
Average Weekly Alcohol Consumed	57(21) (10-11)	51(19) (8-11)	47(17) (8-9)
Maximum Amount Consumed	54(20) (9-11)	51(19) (8-11)	36(13) (7-6)
No. of Days Drinking	43(16) (8-8)	49(18) (6-12)	44(16) (7-9)

It can also be seen that, apart from two instances, more females made reductions in alcohol use than males. However, the results of chi-square tests of independence for each alcohol measure showed that there was no relationship between gender and reductions in average weekly consumption [ $\chi^2(2, n = 57) = .14, p = .93$ ], maximum amount consumed [ $\chi^2(2, n = 52) = .45, p = .80$ ], or number of days drinking per week [ $\chi^2(2, n = 50) = 1.00, p = .61$ ]. To test whether female students made greater reductions in each alcohol measure than male students, three two-way analyses of variance were carried out to test the effects of both gender and group membership on reductions in each alcohol measure. The results of these analyses yielded no significant main effects for groups or gender and no significant interaction. Table 7.4 shows the mean reductions made by male and female students in the three alcohol use measures.

Table 7.4

Mean (SD) Reductions in Alcohol Use from Preintervention to Follow-Up for Male and Female Students

	Personalised Feedback M (SD)	Nonpersonalised Feedback M (SD)	Control Group M (SD)
<b>Average Weekly Alcohol Consumed</b>			
Males	20.30 (19.25)	9.38 (6.42)	20.00 (21.81)
Females	6.59 (6.64)	11.75 (7.21)	6.78 (4.65)
<b>Maximum Amount Consumed</b>			
Males	5.47 (5.15)	7.00 (6.91)	6.36 (4.19)
Females	3.55 (2.83)	5.39 (7.08)	4.79 (4.61)
<b>No. of Days Drinking</b>			
Males	1.63 (1.64)	0.71 (0.49)	0.93 (0.81)
Females	0.91 (0.58)	0.68 (0.73)	0.69 (0.30)

Participants' characteristics, other than gender, related to their reductions in alcohol use--both within each intervention and regardless of the type of intervention--were assessed by means of multiple regression analyses. Changes in drinking across time were evaluated by regressing average weekly alcohol consumption at preintervention on the same variable at follow-up. The variables that were expected to be significantly related to changes in drinking were entered into the regression analysis as separate blocks. The following variables were entered: IDS Positive Affect Situations, Locus of Control, PCI Adaptive Motivation, TPQ Harm Avoidance, and TPQ Novelty Seeking. For this analysis, data from the personalised and nonpersonalised feedback groups were collapsed in order to test the hypothesis that participants' characteristics named above would be associated with reductions in drinking, regardless of the type of intervention that they had received. Contrary to expectations, none of the variables significantly predicted changes in average weekly alcohol consumption. Nonsignificant results were also found when the regression analysis was again conducted for the personalised and the nonpersonalised feedback groups separately. The results showed that none of the participant characteristics were associated with changes in drinking behaviour.

#### 7.1.5 Correlational Analysis

First, the variables that had been measured both at baseline assessment and follow-up (12 weeks postintervention) were correlated with each other in order to establish that the self-report data were reliable. The results showed that RAPI scores at baseline and follow-up were significantly correlated with each other,  $r = .62$ ,  $n = 109$ ,  $p < .001$ . It was found also that the alcohol variables measured by the AUQ were significantly correlated with each other. Specifically, at baseline and follow-up the following variables were significantly related with each other: average weekly alcohol consumption ( $r = .26$ ,  $n = 108$ ,  $p = .006$ ); usual frequency of drinking days per week ( $r = .39$ ,  $n = 110$ ,  $p < .001$ ); typical amount of alcohol consumed on drinking days ( $r = .35$ ,  $n = 108$ ,  $p < .001$ ); and maximum amount of alcohol consumed on any one day ( $r = .21$ ,  $n =$

105,  $p = .03$ ). The AUDIT scores at baseline and follow-up were also found to be significantly related with each other as follows: AUDIT Dependency scores ( $r = .61$ ,  $n = 110$ ,  $p < .001$ ); AUDIT Problems scores ( $r = .57$ ,  $n = 110$ ,  $p < .001$ ); and AUDIT Total scores ( $r = .63$ ,  $n = 110$ ,  $p < .001$ ). Finally, LOC scores at baseline and follow-up were significantly related with each other,  $r = .71$ ,  $n = 109$ ,  $p < .001$ .

The second step in the correlational analysis was designed to test the consistency of self-reported alcohol use measured at follow-up on two different instruments, the AUQ and the Retrospective Drinking Diary (RDD). Both instruments supplied data regarding average weekly alcohol consumption, number of days per week on which alcohol was consumed, and the maximum amount of alcohol consumed on any one day. Data collected on the RDD were used to calculate two sets of the above three drinking variables. One set measured average weekly alcohol consumed, average number of days drinking per week, and the average maximum amount consumed on any one day per week for the 12-week period following intervention. The other set represented the same variables as the first, but this time they were the averages for the four weeks prior to follow-up. The second set of variables used a time scale that corresponded more closely to the AUQ.

Correlations between the three variables measured on the AUQ and the RDD are displayed in Table 7.5. The significant relationships indicate a high level of consistency among the follow-up measures. The correlations between the AUQ variables and both sets of RDD variables provided a measure of reliability for the self-reported drinking data. It can be seen that the highest correlations were found between the two sets of alcohol variables measured by the RDD, showing that the retrospective drinking diary technique had yielded reliable data. The lowest correlations were found between the RDD and AUQ on the measure of maximum amount of alcohol consumed on any one day. Also, in respect of the average number of days drinking per week, correlations between the RDD and AUQ were higher than for maximum amount consumed but lower than for average weekly alcohol consumption. These findings possibly reflect



the superior precision of RDD data in that students could enter an exact maximum amount on the RDD rather than choosing a range as on the AUQ.

Table 7.5

Intercorrelations Between Self-Reported Alcohol Use Measured by the AUQ and the Retrospective Drinking Diary (RDD)

Variables	AUQ			RDD (Avg. of 12 weeks postintervention)		
	QxF	Days	Max.	QxF	Days	Max.
RDD (Avg. of 12 weeks postintervention).						
QxF	.65*					
No. of Days		.60*				
Max.			.38*			
RDD (Avg. of 4 weeks prior to follow-up).						
QxF	.65*			.94*		
No. of Days		.49*			.85*	
Max.			.39*			.92*

Note. AUQ=Alcohol Use Questionnaire; RDD=Retrospective Drinking Diary; QxF = Average Weekly Alcohol Consumption; No. of Days=Average Number of Days Drinking Per Week; Max.=Weekly Maximum Amount of Alcohol Consumed on One Day. \*p < .001.

To complete the correlational analysis, the alcohol measures and the index of alcohol-related problems were correlated with the other variables of interest. The correlations are displayed in Table 7.6. The results show that all three alcohol measures were significantly, positively related to RAPI scores. All three of the IDS factors (Positive Affect Situations, Negative Affect Situations, and Alcohol Involvement) were also significantly, positively related to RAPI scores. A different pattern of correlations was evident between the IDS factors and the alcohol measures. Here it was found that Alcohol Involvement was significantly, positively related to all three of the alcohol variables, whereas Negative

Affect Situations was not related to any of the alcohol measures. The pattern was completed by the finding of a significant, positive relationship between Positive Affect Situations and both average weekly alcohol consumed and number of days drinking per week. However, Positive Affect Situations were not related to the maximum amount consumed on any one day per week. In respect of reasons for drinking, Negative Affect reasons were significantly, positively related to RAPI scores but Positive Affect reasons were not related to RAPI scores, and neither type of reasons was related to the alcohol measures.

Motivational factors were found to be differentially related to alcohol use and alcohol-related problems. Namely, PCI Maladaptive Motivation showed a significant, positive relationship with RAPI scores but was unrelated to the alcohol-use measures. On the other hand, PCI Adaptive Motivation was unrelated to RAPI scores but showed a significant, negative relationship with average weekly alcohol consumption and the maximum amount consumed on any one day of the week. Personality factors showed few significant correlations with the other variables. TPQ Novelty Seeking was the only personality factor significantly related to RAPI scores. Two other significant relationships were found among the personality variables. Specifically, TPQ Novelty Seeking was positively related to the maximum amount consumed on any one day of the week, whereas TPQ Harm Avoidance was negatively related to maximum consumption. Finally, it was found that scores from the Readiness to Change Questionnaire were significantly, positively related to RAPI scores but unrelated to the alcohol measures.

Table 7.6

Intercorrelations Between Personality Factors, Motivational Variables, Drinking Situations, Drinking Reasons, and Alcohol Consumption and Alcohol-Related Problems

Variables	RAPI	QxF	Days	Max.
QxF	.20*	--		
Days	.20*	.54***	--	
Max.	.32**	.86***	.30**	--
IDS				
Pos. Affect	.27**	.22*	.31**	ns
Neg. Affect	.33**	ns	ns	ns
Alc. Involvement	.32**	.22*	.25*	.20*
RFD				
Pos. Affect	ns	ns	ns	ns
Neg. Affect	.23*	ns	ns	ns
PCI				
Adaptive	ns	-.20*	ns	-.21*
Maladaptive	.33*	ns	ns	ns
TPQ				
NS	.22*	ns	ns	.21*
HA	ns	ns	ns	-.19*
RD	ns	ns	ns	ns
LOC	ns	ns	ns	ns
RTCQ	.40***	ns	ns	ns

**Note.** QxF = Average Weekly Alcohol Consumption; Days=Average Number of Days Drinking Per Week; Max.=Weekly Maximum Amount of Alcohol Consumed on any One Day; RAPI=Rutgers Alcohol Problem Index; IDS=Inventory of Drinking Situations; RFD=Reasons for Drinking scale; PCI=Personal Concerns Inventory; TPQ=Tridimensional Personality Questionnaire (NS=Novelty Seeking, HA=Harm Avoidance, and RD=Reward Dependence); LOC=Locus of Control; RTCQ=Readiness to Change Questionnaire.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### 7.1.6 Prediction of Alcohol-Related Problems

The correlations displayed in Table 7.6 showed which variables were significantly related to RAPI scores. It was decided to explore these relationships in greater detail by conducting a multiple regression analysis. On this basis, Novelty Seeking, RFD Negative Affect, PCI Maladaptive Motivation, all the IDS factors (Positive Affect Situations, Negative Affect Situations, and Alcohol Involvement), and the three alcohol measures were selected for entry in a regression model to predict RAPI scores. Although significantly related to RAPI scores, the Readiness to Change index was not entered into the regression model. It was reasoned that Readiness to Change is more likely to be affected by the incidence of alcohol-related problems than the reverse circumstance. Therefore, the Readiness to Change index was deemed an inappropriate, predictor variable for the regression model.

Collinearity statistics confirmed that intercorrelations between average weekly alcohol consumption, number of days drinking per week, and the maximum amount consumed on any one day of the week would produce inaccurate results. Therefore, a new independent variable was created simply by combining the three alcohol-use measures. This action was taken in accordance with one solution to the problem of multicollinearity recommended by Miles and Shevlin (2001). The new variable (Heavy Drinking Index) was found to be positively skewed, and the results of a normal probability plot confirmed that the data were not normally distributed. A log transformation of the heavy drinking index removed positive skew and produced normally distributed data. All of the variables were examined to check that the assumptions for multiple regression were satisfied. The evidence of simple scatterplots, normal probability plots, and scatterplots of standardised residuals against standardised predicted values showed that the analysis could proceed with confidence.

Sample size was another issue that needed addressing before proceeding with the multiple regression analysis. Determining the number of participants necessary for a regression model featuring seven

predictor variables, was guided by two methods. First, to test the  $R^2$  of a regression model the minimum number of participants should be greater than  $50 + 8k$  ( $k$  = number of predictor variables) according to Green (1991). Using this formula yielded a sample size of at least 107 students, which was exceeded in the present study. Second, power analysis was used to confirm that the sample size was adequate as recommended by Miles and Shevlin (2001). On this basis, for a large expected effect size at an alpha level of .05 with power set at .80 the minimum sample size required was 52. Alternatively, for a medium expected effect size at an alpha level of .05 with power set at .80 the minimum sample size required was 108. Therefore, the rule concerning the minimum number of subjects for a regression analysis was not violated.

The regression model was based on the theoretical rationale that personality factors, motivational variables, reasons for drinking, drinking situations, and measures of alcohol use all influence the occurrence of alcohol-related problems. The results of the correlational analysis identified which variables among the above domains should constitute the model. Therefore, Novelty Seeking, Maladaptive Motivation, RFD Negative Affect, all three IDS variables (Positive Affect Situations, Negative Affect Situations, and Alcohol Involvement), and the index of heavy drinking comprised the regression model for predicting RAPI scores. Hierarchical variable entry was employed as the method of analysis best suited to the testing of the model of prediction. The theoretical ordering of variables in the model was based on the rationale that entry should represent their respective proximity to the occurrence of alcohol-related problems. Thus, the heavy drinking index was entered first. The IDS variables were entered next, and were followed by RFD Negative Affect because drinking situations were deemed more proximal to actual alcohol use and related problems than reasons for drinking. Maladaptive Motivation was entered next because this variable is more abstract and complexly derived than either situations or reasons and not directly linked to drinking. Novelty Seeking was the last variable to be entered because, in common with personality factors in general, it is arguably the most

stable and enduring of the variables under consideration here. Gender and age were not entered in the model because neither was significantly correlated with RAPI scores.

The hierarchical multiple regression analysis, displayed in Table 7.7, determined the relative contributions of alcohol use, drinking situations, reasons for drinking, motivational structure, and personality in the prediction of alcohol-related problems. To begin with, it can be seen that the regression model significantly predicted RAPI scores at follow-up, accounting for 40 percent of the variance,  $F(7, 95) = 9.14, p < .001$ . Next, considering the specific predictor variables, we see that the Heavy Drinking Index was entered into the model first and was found to significantly predict RAPI scores, accounting for 19 percent of the variance. Next, the three IDS variables were entered together as one block. They significantly predicted RAPI scores, explaining a further 12 percent of the variance. RFD Negative Affect was entered as Block Three, but it did not significantly increase the amount of variance explained in RAPI scores. PCI Maladaptive Motivation was entered into the analysis in the next step. It made a unique contribution to the prediction of RAPI scores by significantly accounting for eight percent of the variance. Finally, TPQ Novelty Seeking did not explain any additional variance in RAPI scores.

The following results, displayed in Table 7.7, showed that the theoretical model significantly predicted the incidence of alcohol-related problems, accounting for 40 percent of the variance in RAPI scores reported by students at follow-up. Heavy Drinking, Maladaptive Motivation, and all three IDS factors were found to be significant independent predictors of alcohol-related problems. The analysis also showed that Novelty Seeking and Negative Affect reasons for drinking did not independently predict alcohol-related problems.

Table 7.7

Hierarchical Multiple Regression Analysis of the Ability of Alcohol-Use, Personality Factors, Motivational Variables, Drinking Situations, and Drinking Reasons to Predict Alcohol-Related Problems

Dependent variable	Independent variables in order of entry	$\Delta R^2$	$\beta$ in final equation
RAPI	1. Heavy Drinking Index	.19***	.37***
	2. IDS Pos. Affect Sits	.12***	.15
	IDS Neg. Affect Sits		.15
	IDS Alc. Involvement		.03
	3. RFD Neg. Affect	.01	.16
	4. Maladaptive Motivation	.08***	.27**
	5. Novelty Seeking	.00	.09

**Note.** RAPI = Rutgers Alcohol Problems Index. Independent variables used in the analyses were, Heavy Drinking Index (summed Average Weekly Alcohol, No. of Days Drinking Per Week, & Maximum Amount Consumed Per Week); Inventory of Drinking Situations (IDS) Factors (Positive Affect Situations, Negative Affect Situations, Alcohol Involvement); Reasons For Drinking (RFD) Negative Affect; PCI Factor 2 Maladaptive Motivation; TPQ Novelty Seeking. Howell's (1997, p. 541) formula was used to test the significance of  $R^2$  changes resulting from the addition of predictor variables.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

An additional multiple regression analysis was carried out to clarify the individual contribution of each of the IDS factors. The IDS factors had been entered as a single block because of their significant correlations with RAPI scores. However, although all three IDS factors were significantly correlated with RAPI scores, it was not certain from the results of the above analysis which of the factors uniquely predicted alcohol-related problems. Tolerance statistics indicated that intercorrelations between the three IDS factors did not present a major problem, but beta weights did not determine the relative importance of the three factors in predicting RAPI scores. Therefore, the second multiple regression analysis was conducted

using a forward selection technique that enters variables one at a time beginning with the one that produces the largest increase in explained variance. The procedure continues entering variables until there are no more significant increases in  $R^2$ . All of the original independent variables were entered as one block for selection in the model with a criterion significance level of  $< 0.001$  for entry. The results of the analysis showed that three variables significantly, independently predicted RAPI scores. Specifically, Heavy Drinking Index, Maladaptive Motivation, and IDS Negative Affect were found to be independent predictors of alcohol-related problems. Heavy Drinking Index significantly increased  $R^2$ , accounting for 19% of the variance in RAPI scores,  $F(1, 101) = 24.09, p < .0001$ . Maladaptive Motivation significantly increased  $R^2$ , explaining a further 10% of the variance,  $F(2, 100) = 20.74, p < .0001$ . Finally, IDS Negative Affect significantly increased  $R^2$ , accounting for a further 8% of the variance,  $F(3, 99) = 19.16, p < .0001$ .

The two models shown in Figure 7.4 represent hypothesised causal relationships between IDS Negative Affect Situations, PCI Maladaptive Motivation, Heavy Drinking Index, and alcohol-related problems. Mediation analysis (Baron & Kenny, 1986) was conducted to test Model 1. Mediation was not established because neither IDS Negative Affect Situations nor PCI Maladaptive Motivation significantly predicted Heavy Drinking Index. Model 2 better represents the hypothesised causal relationships, in that IDS Negative Affect Situations, PCI Maladaptive Motivation, and Heavy Drinking Index all directly predicted alcohol-related problems.



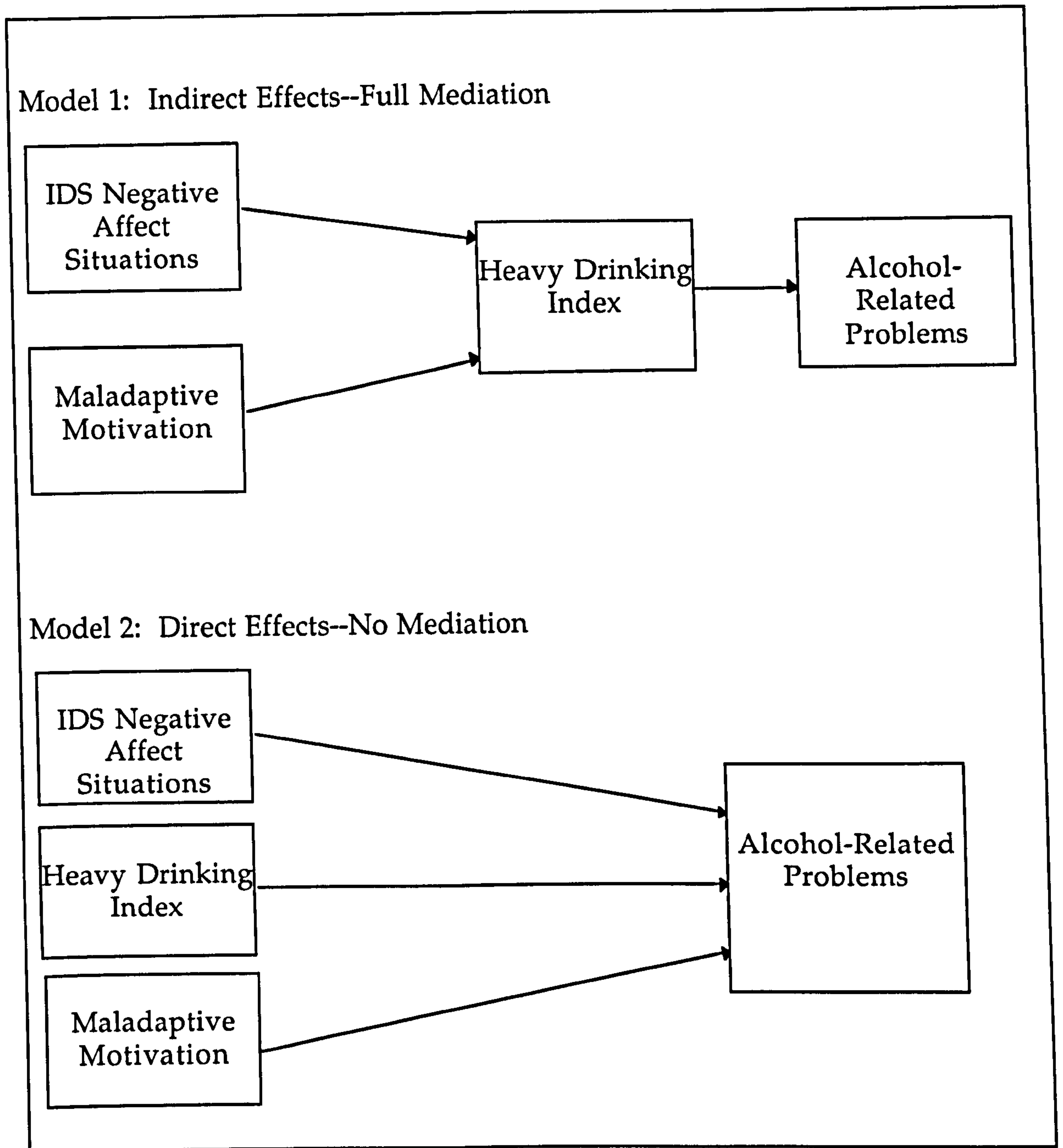


Figure 7.4. Two hypothesised models describing the effects of IDS Negative Affect Situations, Maladaptive Motivation, and Heavy Drinking Index on alcohol-related problems.

## 7.2 Discussion

The main hypothesis of interest was not supported by the results of the present study. Heavy drinking students who received personalised feedback did not reduce their consumption to a greater degree than heavy

drinking students who received nonpersonalised feedback. There were no significant differences in alcohol use between the personalised feedback, nonpersonalised feedback, and control conditions from preintervention to 4, 8, and 12 weeks following the intervention. However, in respect of average weekly alcohol consumption, an overall downward trend was detected for the personalised feedback condition in contrast to both the nonpersonalised feedback and control groups. In fact, there was an overall 15 percent reduction in the average amount of alcohol consumed per week 12 weeks following the intervention, whereas there was an overall increase for the nonpersonalised and control groups by the 12 week follow-up session. A different trend was evident regarding the maximum amount of alcohol consumed on any one day of the week. In this case, both the personalised and nonpersonalised feedback groups demonstrated a downward trend in maximum amount drunk, showing overall reductions of 12 percent and 16 percent, respectively, by 12 weeks postintervention. The control group, on the other hand, showed an overall 7 percent increase in the maximum amount drunk during the same period of time.

Although nonsignificant differences between groups in alcohol consumption were observed, these trends do not provide support for the effectiveness of opportunistic brief interventions for university students. However, students' readiness to change their drinking was certainly affected by both interventions, and it was clear that having received personalised feedback had a greater affect on students' readiness to change than did the nonpersonalised feedback. The immediate question to answer, therefore, is why students did not translate their increased readiness to change into significant reductions in drinking.

There are a number of possible reasons why students who were ready to change their drinking failed to make significant reductions in alcohol use. First, the frequency of the interventions was not sufficient. Second, the interventions were delivered by a researcher rather than a healthcare professional, whose mere presence may have lent more weight to the intervention. Third, young students who constituted the bulk of

the sample are liable to be the most dismissive of warnings to reduce their drinking.

These possible reasons for the observed outcome will now be examined in greater detail. In terms of frequency of the interventions, students received a single session of feedback that lasted an average of 19 minutes (range = 13 to 27 minutes). Other brief interventions with college students that have been successful have ranged from one to eight sessions, each varying in duration from one to two hours (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Darkes & Goldman, 1993), but it has not been clearly demonstrated that delivering more intervention sessions increases effectiveness (Baer, Marlatt, Kivlahan, Fromme, Larimer, & Williams, 1992; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990) over fewer sessions. In addition, single-session interventions of 50 minutes and one hour have also proved to be effective (Baer et al., 1992; Borsari & Carey, 2000; Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley, Somers, & Williams, 1998). Although the interventions used in the present study were briefer in duration than those used in previous research, the significant increases in readiness to change showed that both interventions were of sufficient intensity. However, the significant decreases in readiness to change from postintervention to follow-up 12 weeks later appeared to show that a further intervention session was needed to maintain students' motivation for change.

The greater increase in readiness to change for the personalised feedback group compared to the nonpersonalised one showed that the former intervention was more effective in enhancing motivation to change than was the latter. It was expected that personalised feedback would prove superior to nonpersonalised feedback. Nonpersonalised feedback consisted of general alcohol-related information combined with the explicit message to students that they were among the highest percentile of student drinkers. Therefore, to make a successful reduction in drinking, students had to have considerable self-awareness to apply the general information to themselves and/or to be sufficiently motivated to change by the knowledge that they were among the heaviest drinkers. By

contrast, students in the personalised feedback group received what could be termed a more intensive intervention than those in the nonpersonalised feedback condition. The feedback was more intense because it was tailored to the individual and this information was expected to generate sufficiently strong incentive to reduce drinking. However, students would still have to connect different elements of the feedback information in a cohesive manner in order to take the steps necessary to reduce their consumption. It is possible that students' failure to link elements of the information as it applied to themselves personally contributed to the lack of success.

As Linehan (1999) described, four functions are necessary for the success of any type of behavioural intervention; increasing knowledge, increasing awareness, increasing capability, and enhancing motivation. The first function, increasing knowledge about the effects of alcohol, was certainly addressed in both the personalised and nonpersonalised interventions. Second, increasing students' awareness of personal risks was clearly contained in the personalised feedback. The third function, increasing capability to reduce drinking was kept to a minimum but was provided to both groups in the form of guidelines for sensible drinking. Finally, the fourth function of enhancing motivation, to reduce harmful and hazardous drinking, was addressed but in an implicit way. In other words, students' motivation was expected to be enhanced by the presentation of personal risk status, and in fact the present study was premised on the expectation that that element alone would be effective. The delivery of the feedback, therefore, purposely omitted any overt counselling techniques aimed at identifying and exploiting students' ambivalent attitudes related to their drinking.

Possibly, then, the personalised feedback intervention was not successful because active counselling techniques designed to enhance students' motivation to change were not employed. Most successful interventions for heavy-drinking college students evaluated in previous studies used interactive counselling techniques (Baer et al., 1992; Borsari & Carey, 2000; Darkes & Goldman, 1993; Kivlahan et al., 1990; Marlatt et al.,

1998). In some of these, the nonconfrontational style of counselling called Motivational Interviewing (Miller & Rollnick, 1991) was used to great effect (Baer et al., 1992; Marlatt et al., 1998). However, one brief intervention proved successful when personalised, normative feedback was mailed to students (Agostinelli, Brown, & Miller, 1995). Obviously the success of this intervention was not founded on counselling techniques of any kind, but demonstrated the effectiveness of normative feedback in raising awareness and motivating students to change their behaviour. In addition, other interventions that did not involve counselling have proved successful, including self-help manuals (Heather, Whitton, & Robertson, 1986; Miller & Munoz, 1982), simple advice from a general practitioner (Anderson & Scott, 1992), and simple advice from a 'health adviser' (Babor & Grant, 1992).

There is a second possible reason that the interventions did not significantly reduce students' drinking. This concerns students' perceptions about the importance of the feedback information delivered to them and the authority of the personnel giving the information. It is reasonable to suppose that the delivery of health-related information by a healthcare professional, such as a doctor or a nurse, would carry more weight and be more likely to ensure success for the intervention than one delivered by an academic conducting a research project. However, reviewing the literature on brief interventions showed that not all brief interventions delivered by healthcare professionals were successful. In fact, successful interventions with students have typically been delivered by research psychologists. It may well have been that some students understood the importance of the information to them personally, whereas others failed to grasp its importance because they perceived the whole exercise as merely a research project. Therefore, students could readily dismiss the information on the basis that it had little connection to real life.

The third and final possible reason why students did not significantly reduce their drinking is related to the previous one, and concerns students' attitudes about the information they received. The

average age of the sample was 19 years old. Students of this age are likely to dismiss warnings of risks to their health from excessive drinking. Some students may even have viewed the personalised, normative feedback as a sort of 'badge of merit' in that it denoted a status that was attractive to their peers. Clearly, such an attitude as this would have had a reverse effect to the intended one on drinking habits. Combating dismissive attitudes, then, could only be achieved in the context of counselling aimed at emphasising the links between drinking and its adverse consequences. A concerted effort to raise awareness of the risks posed by excessive drinking to personal health and social relationships should help to erode dismissive attitudes that are resistant to a more neutral intervention.

Although significant reductions in alcohol consumption were not found, the observed nonsignificant differences between the groups warranted future study. Also, the significant increase in students' readiness to change showed that both types of feedback had raised awareness of risky drinking practices and enhanced motivation to change drinking habits. In addition, the results showed the greater ability of personalised feedback over nonpersonalised feedback to heighten awareness and enhance motivation. However, a further 'booster' session delivered during the follow-up period might have maintained students' motivation to change their drinking behaviour.

### 7.2.1 Readiness to Change

The ability of both types of feedback to increase students' readiness to change appeared to be mediated by other variables. In the nonpersonalised condition, it was found that as Reward Dependence decreased, readiness to change increased. According to Cloninger's (1987) tridimensional theory of alcoholism, one who is low on Reward Dependence is socially detached, emotionally cool, practical, tough-minded, and independently self-willed. A person with such personality characteristics might reasonably be expected to respond favourably to intervention in terms of resolving to change drinking behaviour on receipt of alcohol-related information. On the other hand, as Reward Dependence increased, readiness to change decreased. According to

Cloninger (1987), high Reward Dependence describes one who is eager to help others, emotionally dependent, warmly sympathetic, sentimental, sensitive to social cues, and persistent. It appeared that nonpersonalised feedback had a reverse effect on the awareness of students with the characteristics of high Reward Dependence. This finding may indicate merely that nonpersonalised feedback was easily dismissed by students with high Reward Dependence. However, it may also indicate the importance that social rewards represent to this type of individual and how such rewards are firmly linked to alcohol use. The reaction of these students, therefore, may have been to reject the suggestion that their drinking habits needed changing because their drinking habits were obtaining important social rewards for them. Therefore, providing alcohol-related information of a general nature, in a very brief format, was possibly counterproductive for students with high Reward Dependence.

In the personalised feedback condition, a positive, significant relationship was found between Adaptive Motivation and increases in readiness to change from baseline assessment to postintervention. This finding shows that students who were high in Adaptive Motivation were more likely to increase their readiness to change following the receipt of personalised alcohol-related feedback. Inspection of the motivational indices that comprise Adaptive Motivation helps to clarify the reason for this outcome. For example, it seems entirely reasonable to expect that strong commitment to goals for resolving important current concerns, high expected likelihood of reaching those goals, and high personal control over the outcome would be reflected in an increase in readiness to change. For such students, therefore, the feedback session seems to have heightened awareness of an important current concern (the need to reduce drinking) that they were confident of being able to resolve. Hence, there was an increase in their readiness to change their drinking habits.

### 7.2.2 Reductions in Alcohol Use

A proportion of students reduced their drinking from preintervention to follow-up in all three groups. Certain individual characteristics were hypothesised to be related to reductions in drinking.

However, none of the predicted relationships were supported by the results. Obviously, a range of factors not measured in the present study might account for students' reductions in drinking. For example, lack of finances or the pressure of academic work will have contributed to individual reductions. Some students will have stabilised their drinking habits in the 'maturing-out' process well documented by other researchers (see Gotham, Sher, & Wood, 1997). Forming a stable romantic relationship will have contributed to the stabilisation of alcohol use. Other students will have reduced their drinking because of other life events including illness, personal injury (both related and unrelated to drinking), and the occurrence of alcohol-related consequences. However, neither personality, motivation, reasons for drinking, nor drinking situations predicted participants' reductions in drinking.

### 7.2.3 Prediction of Alcohol-Related Problems

The final goal of the present study was to determine the ability of alcohol use, personality factors, motivational variables, drinking situations, and reasons for drinking to predict alcohol-related problems. In preparation for the analysis, two sets of intercorrelations were examined. First, the alcohol variables measured on two different instruments, the Alcohol Use Questionnaire (AUQ) and the Retrospective Drinking Diary (RDD), were intercorrelated. A high level of consistency was found among the variables, providing sound evidence that the self-report data were reliable. In addition to this finding, intercorrelations indicated that combining the three alcohol measures to create a heavy drinking index would provide the most accurate and meaningful variable to use in further analyses. Second, potential predictor variables were correlated with the three alcohol-use measures and alcohol-related problems reported at follow-up. The results here showed that the alcohol measures were significantly, positively related to alcohol-related problems, as one might expect. Among the personality factors (Novelty Seeking, Harm Avoidance, Reward Dependence, and Locus of Control), none was related to average weekly alcohol consumption and only Novelty Seeking was related to alcohol-related problems. This finding replicated the pattern of



relationships between the personality and alcohol-use variables identified in Chapter 4 (p. 120). Motivational variables (Adaptive and Maladaptive Motivation) also showed a similar pattern of correlations with alcohol-related problems found in Chapter 4 (p. 120). Specifically, Adaptive Motivation was not related to problems, but Maladaptive Motivation was positively related to problems. In addition, Adaptive Motivation was negatively related to average weekly alcohol consumed and maximum amount consumed. This finding showed that as Adaptive Motivation increased, the average and maximum amounts of alcohol consumed by students decreased. In the case of the IDS variables, all three drinking situations (Positive Affect, Negative Affect, and Alcohol Involvement) were significantly, positively related to alcohol-related problems in a similar manner as the relationships found in Chapter 3 (p. 85). The two RFD factors (Positive Affect and Negative Affect) were unrelated to alcohol-use measures and only Negative Affect reasons for drinking was significantly, positively related to alcohol-related problems. Finally, the variable that showed the strongest relationship with alcohol-related problems was the readiness to change index. Although significant correlations do not allow causal statements to be made, it is more likely that the occurrence of alcohol-related problems increased students' readiness to change their drinking habits rather than the other way round. The finding may be indicative of the dynamic relationship between the two indices. For example, it may be that when problems occur readiness to change increases, but when problems do not occur readiness to change declines.

The varying abilities of heavy drinking, personality, motivation, reasons for drinking, and drinking situations to predict alcohol-related problems were clearly demonstrated in the present study. None of the personality factors was capable of predicting alcohol-related problems, although Novelty Seeking was significantly, positively related to the incidence of problems, as might be expected. The influence of this factor on the occurrence of alcohol-related problems was possibly wholly mediated by heavy drinking. In other words, Novelty Seeking behaviour

is likely to include excessive drinking in an impulsive, ill-conceived manner, and it is this pattern of consumption that results in a certain level of alcohol-related problems. The influence of Novelty Seeking may then be seen in the type of problem that occurs when the individual is intoxicated. For example, drink-driving accidents and personal injuries resulting from 'dare-devil' actions may be associated with a Novelty Seeking orientation rather than other personality factors. Further research could be aimed at investigating such relationships.

Reasons for drinking did not predict alcohol-related problems, despite the positive relationship between Negative Affect reasons and problems. As discussed in Chapter 3 (p. 94), negative-affect reasons for drinking appeared to be of limited value in predicting alcohol-related problems. The IDS Negative Affect situations better conveyed students' motivation to drink than did the Negative Affect scale from the Reasons for Drinking Questionnaire. This view appeared to be confirmed by the results from the IDS factors. All three IDS factors (Positive Affect, Negative Affect, and Alcohol Involvement) together made a unique contribution to the prediction of alcohol-related problems. To complete the model, Maladaptive Motivation uniquely predicted the occurrence of alcohol-related problems, as did the heavy drinking index.

The finding that all three types of drinking situations predicted problems was not entirely meaningful and needed further clarification. Therefore, the model of prediction was clarified in the following manner. Students' heavy drinking habits predicted a significant level of alcohol-related problems that they experienced. Those students who were high in Maladaptive Motivation experienced a level of alcohol-related problems over and above that predicted by their heavy drinking. Finally, students who drank mainly in situations related to negative affect experienced a level of problems not accounted for by their heavy drinking or their motivational structure.

The model of prediction that was identified has implications for the design of future interventions. The link between heavy drinking and alcohol-related problems among students referred to in many studies (see

Wechsler, Lee, Kuo, & Lee, 2000) was strongly supported in the present study. Most of the previous studies have concentrated on the relationship between the frequency of binge drinking and the occurrence of a variety of problems (e.g., Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). However, the heavy drinking index used in the present study accounted for more aspects of drinking than did a binge drinking frequency measure. Therefore, the heavy drinking index was a more accurate reflection of students' drinking patterns than was a binge-drinking measure. It could be used to identify students for whom an intervention would be of benefit and form the basis for the design and implementation of an intervention for them.

Maladaptive Motivation and IDS Negative Affect could also serve the functions of identifying high-risk student drinkers as well as forming the basis for a tailored intervention for them. For example, students with a maladaptive motivational structure could be assisted to resolve their current concerns in other areas of their lives and formulate emotionally satisfying goals to pursue. Students would then be expected to be less likely to drink to an effort to obtain emotional satisfaction and less likely to experience alcohol-related problems. In the case of students who drink mainly in situations related to negative affect, the indications are that such students constitute a sub-group of drinkers who warrant a specific, more intensive intervention. An effective intervention, therefore, would concentrate on the source of the negative affect experienced by these students and ways to counteract it other than by drinking alcohol. Because interpersonal conflict appears to be the catalyst for much of the negative affect experienced, students could be helped to adopt nondrinking strategies for managing interpersonal relationships and conflict with others. As a result, students should be less likely to engage in problematic drinking because they would not be motivated to drink in order to counteract negative affect.

### 7.3 Conclusion

The main finding of the present study was that a brief intervention consisting of personalised feedback was most successful in increasing

readiness to change drinking behaviour. However, the predicted superiority of personalised feedback to reduce excessive drinking among students was not supported. The component parts of the feedback information were the same for both types of intervention and appeared to satisfy the requirements of an effective intervention recommended by researchers in this field (Linehan, 1999; Miller, 1995). It appeared most likely that a single intervention session was not sufficient to convert significant increases in readiness to change into significant reductions in drinking. Therefore, it would probably be more effective to have follow-up contacts to check on students' progress and maintain their readiness to change. During follow-up sessions, students' progress could be evaluated by reviewing daily drinking diaries completed for the period between these sessions.

According to the results, personal information concerning alcohol-related problems should form the basis of the intervention. Alcohol-related problems were predicted by heavy drinking, maladaptive motivation, and drinking situations related to negative affect, and these three aspects should be explored in a feedback session. Personalised feedback of this type coupled with specific assistance to improve motivational structure and manage interpersonal relationships, therefore, would be expected to increase the effectiveness of an intervention designed to reduce heavy drinking among college students.

## Chapter 8

### General Discussion

The present study began with a survey of the drinking habits of university students. The data collected during the survey served to identify students defined as excessive consumers of alcohol. These heavy drinking students completed a number of assessment questionnaires related to personality, motivation, reasons for drinking, drinking situations, alcohol-related problems, readiness to change excessive drinking, and alcohol consumption. Following the baseline assessment, the students were randomly assigned to either one of two intervention groups or to a no-intervention control group. The two interventions consisted of either personalised or nonpersonalised feedback information related to student drinking patterns, alcohol-related problems, reasons for drinking, and high-risk drinking situations. All students in the study were followed-up 12 weeks later when they completed part of the same set of baseline, questionnaire measures.

The initial screening survey contributed a body of data to the existing knowledge concerning college students' alcohol use patterns in the United Kingdom. There was strong evidence to show that the distinctive style of binge drinking, identified in many previous studies mainly in the United States (e.g., Wechsler, Lee, Kuo, & Lee, 2000), was the typical drinking pattern of students in the present study. However, where direct comparisons with other studies could be made, current students differed from those previously studied in the United States and other parts of the United Kingdom. This implies that specific differences in the environment in which students live, work, and drink, as well as cultural differences and variations in the time of year at which data were collected, possibly play a more important role than might be expected. In other words, consuming five or more drinks in one hour in a large, American city may be a totally different experience from drinking the same amount over four hours in a small town in North Wales. For example, students in North Wales may drink in a more relaxed environment primarily because they are legally entitled to, unlike their American counterparts. In

addition, the student resident in a small town in North Wales may be more likely to walk the relatively short distance home, whereas the American student may be more likely to drive while intoxicated. As Delk and Meilman (1996) emphasised, cultural norms and expectations make a difference in drinking patterns which, of course, makes generalising to students in other localities difficult.

Although male students generally drank more heavily than female students, the results of the survey found little evidence to support the gender-specific definition of binge drinking recommended by Wechsler, Dowdall, Davenport, and Rimm (1995). This finding highlighted the broader, ongoing problem of determining a measure of alcohol use that most reliably reflects the pattern of drinking that warrants intervention with men and women alike (O'Hare, Cohen, & Sherrer, 1997). Undoubtedly, the binge drinking measure is of great importance, but it should not mask consideration of other problematic patterns of drinking or be relied upon as a comprehensive measure. For instance, a student may not have binged in the previous two weeks by definition, but may have consumed four drinks on every day of that fortnight. Such a student, although admittedly an extreme case, would not then be classified as at-risk for adverse consequences and be overlooked for further intervention.

Other researchers, particularly those evaluating interventions to reduce students' drinking, appear to have recognised the danger in relying solely on an index of binge drinking. Marlatt's research group at the University of Washington (see Dimeff, Baer, Kivlahan, & Marlatt, 1999) have used a number of alcohol measures in order to conduct a comprehensive evaluation. These measures have included total volume of alcohol consumed per month, and typical daily quantity, frequency, and peak consumption over the previous month (e.g., Marlatt, Baer, Kivlahan, Dimeff, Larimer, Quigley, Somers, & Williams, 1998). As well as attempting to measure drinking in a comprehensive way, these studies have measured the success of an intervention by reductions in harmful consequences. As Marlatt (1996) argued, concentrating on reductions in drinking rather than reductions in alcohol-related problems (which would

probably entail reductions in drinking as well) may be counterproductive, whereas a harm-reduction approach should aim primarily to reduce problems, as the name implies. Therefore, one task of future evaluations of interventions would be to concentrate on the reduction of problems. In the process, the alcohol measure that is most reliably related to the incidence of alcohol-related problems can be identified, and whether or not the measure should be gender-specific can be determined in a well designed study. Such a study could screen first and foremost on the basis of the level and/or type of problems and measure alcohol consumption during the course of an intervention.

The task of reducing the level of alcohol-related problems that students experience can be guided by determining the background factors that influence their occurrence. In this respect, the results concerning the utility of reasons for drinking and high-risk drinking situations in predicting alcohol-related problems may be of great value. A clear distinction between positive and negative affect was found in the analysis of both reasons for drinking and drinking situations. This finding was consistent with the large body of research into these two constructs, which indicates the durability of the distinction between positive and negative reinforcement. Moreover, in the case of reasons for drinking, the distinction has remained constant across different sets of reasons. Therefore, contrary to the suggestion that a positive/negative model of drinking reasons is incomplete and misleading (MacLean & Lecci, 2000), it appears that these two dimensions are of fundamental importance. The basis for this contention can be seen in Cox and Klinger's (1988) motivational model of alcohol use, in which the direct and indirect effects that drinking will have on a person's affect are defined in terms of either positive or negative affect.

This conclusion appears to be supported when considering the ability of high-risk drinking situations and reasons for drinking to predict alcohol-related problems. The ability of reasons for drinking related to reducing or alleviating negative affect to predict problems was supplanted by those drinking situations that were associated with negative affect. The

latter domain proved a better predictor of problems, because drinking situations better captured the immediate influences on a student's decision to drink than did reasons for drinking. Therefore, the deficiency in the reasons-for-drinking measure stems from its inability to fully describe the processes that preface drinking. Reasons for drinking represent only one part of the context in which drinking occurs. Another part includes the drinking situations, which combine setting, events, motives, and reactions to other people. One implication for future research into drinking motives is that including additional dimensions does not necessarily add more information that is meaningful. This might also explain the difficulty other researchers, such as Cooper (1994) and MacLean and Lecci (2000), have experienced in the search for the optimal number of dimensions of drinking motives.

Clearly, drinking to counteract or alleviate negative affect is strongly associated with a problematic pattern of alcohol use among students, as other studies have shown (Bradley, Carman, & Petree, 1992; Carey & Correia, 1997; Klein, 1992; Ratliff & Burkhart, 1984). As Cooper (1994) said, an apparent maladaptive, pathological pattern of drinking develops among those who drink primarily to cope with negative affect, and the key to understanding this pattern is that the experience of negative affect has strong motivational consequences. In a motivational model, therefore, those who drink to counteract negative affect strongly expect the direct effects of alcohol to remedy their emotional state. Possibly their expectation concerning the direct, immediate effects of alcohol is stronger than those who drink primarily to enhance positive affect. Possibly too, the direct effects of alcohol in reducing negative affect in the past have constituted stronger reinforcement for those who drink to achieve that goal. Moreover, it might be that the direct effects of alcohol outweigh the expected instrumental, indirect effects that other people consider more important.

A person who drinks to counteract negative affect, therefore, derives so much direct, immediate satisfaction from the reduction of negative affect that they become less concerned with other goals they



might expect drinking to achieve for them, such as meeting people, finding a relationship, or 'fitting-in' with others. However, it is clear that drinking for such motives is liable to increase negative affect, because, for example, the other goals in life that drinking was expected to facilitate are instead thwarted. Consider the example of a student who drinks to cope with anxiety concerning social situations, expecting other desired effects to happen as well. This person expects to be able to make friends with others, form relationships and so on by drinking, but when such expectations are not realised then she/he is left with a negative emotional state with which to cope. The person is, therefore, motivated for further drinking that, in turn, is unlikely to bring emotional satisfaction from non-drinking areas of life.

Another important way in which drinking to reduce negative affect will increase a person's motivation to drink originates from the direct, chemical effects of alcohol. For example, a person might drink to relieve feelings of depression and feel better while under the influence of alcohol. However, the next day when the effects have worn off the person is likely to feel even more depressed because of the toxic effects of the metabolites of alcohol. The person is now motivated to drink in order to alleviate the depressed mood. This course of action, while bringing temporary relief from negative affect, is likely to ensure that the depression worsens.

Drinking to counteract negative affect may lead to interference of the positive, nonchemical incentives in life in other ways. As the results of the present study showed, drinking in response to interpersonal conflicts predicted the incidence of problems beyond that attributable to drinking itself. How this result may have arisen can be seen in the example of a person who has a serious argument with a family member. The argument leaves the person feeling angry and ashamed and she/he drinks to reduce those feelings. However, drinking exacerbates the problem because the person now feels aggressive and angry, and may argue with a friend or drink much more alcohol than they usually do in order to quell the negative feelings. Heavily intoxicated, the person is more prone both to experience incidental negative consequences at the

time and physical illness the next day. In addition, the negative consequences themselves may become the source of further arguments with family and friends, thereby interfering with the person's current concern of achieving good relationships with family/friends.

Besides motives for drinking and drinking situations, the present study found that personality factors and motivational variables influenced the occurrence of alcohol-related problems. The personality dimension of novelty seeking and a factor defining maladaptive motivation predicted alcohol-related problems. However, the utility of novelty seeking in identifying problematic drinking had to be qualified by doubts concerning this dimension's validity. Overall results appeared to support Earleywine, Finn, Peterson, and Pihl's (1992) suggestion that novelty seeking is not a distinct dimension. Possibly novelty seeking incorrectly combines two separate constructs--impulsivity and sensation seeking. Just how misleading the combination might be will await the results of further research into Cloninger's (1987) tridimensional theory of personality factors related to alcohol problems. It might be found that impulsivity predicts problems, whereas sensation seeking predicts consumption or different types of problems. In any event, it was concluded that further empirical investigation of the tridimensional personality factors should be conducted in order to identify their degree of usefulness. In particular, and in agreement with previous studies (Cannon, Clark, Leeka, & Keefe, 1993; Earleywine et al., 1992; Nixon & Parsons, 1989, 1990), there is enough evidence to warrant further study to assess the suitability of novelty seeking as a risk factor for emergent problematic drinking and future alcohol dependence.

The present study also found enough evidence to justify further investigation into the influence of motivational structure on problematic drinking patterns. Although the predictive power of maladaptive motivation was only partially supported, this factor illustrated the view that students who were unable to derive emotional satisfaction from nondrinking areas of their lives were liable to drink in a problematic way. Clearly, those people who are not in a position to happily resolve current

concerns in their lives will experience elevated levels of frustration, anger, and depression, which, in turn, would motivate further drinking and provide fertile conditions for the occurrence of problems.

This interpretation of the role of maladaptive motivational structure was strengthened by the personality factors to which it was related. High harm avoidance and an external locus of control distinguished maladaptive motivation, providing a picture of a person who is vulnerable to problematic drinking if not assisted to learn how to resolve concerns in his or her life. The picture, then, is of an apprehensive, pessimistic person who tends to believe that she or he has little personal control over the outcomes of events that happen in her or his life. Not surprisingly, such a person would tend to be apathetic, uncommitted to personal concerns, generally unhappy, and expect drinking to provide some emotional satisfaction. A person of this type, albeit an extreme case, may be helped to restructure her/his motivation in order to derive satisfaction from non-drinking areas of life.

The final phase of the present study provided evidence of a consistent pattern of relationships between alcohol-related problems and the factors related to personality, motivation, drinking motives, and drinking situations. Common relationships were found concerning the level of alcohol-related problems reported both at assessment and at follow-up 12 weeks after the intervention. Namely, novelty seeking, maladaptive motivation, reasons for drinking related to alleviating negative affect, and all three types of drinking situations were positively related to the occurrence of problems prior to the baseline assessment and during the subsequent months. The replication of these significant relationships with alcohol-related problems strengthens the view that each factor should be included in a comprehensive motivational model of problematic alcohol use

In Cox and Klinger's (1988) model, multiple factors impact a person's motivation to drink. The factors contribute to the expectation that a person has concerning the direct and indirect effects that drinking will have on her/his emotional state. Personality characteristics are

historical factors that modulate the other factors influencing alcohol use. Many studies have found that impulsivity and sensation seeking both predate and co-exist with problematic drinking (Cox, Yeates, Gilligan, & Hosier, 2001). Therefore, the relationship found here between novelty seeking and alcohol problems adds weight to the modulating function of this factor, despite the qualifications raised previously in this discussion.

Reasons for drinking and drinking-related situations also showed consistent relationships with alcohol-related problems at the baseline assessment and at follow-up. Both of these factors are best understood as cognitive mediators in Cox and Klinger's model (1988). Cognitive mediators are the thoughts, beliefs, perceptions, and other cognitive processes that people hold concerning the effects they expect to experience from drinking alcohol or not drinking it. As discussed earlier, drinking situations were deemed more important than reasons for drinking because the former better expressed the effects people expected to derive from drinking. In addition, the consistent relationship between problems and both reasons and situations at baseline assessment and follow-up, concerned negative affect rather than positive affect. Thus, it can be argued that the most important cognitive event mediating problematic alcohol use is the following expectation. It is the belief that drinking will, in general, counteract negative affect and, in particular, alleviate the negative affect that originates from interpersonal situations. Consequently, expecting these direct effects from consuming alcohol will promote drinking that is the most likely to result in negative consequences.

The other relationship found in the present study both at the baseline assessment and follow-up involved maladaptive motivation. In Cox and Klinger's (1988) model this relationship can be simply stated by saying that students with a maladaptive motivational structure drank in a problematic manner. They did so because they were not able to derive emotional satisfaction from nondrinking areas of their lives. These students, therefore, sought emotional satisfaction from drinking alcohol, which, in turn, led to the negative consequences.

The importance of these relationships was confirmed by the ability of heavy drinking, maladaptive motivation, and situations related to negative affect to reliably predict negative consequences. Heavy drinking predicted a certain level of problems, as one might expect. However, both maladaptive motivation and situations related to negative affect independently predicted problems over and above the level attributable to heavy drinking. In other words, as long as a certain amount of alcohol was consumed, a student's vulnerability to experience negative consequences was increased by virtue of the influence of other factors. In the present study, the risk of a student experiencing adverse consequences when drinking alcohol was increased for those who drank to counteract negative affect and those with a maladaptive motivational structure.

In the motivational model of alcohol use (Cox & Klinger, 1988), problem drinking can be distinguished by the influence of the drive to alleviate negative affect exerted on the decision to drink. Clearly, the ability of drinking in response to negative affect engendered by interpersonal situations to predict problems supports this view. The predictive power of maladaptive motivation also conforms to this view because the inability to resolve current concerns inevitably leads to the experience of negative affect (or the absence of positive affect). Reducing negative affect by drinking alcohol, therefore, remains the chosen option. The mechanism by which these relationships operate can be further clarified from the perspective of self-regulation theory.

Self-regulation theory states that people are motivated to regulate their behaviour in some way or another (Carver & Scheier, 1981). From this standpoint, the manner in which people cope with unpleasant mood states has received attention. Social learning theorists have explained the processes by which people cope with stress (Bandura, 1977; Lazarus & Folkman, 1984). Such work led to the explanation that individuals differ in respect of whether or not they employ an avoidant or problem-focused style of coping with stress (Kassel, Jackson, & Unrod, 2000). Research has shown differences in coping style to be strongly related to alcohol and other substance use (Cooper, Russell, & George, 1988; McKee, Hinson,

Wall, & Spriel, 1998; Mezzich, Tartar, Kirisci, Hsieh, & Grimm, 1995). Drinking alcohol can serve a self-regulatory function by offering a strategy that some people adopt in order to cope with stress. This strategy is focused on increasing positive affect and/or decreasing negative affect. Such a coping strategy may prove adaptive in the short term, but maladaptive in the long run (Kassell et al., 2000). Indeed, previous studies have shown that, in particular, those who drink to cope with negative affect experience a higher level of alcohol-related problems than others whose drinking serves a different function (Carey & Correia, 1997; Cooper, Frone, Russell, & Mudar, 1995; Williams & Clark, 1998).

The view that drinking to cope with negative affect while effective in the short-term inevitably leads to adverse consequences in the long-term, was illustrated to good effect in recent research (Kassel et al., 2000). This study investigated the influence of Negative Mood Regulation (NMR) expectancies on problematic drinking among college students. NMR expectancies were developed from social-learning theory and can be defined as cross-situational beliefs that a particular action will remedy affective distress. Hence, some people will expect to cope successfully with negative affect while others will have low expectancies regarding their ability to cope. The former individuals will be more likely to adopt adaptive coping strategies than the latter individuals who may choose to drink alcohol to cope with negative affect. Moreover, the person who copes by drinking alcohol will be more likely than others to experience alcohol-related problems (Kassel et al., 2000).

The results of the Kassel et al. (2000) study supported the view that students who have little confidence in their ability to cope with negative affect in an adaptive way, experience more drinking problems than others. Therefore, the finding of the present study that students who are strongly motivated to drink in order to cope with negative affect experience more problems, fits well within a self-regulation context. Both views combine to describe students who have little confidence in being able to deal with negative affect in other less potentially harmful ways than by drinking alcohol, and who also expect drinking to effectively remedy their negative

affect. Furthermore, for these students, expecting alcohol to remedy negative emotional states is the dominant expectation about drinking, and one which, if acted upon, provides strong, immediate reinforcement. It is possible then that these students experience negative affect in a different way than others, or that they experience a more intense level of negative affect.

The above explanation was further clarified by a subsidiary finding of the Kassel et al. (2000) study. Namely, coping motives for drinking independently predicted the occurrence of alcohol-related problems, explaining more variance than did NMR expectancies. In previous studies, motives for drinking related to coping with negative affect have been found to directly affect alcohol-related problems (Cooper, 1994; Cooper, Russell, Skinner, & Windle, 1992). Both these studies also found that drinking motives for enhancing positive affect did not directly affect the level of drinking problems. In a more recent study, Cooper, Frone, Russell, and Mudar (1995) tested a motivational model of alcohol use in which drinking motives played a central role in regulating both positive and negative emotional states. Using two different samples (adults and adolescents), it was found that drinking to cope with negative affect constituted alcohol use that was phenomenologically distinct from drinking to enhance positive affect. Furthermore, each of these two distinct drinking behaviours was characterised by unique antecedents and consequences. Cooper et al. (1995) concluded that their results were consistent with Cox and Klinger's (1988) motivational model, in that drinking motives were the final common pathway to alcohol use and that each type of drinking motive was associated with a unique set of antecedents and consequences. In this respect, coping motives for drinking mediated the antecedent influence of negative emotions and tension-reduction expectancies on problematic alcohol use, with coping motives directly predicting drinking problems. On the other hand, enhancement motives mediated the influence of social/emotional enhancement expectancies and sensation seeking on drinking. However, enhancement motives did not predict drinking problems over and above

the level attributable to alcohol use.

The findings of the present study lend general support to Cooper et al. (1995) model, in that drinking aimed at alleviating negative affect was found to be distinct from drinking in order to enhance positive affect. However, the results of the present study appear to show that drinking situations related to negative affect were more proximal to actual drinking behaviour than the reasons people gave for their drinking. Of course, this may merely indicate that drinking situations serve as a proxy for drinking motives. On the other hand, it might be that drinking situations in general, and those related to negative affect in particular, represent the final path to alcohol use because they embody drinking motives, although the motives are inferred. Given that most people drink for both coping and enhancement motives, cross-situational information may further clarify matters as Cooper et al. (1995) observed. In any event, it appears likely that the information provided by the Inventory of Drinking Situations (IDS; Annis, Graham, & Davis, 1982) can usefully contribute to the modelling of problematic alcohol use.

When considered together, the results of Kassel et al. (2000) study regarding negative mood regulation expectancies, Cooper et al. (1995) findings concerning drinking motives, and the results of the present study pertaining to drinking situations and motivational structure, offer a potentially fruitful direction for research into the motivation of problematic alcohol use. Cooper et al. (1995) recommended that a process of careful integration of expectancy and motive constructs would benefit future research. The addition of the constructs of drinking situations and motivational structure to this process, would help to elucidate the precise mechanisms acting along the final pathway to drinking alcohol.

The operation of these mechanisms may be conceptualised in the following way. There are two distinct, alternative pathways to drinking alcohol. One is characterised by drinking to enhance positive affect and represents normative drinking behaviour (Cooper et al., 1995). The incidence of adverse consequences is wholly mediated by excessive consumption of alcohol. The other pathway is distinguished by drinking



to manage negative emotional states. People who follow this pathway are motivated to drink to counteract negative affect, the main source of which originates from interpersonal situations. They not only hold high expectations concerning alcohol's tension-reducing properties, but also believe that they are unable to manage negative mood in other, adaptive ways, and are not able to derive emotional satisfaction from achieving goals in various areas of their lives. The occurrence of negative consequences for these people is only partially mediated by the amount of alcohol consumed. In other words, these people can be drinking less than others but experience more problems because of their distinctive motivational pattern.

Clearly, one task for future research is to unravel the causal order of constructs implicated in a motivational model of problematic drinking. As Cooper et al. (1995) pointed out, causal effects are better understood as reciprocal relationships rather than unidirectional ones. For instance, the ability to cope with negative mood may develop as a result of coping without recourse to drinking. However, drinking to reduce negative affect might disrupt the development of coping strategies, which in turn would lower the level of confidence a person has of dealing with the negative mood. Thus, the perceived inability to cope with negative affect may develop as a consequence of the high reinforcement a person receives from the tension-reducing properties of alcohol. Furthermore, the reinforcing properties of drinking used to cope may lead to a psychological dependence on alcohol, making problems more likely to occur and drinking more likely to continue despite the resulting consequences. This cycle would perpetuate ineffective coping strategies, lessening the person's ability to resolve problems, which would inevitably accentuate negative mood.

Both Cooper et al. (1995) and Kassel et al. (2000) observed that the occurrence of different drinking patterns has important implications for future intervention strategies. The evaluation of the two opportunistic<sup>1</sup>

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<sup>1</sup> The brief interventions used in the present study can be described as opportunistic because, although students were recruited to an alcohol research study, they were not actively seeking help to reduce their drinking (Heather, 1995).

brief interventions carried out in the present study, gave some indication of the types of effective interventions that might be implemented in the future. The main finding of the evaluation showed that an opportunistic brief intervention comprising the feedback of personalised, alcohol-related information, increased students' readiness to change drinking behaviour to a greater degree than a similar intervention consisting of nonpersonalised information. The subsequent decrease in readiness to change, from postintervention to follow-up 12 weeks later, appeared to indicate that more sessions would be needed to potentiate the initial effect.

Determining the optimal number and duration of sessions to deliver is problematic, as Heather (1995) pointed out. Opportunistic brief interventions found to be effective among students and other populations have varied considerably in the number and duration of sessions delivered (Bien, Miller, & Tonigan, 1993; Dimeff, Baer, Kivlahan, & Marlatt, 1999; Heather, 2001). The largest body of evidence supporting the effectiveness of opportunistic brief interventions among students, describes two 50-minute sessions of assessment and feedback as necessary for an effective intervention (Dimeff et al., 1999). Therefore, the question to be addressed concerns the number of sessions that should be delivered. Of course, a simple answer is that enough sessions should be delivered in order to reduce consumption/problems. On this basis and the evidence from previous successful interventions, an initial assessment should be followed by a personalised feedback session. The programme of intervention could then proceed in a series of sessions comprising ongoing assessment and monitoring of progress until, theoretically, all the participants have achieved the goal of the intervention. At first sight, such a programme may appear to require potentially heavy demands on participants' time and effort. However, the present study showed that a very brief intervention, which did not include any overt efforts to enhance motivation, proved very successful in increasing awareness and the motivation to change. Therefore, the minimal opportunistic brief intervention evaluated in the present study represents, as Heather (2001) explained, a starting point in a stepped-care approach in which further

sessions would constitute a secondary prevention strategy aimed at reducing problematic drinking.

In view of the finding that there are two distinct alcohol-use behaviours as discussed earlier (Cooper et al., 1995), it follows that there should be two different types of opportunistic brief interventions aimed at reducing problematic drinking among students. Clearly, a programme of ongoing assessment and monitoring would be most appropriate for those who drink to enhance positive affect because such students appear to be most likely to benefit from increased awareness of the potential hazards of continued, excessive drinking. Such students, according to Cooper et al. (1995), follow a normative pattern, but they experience negative consequences as a direct result of their excessive drinking. These people, then, would appear to represent the main targets of opportunistic brief interventions. They, as Heather (2001) described, are not actively seeking help for alcohol problems, show low-to-moderate levels of dependence, and are capable of responding favourably to motivational enhancement techniques. There is no reason to believe, therefore, that opportunistic brief interventions that have been successful to date (see Dimeff et al., 1999) should not continue to be successful with normative, albeit excessive, student drinkers.

Opportunistic brief interventions with students who drink in order to manage negative emotional states would be different from those with students who drink to enhance positive affect. The results of the present study, together with those of Cooper et al. (1995) and Kassel et al. (2000), show that, with these students, interventions should be aimed at the motivational source of their problematic patterns of drinking. Therefore, the primary tasks of an intervention of this type would involve the learning of skills to process and resolve negative affect. Identifying sources of interpersonal conflict, learning to deal in an adaptive way with the negative affect that ensues from interpersonal conflict, raising self-efficacy to cope with negative affect in adaptive ways rather than by drinking alcohol, would be specific goals of the intervention.

The pivotal focus for the above tasks would be provided by the

Personal Concerns Inventory (Klinger, Cox, & Blount, 1995). The use of the PCI would provide a framework within which students' most important concerns in relation to their management of negative mood could be resolved. The task of resolving important concerns could be achieved by employing the Systematic Motivational Counseling technique (SMC; Cox, Klinger, & Blount, 1996). Restructuring components of the SMC would be used to enhance motivation, and identify and change maladaptive motivational patterns. Restructuring motivation would be expected to generate the conditions fertile for obtaining emotional satisfaction from nondrinking areas of life, thereby reducing the need for drinking to manage emotional states. Accomplishing the remedial aims of the intervention would entail a series of sessions in which a student's progress would be monitored. The new skills learned in the intervention sessions would be practised in real-life situations, and the outcomes would be evaluated in subsequent sessions.

Clearly, it is difficult to determine the optimal number of motivational restructuring sessions that would be required to achieve the aims of the intervention. The guiding principle should be that sessions continue until effectiveness is established, which may be a time-intensive process. However, the justification for investing more time and effort in this particular type of intervention than other types, is that receiving an intervention that raises awareness of existing and potential drinking problems is likely to prove counter-productive with those who drink to manage negative emotional states. Interventions that raise awareness, such as the ones evaluated in the present study, are likely to increase the negative affect experienced by those who drink to cope with negative mood states, particularly when such people have little confidence in their ability to cope in ways other than by drinking alcohol. Therefore, the intervention itself could actually increase the motivation to drink alcohol to counteract negative affect.

The implementation of both types of intervention in a university campus would appear to be straightforward. Students could be offered a health-check service through university occupational health departments,

student counselling services, or student welfare offices. Initially, the service could take the form of a student drinker check-up similar to the one developed and evaluated by Miller, Sovereign, and Krege (1988), in which assessment and feedback would be offered as the first phase of ongoing intervention. Alternatively, data collection projects similar to the screening survey described in Chapter 2 of this study could initiate the intervention process. Screening and initial assessment would be aimed at identifying students' drinking patterns, so that individuals could be matched to a corresponding intervention. Both types of intervention would be delivered within a stepped-care model in which students are followed on a regular basis, theoretically until the intervention proves effective. The stepped-care approach in which a sequence of interventions of increasing intensity are delivered, has obvious advantages over less flexible intervention programmes. Heather (2001) explained that this approach is cost-effective, because those who do not benefit initially from an intervention are identified and can be immediately assigned to a more intensive intervention. In addition, outcome evaluations could be used to improve the efficiency of the programme, the optimal intensity and frequency of the intervention could be determined, and the individual characteristics influencing the rate of success could be identified.

Whether or not an effective intervention, such as the one outlined above, could be extended for use with young adults in the general population remains to be determined. Generalising the findings of the present study from students to other populations is difficult. On the one hand, students' lifestyles are different from those of nonstudent, young adults. On the other hand, there is no reason to believe that young adults in general do not engage in similar patterns of drinking behaviour as that of students. For example, whether at university or college, employed or unemployed, young adults drink excessive quantities of alcohol predominantly at the weekend (Harnett, Herring, Thom, & Kelly, 1999; Moore, Smith, & Catford, 1994; Webb, Ashton, Kelly, & Kamali, 1996). University students would have more opportunities to drink alcohol than young employed people but not young unemployed ones. On the other

hand, students may have less money to spend on alcohol than young employed people, but more money available for alcohol than young unemployed people. It may be argued that students live and work in an environment that generally is more encouraging of heavy drinking than is other social environments. Peer influences and social drinking norms are possibly greater in the university context than those in other communities, and as Norman, Bennett, and Lewis (1998) viewed it, binge drinking is an integral part of the social environment of young adults in full-time education. However, caution should be exercised in applying the findings of research with students to nonstudents. As Crowley (1991) warned, the degree to which students are representative of young adults in general is not well established. Future attempts to evaluate effective interventions would benefit from comparing matched samples of students and nonstudents.

The suitability of two types of intervention corresponding to positive affect enhancement or negative affect reduction for application to other populations appears to have a sound basis. Both drinking to enhance positive affect and to counteract negative affect are patterns that have been identified among adolescents (Bradizza, Reifman, & Barnes, 1999; Cooper et al., 1995; Windle & Windle, 1996), young adults (Bruce & Pihl, 1997), older adults (Abbey, Smith, & Scott, 1993; Cooper et al., 1992; Cooper et al., 1995), and alcoholics (Cannon, Leeka, Patterson, & Baker, 1990; Marlatt & Gordon, 1985). Therefore, a programme of intervention similar to the one described above, would appear to represent a viable option for implementation with other populations. However, the time demands of an intervention aimed at negative-affect drinkers in the general population may preclude its use in primary healthcare contexts, although screening and recruitment to the programme could be carried out in these settings. It may be that this type of intervention is better suited for use in settings where more time is available, such as in probation services or social services or with special populations, such as prisoners in young offender institutions.

Before closing, there are certain limitations of the present study that

should be acknowledged. Of prime importance is the fundamental issue of the validity of self-report data. There is a large body of evidence that attests to the claim that self-reports of alcohol use and negative consequences are generally reliable and valid (e.g., Babor, Brown, & Del Boca, 1990; Gladsjo, Tucker, Hawkins, & Vuchinich, 1992), although response accuracy will remain subject to a degree of variability. However, as Donovan (1999) emphasised, validity of self-report data is enhanced when certain criteria are satisfied. These criteria include ensuring that participants are not intoxicated at the time of assessment, providing a nonthreatening, nonjudgemental setting, guaranteeing confidentiality/anonymity, and ensuring that instructions and questions are clear and understandable.

The students in the present study completed the screening measure on registration day when it could reasonably be expected that they were not intoxicated, their confidentiality was assured, and the wording of questions was clear and understandable. These conditions were satisfied also in the completion of the baseline assessment questionnaires, which took place during the day in a quiet, private room, where students were made aware that the aim of the research was to gather information regarding students' drinking habits. No attempt was made to query students about whether or not they felt labelled or judged. If they did, their responses might have been affected. However, acceptance of the invitation to participate with full knowledge of the nature of the research suggests that this was not the case.

Another potential limitation concerns the time lapse between the screening and baseline assessment. Students completed the baseline assessment on average five weeks after completing the screening instrument. Nevertheless, this time lapse was not considered a serious problem, because responses on the screening instrument seemed to reflect a stable, pattern of drinking, which was current at the time of the baseline assessment.

Clearly, it is of primary importance to obtain valid and reliable data concerning alcohol consumption and alcohol-related problems. To

circumvent potential problems posed by measuring these variables at different points in time, a retrospective, drinking-diary technique was used at follow-up, and students were re-tested for the incidence of alcohol-related problems. The results showed a strong correlation between alcohol use and alcohol-related problems taken at screening, assessment, and follow-up, so that inferences could be drawn with confidence. Nevertheless, the validity of these data could be further improved by asking participants to keep a drinking diary in which they record the incidence of problems and other measures concurrently with their alcohol use. Alternatively, follow-up periods could be shorter than three months, which would increase the accuracy of data collected by the retrospective, drinking-diary technique.

The final limitation concerns the sample size. It was noted during an a priori power analysis that sample sizes in the present study were sufficient to detect significant within-group effects with high statistical power. However, it was also noted that with the present sample sizes there was medium statistical power to detect significant between-group effects. The post hoc power analysis then showed that statistical power was very low to detect the observed, nonsignificant effects of the interventions. A future study of the present type should ensure an adequate sample size for the detection of a criterion effect for between-group differences. In addition, delivering booster sessions as part of the intervention programme might ensure larger effect sizes, thereby reducing the sample size that would be needed.

In conclusion, the present study provides a comprehensive picture of alcohol-use patterns among university students in North Wales. As a result of evaluating two opportunistic brief interventions aimed at reducing students' heavy drinking, two different drinking patterns serving different functions were identified. Patterns of drinking were best understood within a motivational model of alcohol use (Cox & Klinger, 1988, 1990), because each pattern had a unique set of antecedents and consequences. On this basis, matching opportunistic brief interventions with the particular motivational pattern of drinking was recommended as



the best way to continue this area of research. In other words, different motivational patterns for drinking alcohol imply different interventions aimed at reducing problematic alcohol use. Special attention was paid to the pattern of drinking characterised by the regulation of negative affect, because this pattern is regarded as the most problematic. This drinking pattern appears to require a more intensive intervention aimed at addressing the underlying motivation to drink than does a drinking pattern arising from the motivation to enhance positive affect. As Cox and Klinger (1988, p.178) asserted, viewing the use of alcohol from the perspective of emotional and motivational principles increases our understanding of the decision a person makes to drink alcohol, or not to do so. Understanding these processes promises to contribute to the development of more effective intervention strategies for heavy-drinking college students.

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## Appendix A

Alcohol Use Questionnaire (AUQ) package comprising a bilingual information sheet, bilingual consent form, and the AUQ.

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## Appendix B

Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989).

(Copyright acknowledged. Source: Helene White, Center of Alcohol Studies, Rutgers University, Piscataway, NJ 08855-0969. Source Reference: White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. Journal of Studies on Alcohol, 50, 30-37.

Reproduced from National Institute on Alcohol Abuse and Alcoholism (NIAAA). (1995b). Assessing alcohol problems. Rockville, MD: U. S. Department of Health and Human Services).

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## Appendix C

Reasons For Drinking scale (RFD; Cronin, 1997).

(The list of reasons for drinking was reproduced from Cronin, C. (1997). Reasons for drinking versus outcome expectancies in the prediction of college student drinking. Substance Use and Misuse, 32, 1287-1311).

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## Appendix D

Inventory of Drinking Situations (IDS; Annis, Graham, & Davis, 1987).

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## Appendix E

### Consent Form for Participation in Baseline Assessment.

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## Appendix F

Personal Concerns Inventory (PCI; Klinger, Cox, & Blount, 1995).

(Reproduced by kind permission of the authors. Source Reference: Klinger, E., Cox, W. M., & Blount, J. P. (1995). Motivational Structure Questionnaire (MSQ). In J. P. Allen & M. Columbus (Eds.), Assessing alcohol problems: A guide for clinicians and researchers (pp. 399-411). Bethesda, MD: NIAAA).

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## Appendix G

Tridimensional Personality Questionnaire (TPQ; Cloninger, Przybeck, Svrakic, & Wetzel, 1994).

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## Appendix H

Internal-External (I-E) Locus of Control scale (LOC; Rotter, 1966).

(Source Reference: Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychology Monographs: General and Applied, 80, 1-28).

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## Appendix I

### Information Form Inviting Students to Participate in Baseline, Intervention, and Follow-up Sessions.

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## Appendix J

Readiness to Change Questionnaire (RTCQ; Heather, Gold, & Rollnick, 1991).

(Copyright acknowledged. Source: Centre for Alcohol and Drug Studies, Plummer Court, Carlisle Place, Newcastle-upon-Tyne. NE1 6UR United Kingdom. Source Reference: Heather, N., Gold, R., & Rollnick, S. (1991). Readiness to change questionnaire: User's manual. Technical Report 15. Kensington, Australia: National Drug and Alcohol Research Centre, University of New South Wales. Reproduced from National Institute on Alcohol Abuse and Alcoholism (NIAAA). (1995b). Assessing alcohol problems. Rockville, MD: U. S. Department of Health and Human Services).

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## Appendix K

### Nonpersonalised Feedback Sheets

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## Appendix L

### Personalised Feedback Sheets

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## Appendix M

### Retrospective Drinking Diary (RDD)

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## Appendix N

### Calendar

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