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## **DOCTOR OF PHILOSOPHY**

### **Developing and evaluating brief, computerised interventions for excessive drinkers**

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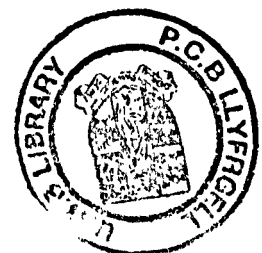
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**Developing and Evaluating Brief, Computerised Interventions for Excessive  
Drinkers**

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## Summary

The purpose of the thesis was (a) to evaluate brief interventions for excessive alcohol consumption, and (b) to develop and evaluate a new and improved questionnaire for measuring excessive drinkers' alcohol consumption. The first two studies evaluated two computerised opportunistic brief interventions, which were aimed at reducing the alcohol consumption of excessive drinkers. The third study developed and evaluated a new alcohol consumption questionnaire called the Typical and Atypical Drinking Diary (TADD). In Study One, heavy drinking university students ( $n = 88$ ) were randomly assigned to one of three groups: Computerised Brief Intervention (CBI), Computerised Brief Intervention-Enhanced (CBI-E), or a non-intervention control group. The CBI was based on the principles of motivational interviewing and was designed to motivate participants to reduce their alcohol consumption by measuring their consumption and providing them with normative feedback about their level of consumption and the consequences of it. The CBI-E included the same drinking-related components as the CBI. Additionally, however, it aimed to motivate participants to reduce their drinking indirectly, by addressing their general motivational patterns that might interfere with the emotional satisfaction that they derived from goal strivings to resolve their personal concerns. It did so by administering a computerised version of the Personal Concerns Inventory and providing participants with feedback about the results of the assessment. Participants ( $n = 75$ ) were re-assessed 12 weeks after the intervention. Males in the two intervention groups significantly reduced their average weekly alcohol consumption, unlike those in the control group. Female students significantly reduced their average weekly alcohol consumption irrespective of their group allocation. Only those participants (both males and females) who received a brief intervention significantly reduced their binge drinking. In Study Two, heavy drinking

hospital patients (n = 45) were randomly assigned to three groups (as described above) and were re-assessed (n = 26) after 13 weeks. None of the three groups significantly changed their average weekly alcohol consumption; however, the two intervention groups had a nonsignificant 52% *decrease* in consumption, and the control group had a nonsignificant 6% *increase*. In Study Three, the TADD was administered to 158 university students. The measures of alcohol consumption derived from it were compared with measures from the Khavari Alcohol Test (KAT; a self-reported quantity-frequency index of drinking) and the Timeline Followback interview (TLFB; a precise but time-consuming and labour-intensive measure of consumption). Significantly more closely than the KAT drinking indices, the TADD indices approximated those derived from the TLFB. These results suggest that the simpler TADD is a good alternative to the TLFB interview. The implications of the results of the three studies for future research are discussed.



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## CHAPTER 1

### Introduction: An Overview of Alcohol-Related Problems and Brief Interventions for Them

For many people, drinking alcohol is an enjoyable experience. In moderation, alcohol can aid a person's relaxation, enhance a person's mood, and even improve a person's health. Most drinkers in the United Kingdom are moderate drinkers: 69% of the females and 63% of the males (Office for National Statistics; ONS, 2001). For moderate drinkers the risks of harm are minimised and the likelihood of benefits are maximised. However, there are increasing numbers of people in the United Kingdom who drink at levels at which the risks of harm are increased and the likelihood of benefits are decreased.

This chapter reviews drinking behaviour, its consequences, and interventions for problem drinkers; it has five main parts.

The first part demonstrates the prevalence of those who drink excessively and the health implications for those who do. It highlights the number of deaths in the United Kingdom due to excessive drinking. Likewise, it considers the health benefits of those who drink and the limitations of such benefits. It also describes the costs to the National Health Service, employers, and society.

The second part defines the standard British unit of alcohol. It considers the safe limits, or sensible limits, of drinking. It describes the levels of alcohol consumption that can be considered hazardous or harmful, and how certain patterns of drinking can be classified as alcohol abuse or alcohol dependence. The risk of harm from occasional heavy drinking is also described, as are how and why *blood alcohol concentration* may be a more accurate way to classify patterns of drinking that may be harmful.

The third part discusses prevention strategies. It describes techniques for primary and secondary prevention, and reviews the empirical support for each approach.

The fourth part of the chapter is divided into four sub-sections in which the most efficacious treatment strategies are reviewed. These sections review the treatment modality with the strongest support, describe the components of this treatment modality, and illustrate various methods for recruiting excessive drinkers into treatment and the effectiveness of each method.

The fifth and final part of the chapter draws conclusions from the evidence provided in the earlier sections.

### **Prevalence, Health Implications, and Costs of Drinking**

Alcohol misuse in the United Kingdom is increasing. Statistics from the Office for National Statistics (ONS, 2001) indicate that 29% of adult males and 17% of adult females are drinking at hazardous or harmful levels. The consumption of alcohol has steadily increased over the last 14 years. Women have shown the greater increase—their consumption level has risen by 70% since 1988 (ONS, 2001). The majority of excessive drinkers (both male and female) are in the 16-24 year-old age group, with 41% of males and 33% of females drinking at hazardous or harmful limits (ONS, 2001).

Excessive amounts of alcohol are toxic to almost every tissue in the body, and prolonged excessive drinking increases the risk of a variety of diseases (Agarwal, 2002). The risk of problems such as liver disease, heart disease, cancers, gastric ulcers, and brain damage increases in a dose-response relationship (the greater the alcohol consumption, the greater the risk of disease) (Agarwal & Seitz, 2001). Cancers—particularly those of the upper digestive tract (larynx, pharynx, oesophagus, and oral cavity), the rectum, the colon, the liver, and breasts—account for the majority of the disease-induced deaths attributable

to excessive drinking (Corrao, Bagnardi, Zambon, & Arico, 1999). Many authorities estimate that 3% of cancers are caused by excessive drinking (e.g., Anderson, Cremona, Paton, Turner, & Wallace, 1993; Medical Research Council, 1998).

Excessive drinking also increases the risk of accidental death or injury. Of the deaths in England and Wales in 1996, 47% of those resulting from assault, over 25% of those resulting from motor vehicle accidents, and 29% of the suicides were attributable to alcohol (Britton & McPherson, 2001). Clearly, drinking is an important factor in such incidences of harm; moreover, *binge drinking* (periodic heavy drinking) can greatly contribute to such events. Specific patterns of drinking, including binge drinking, are discussed below.

The incidence of alcohol-related deaths among men and women mirror the recent increase in alcohol consumption. The number of deaths in the United Kingdom directly attributable to alcohol has risen by 40%, from 3,853 in 1994 to 5,508 in 1999. The Department of Health (2001) estimated that the total number of alcohol-related deaths in the United Kingdom was over 33,000 per year.

The beneficial effects of moderate drinking may serve to balance the overall mortality rates associated with drinking. It is the cardio-protective properties of alcohol that reduce the annual mortality rate in England and Wales—Britton and McPherson (2001) estimated that, in comparison to a non-drinking population, the protective effects of alcohol reduced the annual death rate in England and Wales by 2%. The relationship between alcohol use and mortality is represented by a U-shaped curve (Anderson et al., 1993; Britton & McPherson, 2001; White, Altmann, & Nanchahal, 2002): non-drinkers and heavy drinkers have higher mortality rates than do light-to-moderate drinkers. However, this U-shaped relationship must be qualified: the beneficial effects of drinking are evident only in men over 55 and women over 65 years old (Britton & McPherson,

2001). White and colleagues (2002) estimated that moderate drinking in the younger age groups (16-24 years old) significantly increases the risk of harm.

The cost of excessive drinking to society is large. The Royal College of Physicians (2001) estimated the cost to the National Health Service to be £3 billion a year. A recent study found that 28% of emergency department visits in the United Kingdom were alcohol-related (Hadida, Kapur, Mackway-Jones, Guthrie, & Creed, 2001). The cost to employers is also high; it is estimated that sickness, absenteeism from work, and accidents cost £3 billion a year (Alcohol Concern, 2002). Excessive drinking has also been implicated in many instances of criminal behaviour. Deehan, Mashall, and Saville (2002) reported that 59% of those arrested in an inner city were intoxicated, with as many as 75% of the arrestees reporting to have consumed alcohol before their arrest. In one year alone, Alcohol Concern (1999) estimated that excessive drinking cost England £10.8 billion.<sup>1</sup>

### **Drinking Limits and Associated Risks**

As defined in the United Kingdom, one unit of alcohol contains 8 grams of ethanol (absolute alcohol). The standard unit of alcohol was developed by Dight (1976) for use in a Scottish survey; since that time the Dight unit has been adopted as the standard unit of measurement for alcohol in the United Kingdom. One unit is equivalent to one-half pint of ordinary strength beer, a four-ounce glass of table wine, or a single *pub* measure of spirits. However, within the three major categories (i.e., beer, wine, and spirits), alcoholic beverages vary in the percentage of alcohol that they contain. A survey for the World Health Organisation (WHO, 1977) reported that the percentage of alcohol in beer ranges from 2% to 5%, in wines from 10.5% to 18.9%, in spirits from 24.3% to 90%, and in

---

<sup>1</sup> However, this must be balanced against the benefits to society in the duty, employment, etc.—the government revenue alone was in excess of £10 billion in 1996 (Raistrick, Hodgson, & Ritson, 1999).



ciders from 1.1 to 17%<sup>2</sup>. The volume contained in various standard measures can also vary, particularly from country to country. Accordingly, the ability to convert alcoholic beverages into standard units is important: units provide a precise and interpretable unit for measuring consumption.

A millilitre of ethanol contains 0.79 grams of ethanol. The number of millilitres of ethanol in a beverage is calculated by multiplying the quantity of the beverage (in millilitres) by the percentage of alcohol that that beverage contains. In turn, the number of millilitres of ethanol in the beverage is multiplied by the number of grams of ethanol per millilitre (i.e., 0.79g). To convert to British units, this product is divided by the number of grams in a British unit (8g). In the example below, the number of grams of ethanol in one pint (550ml) of ordinary strength (i.e., 3.7%) beer is converted into number of units (See Equation 1).

$$(1) \quad (550\text{ml} \times 3.7\%) \times 0.79\text{g} = 16\text{g of ethanol, or 2 standard British units (at 8g)}$$

The British Government has recommended *sensible limits* of alcohol intake to minimise the harmful effects of drinking (Department of Health, 1995). Sensible limits for men are defined as no more than 21 units per week, or a daily amount not exceeding 3 to 4 units, and, for women, no more than 14 units per week, or a daily amount not exceeding 2 to 3 units.

The Medical Council on Alcoholism (1998) also provided guidelines on the health risks associated with alcohol consumption. The Council argued that all alcohol consumption—even consumption at the sensible levels as defined by the British

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<sup>2</sup> The 1977 WHO survey underestimates the variety of strength of beers today. Tennant's Extra lager, for example, is 9% alcohol by volume.

government—can carry a low risk. It defined a *hazardous* level of alcohol consumption as greater than the sensible level but fewer than 50 units a week for males; fewer than 35 units a week for females. It defined a *harmful* level as any amount that exceeded the hazardous level. It is worth noting that the Medical Council on Alcoholism did not specify the risks associated with the two kinds of excessive drinking.

The risk guidelines provided by the Medical Council on Alcoholism (1998), although gender specific, do not take into account age-related risk levels. For instance, drinkers in the younger age range (between 16 and 24 years of age) who drink at the sensible level have a 15% and 32% increased risk of mortality, for females and for males, respectively (White, Altmann, & Nanchahal, 2002). In this age range, drinking at sensible limits amounts to more than just “low-risk” drinking as defined by the Medical Council on Alcoholism. Furthermore, according to White et al., there are no risks associated with drinking at a sensible level for males or females 65 years old and older. In fact, Britton and McPherson (2001) suggested that there are some beneficial health effects in this age group (i.e., reductions in mortality).

Sustained drinking, particularly at levels considered harmful, may increase a person’s risk of becoming alcohol dependent. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994) criteria for alcohol dependence include a cluster of cognitive, behavioural, and physiological symptoms. To meet the DSM-IV criteria for alcohol dependence, a person must display three or more of the following symptoms within a 12-month period: (a) an increased tolerance to alcohol, resulting in increased doses of alcohol to achieve the same effects as previous lower doses; (b) marked withdrawal symptoms; (c) alcohol is taken in larger amounts or over longer periods than was intended; (d) there is a persistent desire (or unsuccessful attempts) to cut down or control the alcohol use; (e) a great deal of time is spent in the pursuit, use, or

recovery from the alcohol use; (f) the neglect of alternative pleasures; (g) continued use despite clear evidence of the harmful consequences.

Measures of harm that consider only the weekly limits of drinking do not present the whole picture of the potential harm of excessive drinking. For example, it is possible to drink within the low-risk weekly consumption guidelines but still be at risk for harm. Wechsler, Davenport, Dowdall, Moeykens, and Castillo (1994), from a survey of 17,592 American college students, concluded that frequent binge drinkers—males who drink five or more American standard drinks (equivalent to 7.5 British units) and females who drink more than four American standard drinks (6 British units) three or more times in a two-week period—are 7 to 10 times more likely than non-binge drinkers to engage in unplanned and unprotected sexual activity, get behind in school work, damage property, get into trouble with campus police, and suffer injuries.

As the Wechsler et al. (1994) study demonstrated, people who binge drink may be drinking in a pattern that meets the DSM-IV criteria for alcohol abuse (APA, 1994). To meet the DSM-IV criteria for alcohol abuse, a person needs to meet two conditions: (a) he or she must be clinically impaired or distressed, and (b) his or her behaviour must not meet the criteria for alcohol dependence (APA, 1994). Apropos the first criterion, the pattern of use must lead to clinically significant impairment or distress manifested by at least one of four criteria within a twelve-month period. The criteria are (a) recurrent alcohol use resulting in a failure to fulfil major role obligations at work, school, or home; (b) recurrent alcohol use in situations that are physically hazardous; (c) recurrent alcohol-related legal problems; and (d) continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol.

In Australia, Mcleod, Stockwell, Stevens, and Phillips (1999) investigated the relationship between alcohol consumption and the risk of injury. They interviewed a

sample of 797 injured patients from an emergency ward and 797 matched controls.

Participants were asked about their alcohol consumption in the six hours prior to their injury. Odds-ratio scales were calculated for the risk of injury at different levels of alcohol consumption. Not until consumption reached 60 g of alcohol (7.5 units) did the odds ratio reach significance—at this point the risk of injury increased threefold; at 90 g (11.25 units) the risk of injury increased fivefold. Mcleod et al. also found gender differences. Males who drank more than 60 g of alcohol (7.5 units) prior to their accident increased the risk of an injury by 2.1 times, whereas females increased the risk by 9.6 times—indicating the risk of injury is substantially higher for females than for males.

The increased risk of injury to women who drink more than 60g (7.5 units), in comparison to men, might be explained in terms of *blood alcohol concentration (BAC)*. The BAC refers to the proportion of alcohol in the blood during a drinking session, and is an indicator of level of intoxication. There are four main factors influencing the BAC<sup>3</sup>: (a) the amount of alcohol the person consumes (the more alcohol, the greater the BAC); (b) the amount of blood in the person's body (calculated according to the person's weight, so that a lighter person achieves a larger BAC than a heavier person from the same amount of alcohol); (c) the amount of time the person takes to consume the alcohol (the faster the consumption, the greater the BAC); and (d) the gender of the person (in comparison to men, women achieve higher BACs, even when the other variables are equal). Women are susceptible to higher BACs than men for two reasons: first, women on average weigh less than men; and, second, biochemical differences between women and men make women more susceptible.

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<sup>3</sup> There may be other factors influencing BAC, such as food consumption, although the degree to which this affects BAC is currently unclear.

Explanations for the gender difference in BAC levels when body weight and amount and rate of consumption are held constant have focused on how the body distributes and metabolises alcohol (Graham, Wilsnack, Dawson, & Vogeltanz, 1998). The distribution of alcohol in the body depends on the amount of fluid in the body. On average, men have more body fluid in which the alcohol can be distributed than women (Watson, Watson, & Batt, 1980). However, gender differences in the amount body water do not fully account for the gender differences in BACs. The rate of at which men and women metabolise alcohol may also influence BAC levels, although this difference may have only a limited effect. The majority of alcohol is absorbed into the blood stream where it is metabolised by the liver. However, alcohol is also partially metabolised in a *first pass* in the stomach and intestines by gastric alcohol dehydrogenase (ADH)—it is here that men appear to metabolise alcohol more quickly than women. This gender difference in gastric ADH, however, appears to occur only in young, non-alcoholic drinkers (Graham et al., 1998).

The female drinkers in the Mcleod et al. (1999) study who drank more than 60 g (7.5 units) of alcohol would have been at risk of substantially higher BACs than their male counterparts, possibly accounting for the substantially higher risk of injury for females than males. Thus, BAC levels may be a more sensitive measure of risk of injury than quantity of alcohol consumed<sup>4</sup>. An odds ratio for the risk of injury plotted as a function of BAC levels, rather than amount of alcohol consumed, would likely have narrowed the gender difference.

Mcleod et al. (1999) suggested that differences in the consumption patterns of males and females might explain the gender difference in risk of injury. The females, in

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<sup>4</sup> Even though BAC levels via a breath test were measured for all cases presenting at the emergency department, the authors did not report them.

the six hours before injury, had consumed only slightly less alcohol than the males. On the other hand, the pattern of consumption differed considerably between males and females: for instance, females had fewer weekly binges than males even when binge episodes had been adjusted for gender differences. Fewer than 10% of the females drank more than 50 g (6.25 units) of alcohol on one occasion per week, whereas 25% of the men drank more than 70 g (8.75 units) on one occasion per week. Mcleod et al. suggested that the greater number of binge-drinking episodes by males might increase their tolerance to alcohol in comparison to females. This difference would increase the likelihood of impairment during a binge episode for females, and so would increase their risk of injury.

### **Prevention Strategies**

Preventive strategies for alcohol abuse take two main forms: *primary prevention* and *secondary prevention*. Primary prevention provides information about alcohol abuse to the public; secondary prevention targets specific at-risk populations. Therefore, secondary prevention is targeted at individuals who experience, or are at-risk of doing so, problems from their alcohol use, and it attempts to reduce the problems or to stop them from escalating.

Kreitman (1986) argued that the prevention of alcohol abuse should target the consumption level of the entire population (i.e., primary prevention). He demonstrated that the majority of alcohol-related problems are found in moderate drinkers rather than in heavy drinkers (when type of drinker is defined in terms of average level of consumption). This is because moderate drinkers far outnumber heavy drinkers in the general population. Based on this rationale, reductions in the consumption of moderate drinkers (the majority of the population) would have a greater effect on reducing the number of alcohol problems

than targeting just heavy drinkers. This approach invokes what Kreitman called the *preventive paradox*.

The validity of the preventive paradox has been challenged. In a replication of Kreitman's (1986) study, Stockwell, Hawkes, Lang, and Rydon (1996) demonstrated that the preventive paradox "disappeared" when binge drinking was taken into account. Stockwell et al. showed that the majority of reported alcohol problems occurred among moderate drinkers rather than heavy drinkers; however, when drinkers were re-classified according to their alcohol consumption on the heaviest drinking day, binge drinkers experienced the majority of the problems.

Skog (1999) argued that a second-order preventive paradox might be viable. He suggested that there is a second-order paradox because of the number of moderate drinkers (defined in terms of average consumption) who binge drink. At an individual level, a heavy drinker binges more frequently than a moderate drinker, so that the risk of experiencing problems is increased among heavy drinkers. However, at the population level, moderate drinkers have a greater total number of binges than heavy drinkers (because there are more moderate than heavy drinkers in the population); accordingly, moderate drinkers have more alcohol-related problems than heavy drinkers.

Skog (1999) went further. He described how the preventive paradox might occur in line with the *risk function* of varying alcohol-related problems. Skog differentiated alcohol-related problems according to the risk function. For instance, certain problems, such as those from acute drunkenness (e.g., accidents or injuries), have a *linear risk function*: the risk of experiencing an accident or injury increases as consumption increases in a linear fashion. When the risk function is linear, moderate drinkers account for the majority of problems, and the preventive paradox applies. Other problems, such as those related to prolonged heavy drinking (e.g., liver cirrhosis), have a *curvilinear risk function*:

the risk of experiencing liver cirrhosis occurs only as consumption reaches a high threshold, and at this point the risk is significantly increased. When the risk function is curvilinear, heavy drinkers account for the majority of problems, and so the preventive paradox does not apply. However, Skog acknowledged that, when the risk function applies to binge-drinking rather than average consumption, the risk function is probably curved, so that the preventive paradox would not apply—this was demonstrated by Stockwell et al. (1996). This reasoning suggests that preventive efforts should target those who binge drink.

Skog (1999) argued that the preventive paradox applies in both trivial and non-trivial ways. In a trivial way, it applies because the proportion of moderate drinkers who binge drink far outnumbers the proportion of heavy drinkers who binge drink. In a non-trivial way, certain incidences of social and economic problems affect moderate drinkers independently of the frequency at which they binge drink. Skog concluded that, because of the non-trivial way in which the preventive paradox can apply, it is too early to conclude that preventive efforts should be aimed specifically at binge drinking

Gmel, Klingemann, Müller, and Brenner (2001) examined Kreitman's (1986) theory of the preventive paradox and Stockwell et al.'s (1996) and Skog's (1999) revisions of it. Gmel et al. classified drinkers dichotomously in two ways: (a) in terms of average daily consumption (moderate drinkers versus hazardous drinkers), and (b) in terms of the number of episodes of binge drinking during the previous month (non-binge drinkers versus binge drinkers). Alcohol-related problems were measured in terms of six social problems: those with work, with the police, with friends, with a partner, with one's family, and from accidents involving other people. Gmel et al.'s (2001) findings mirrored those of Kreitman (1986) on the preventive paradox: moderate drinkers contributed to more social problems than did heavy drinkers—suggesting a preventive paradox. However, the study



also replicated the findings of Stockwell et al. (1996): binge drinkers accounted for more social problems than did non-binge drinkers—suggesting that the preventive paradox did not apply. On the other hand, the study also confirmed the view of Skog (1999): moderate drinkers, rather than heavy drinkers, contributed to the majority of binge episodes—suggesting that the preventive paradox had “reappeared”—it was a *second-order paradox*.

Gmel et al. (2001), as did Stockwell et al. (1996) and Skog (1999), questioned the validity of the preventive paradox. They stated that the pattern of results was not paradoxical, because those who binge-drink were high-risk drinkers, and it is high-risk drinkers who cause the most harm. Gmel et al. also questioned the validity of the second-order preventive paradox. Although the data point to a second-order paradox, as Skog suggested, the paradox appeared to be a trivial paradox, because binge drinking is a common pattern of drinking even among those drinkers whose average consumption is moderate.

Gmel et al. (2001) demonstrated that binge-drinking is a better predictor of social problems than is average consumption. In light of these findings, the authors concluded that the prevention paradox should be disregarded. However, prevention strategies aimed at high-risk drinking should still target the majority of drinkers, because binge drinking is common in the general population.

Secondary prevention targets drinkers who are at risk of harm; this includes drinkers who have high average weekly consumption, those who occasionally binge drink, and those who meet both criteria. In this way, secondary prevention approaches target a substantial proportion of the population. However, targeting only at-risk drinkers would be a more viable strategy in terms of expenditure of resources. Furthermore, primary prevention efforts aimed at reducing the alcohol consumption among those who have only a low-risk of harm may be unacceptable to many people.

## Intervention Strategies

William Miller and colleagues have reviewed the literature on clinical trials evaluating different treatments for alcohol-use disorders (Miller, Andrews, Wilbourne, & Bennett, 1998; Miller, Brown, Simpson, Handmaker, Bien, Luckie, Montgomery, Hester, & Tonigan, 1995; Miller & Wilbourne, 2002), each time ranking the treatments in terms of their effectiveness.

In the latest review, Miller and Wilbourne (2002) considered 361 clinical trials published through 1998. Each of the studies was given a methodological quality score (MQS) and an outcome logistic (i.e., treatment effectiveness) score (OLS). The MQS was the sum of the ratings on 12 dimensions of methodological quality. The OLS was based on both treatment efficacy and the study design, according to these ratings: +2 was assigned to a study with a strong inference of treatment effect; +1 was assigned for a significant effect but where the design yielded less confidence; -1 was assigned to a study that failed to support the treatment; and, -2 was assigned for negative effects but with a design logic that would support the likelihood of an effect. Treatments were grouped according to their modality, and a cumulative evidence score (CES) was derived for each: the CES was the sum of the product of the MQS and the OLS for each study within each treatment modality.

Miller and Wilbourne (2002) used the CES to rank order the treatment modalities that had been evaluated in at least three studies. Forty-six modalities met this criterion, and were given two ranks. One rank included all the studies, regardless of the severity of the sample; the other rank included studies only of clinical samples (those seeking treatment). Brief interventions were found to be the most efficacious treatment modality for both kinds of ranks. Miller and Wilbourne defined a brief intervention as one that included advice giving, did not specify any other treatment modality, and was

administered in one or two sessions (detailed characteristics of brief interventions are given below).

Motivational enhancement was ranked second among all the studies (regardless of population severity), and eleventh among the studies of clinical samples. This difference in ranks suggests that non-treatment seeking samples fare better with this approach than do clinical samples. Studies designated as *motivational enhancement* had included motivational interviewing (MI), or any other method of counselling designed specifically to enhance the client's motivation to change. Studies using this approach were placed into this category, even if the approach was also described as a brief intervention. There are several plausible reasons why motivational enhancement had a lower ranking amongst the clinical samples only. First, motivational enhancement is a relatively new technique and so research trials to test its effectiveness is often by compared against the most effective traditional treatment (e.g., as in Project MATCH) rather than against a no treatment control groups or to treatment as usual. Second, it was unclear, given the broad definition of motivational enhancement used in these studies, whether treatments adhered to a common treatment strategy, adhered to specific manuals, or that the assurance of supervision was provided. Finally—and a general limitation of the review—given the researchers method to calculate the CES, it was possible for studies ranked higher in the list to exert a lower effect on drinking than those studies ranked lower simply because the lower treatment modality had fewer studies.

A smaller scale review of alcohol treatments, conducted for the Task Force of Division 12 (Clinical Psychology) of the American Psychological Association (McCrary, 2000) corroborated the findings of Miller and Wilbourne (2002). One of the goals of the Task Force was to identify psychological interventions that had been supported by empirical research. They reviewed 62 studies that had evaluated 13 different alcohol

treatment modalities, which were viewed as having received strong empirical support. Only two modalities, brief intervention and relapse prevention, met the Task Force's criteria for an efficacious treatment. Motivational enhancement met the criteria for "probably efficacious."

The following section reviews brief interventions. It describes the core components of brief interventions and two sub-categories of them.

### **Brief Interventions**

The potential benefits of brief, less expensive interventions for alcohol abusers are appealing when compared to "traditional" treatments. However, several researchers (e.g., Heather, 1995, 2001; Mattick & Jarvis, 1994; Poikolainen, 1999) have argued that there is a need for caution when considering replacing traditional treatments with brief ones. For example, it is acknowledged that brief treatments may not be appropriate for everybody. Extensive research on the efficacy of such interventions has produced promising results. However, there are many types of interventions that are reported under the umbrella of "brief interventions." Heather (1994, 2001) has emphasized the importance of distinguishing between two different forms of brief interventions: opportunistic brief interventions (OBIs) and brief treatments (BTs).

OBIs are interventions that take place within the community, and are usually implemented by non-specialist personnel. As such, clients are often recruited for the OBI by a screening procedure; this is followed by a brief advice session, which can last just a few minutes. The target population, therefore, consists of those persons who are not actively seeking help for alcohol problems. Some of these individuals may have alcohol-related problems of which they are unaware.

BTs, on the other hand, are relatively short forms of treatment—shorter than standard treatment approaches. However, BTs usually, though not always, take longer than OBIs (see, e.g., Chick, Lloyd, & Crombie, 1985; Edwards et al., 1977). The first distinction between OBIs and BTs is that BTs are actively sought by individuals who are experiencing alcohol-related problems. Thus, specialist therapists or counsellors working in addictions deliver BTs, and these normally take place in a specialist setting. The second distinction between the two interventions concerns outcome measures: the outcomes of BTs are usually compared with those of intensive treatments, whereas the outcomes of OBIs are usually compared with no intervention (i.e., control groups).

Although this distinction is necessary when reviewing the efficacy of research trials, there is no absolute distinction between the different interventions. The variety in intensity and duration of OBIs and BTs can greatly overlap. In some instances, individuals presenting for an OBI may be aware that they have an alcohol problem but might be unaware of how to access specialist help. It follows, then, that an individual must be aware, to some degree, that there is a problem with his or her drinking behaviour to have accepted a referral to talk about it. Because the distinction between these two methods of intervention is not always clear, some reviewers of brief interventions have not always separated them (c.f. Bien, Miller, & Tonigan, 1993; Dunn, Deroo, & Rivara, 2001). Thus, the different types of brief interventions should be viewed on a continuum.

Heather (1996) suggested that brief interventions should not be viewed as a treatment per se but as a collection of interventions sharing a common application technique. As such, brief interventions often share core components. Miller and Sanchez (1993) identified six core components necessary for effective brief interventions. These elements can be summarised by the acronym FRAMES: feedback, responsibility, advice, a menu of strategies, empathy, and self-efficacy.

The first of these components refers to the feedback about personal risk associated with the person's drinking. Assessment procedures allow the therapist to compare the level of the client's drinking with that of a standard norm. The feedback should be presented in a non-judgemental manner. The emphasis is on the client's taking personal responsibility for change. This strategy is consistent with the principle that personal control is a necessary component of motivation to change.

Explicit advice to the client to change his or her drinking should be the basis of any brief intervention (Edwards et al., 1977). In fact, advice was a component of all 32 studies contained in a meta-analysis of brief interventions conducted by Bien et al. (1993). A menu of strategies for reducing drinking should be presented to the client to encourage the acceptance of an appropriate goal. An empathic counselling style can greatly increase the client's cooperation (Miller & Rollnick, 1991, 2002). Finally, enhancing the client's self-efficacy will empower the individual with the ability to change.

The following two sub-sections review the research evidence on BTs and OBIs. For purposes of clarity, the following distinction is made: brief interventions that are compared to standard treatment (ST) are referred to as BT, and those that are compared to no treatment control groups are referred to as OBI.

### ***Brief Treatments versus Standard Treatment***

A seminal study by Edwards et al. (1977) provided the impetus for brief intervention research. Although this was perhaps the first brief intervention study, it included most of the strategies expected of a brief intervention today. Thus, this study is reviewed in detail here.

Over a 12-month period, Edwards et al. (1977) studied 100 married men diagnosed as alcohol dependent. Participants were assigned to a *standard treatment* group (ST) or an

*advice only* group (BT). Participants in the two groups were matched on occupational status and severity of the drinking. Each participant was given an initial, individual counselling session, which in addition to the participant included a psychologist, a psychiatrist, and the participant's wife. The session lasted three hours, during which time the couple was asked a number of structured questions. Each participant was advised that his goal should be total abstinence and that he should attempt to return to work. If the couple had marital difficulties, help to resolve them was available.

Each participant in the BT group was instructed, sympathetically and constructively, that it was his responsibility alone to attain the goal of abstinence. No further clinic appointments were permitted. Any medical assistance that was needed (e.g., to alleviate withdrawal symptoms) was to be provided by the participant's general practitioner. A research assistant maintained minimal monthly contact with the participant's wife to evaluate the patient's progress.

The ST group received the standard alcoholism treatment of the time. This involved an offer of introduction to Alcoholics Anonymous (AA), drink-deterrent medication (calcium cyanamide), and medication to alleviate withdrawal symptoms. Participants received a further assessment by the psychiatrist to devise a treatment plan; meanwhile, the participants' wives had regular support from a social worker. Participants were instructed in strategies for maintaining abstinence, interpersonal skills, and so forth. Treatments differed according to individuals' needs. Initial treatment was intensive; however, as was normal practice, the intensity was reduced as treatment progressed. Participants who suffered from acute withdrawal symptoms were admitted to hospital for a six-week detoxification. Participants also received monthly visits from a social worker—again, this was to help with drink-related problems and any domestic problems.

On all but one (inpatient hospital treatment) of a variety of treatment outcomes following the 12-month experimental period, the groups did not differ. Treatment outcome measures included independent reports from the participants and their wives. These reports covered the extent of drinking behaviour during the preceding 12 months, subjective ratings of the level of current problems, and improvements in drinking behaviour; they also covered social adjustment, including employment and marriage functioning, and time in hospital—the latter, of course, differed between the two groups because only the treatment group was offered this service. Overall, both groups showed improvement at the 12-month follow-up on self-assessment reports—the ST group (63%) and the BT group (58%). Improvements were at a similar level as conventional treatment of the time reported by Emrick (1976). In short, the intensive treatment appeared to bring no improvement over the brief one.

Many professionals found this finding counter-intuitive and surprising. Moreover, it was at variance with the findings of Emrick (1976), who had suggested, following a meta-analysis of treatment approaches, that intensive approaches offer a better prognosis than do less intensive ones. Accordingly, Edwards and colleagues' (1977) findings were criticised in several respects.

Tuchfeld (1977) claimed that the overall lack of group differences may have obscured a more subtle finding. Namely, the more severe alcohol abusers may have fared better with the more intensive treatment, and the less severe alcohol abusers may have fared better with simple advice. However, follow-up analysis performed by Edwards and Taylor (1994) failed to show that any such "matching" had occurred.

Gibbs and Flanagan (1977) argued that the sample selected by Edwards et al. (1977) was non-representative of alcohol abusers in general because all of the participants had an intact marriage. Gibbs and Flanagan suggested that being in a stable relationship



would greatly influence the treatment outcome. (They also argued—contentiously—that, because the study did not include any female participants, the findings of the study could not be generalised to both genders.)

Mattick and Jarvis (1994) criticised the Edwards et al. (1977) on the grounds that the treatments in the study were not delivered entirely as intended. They argued that a large proportion of patients in the ST group refused the extensive treatment that was offered, and that a proportion of individuals in the BT group actively sought further treatment. That is, there was much variation of the intensity of treatment for participants in each group. However, Mattick and Jarvis did concede that the groups differed significantly in the level of treatment that they received. In short, their criticism is that the Edwards et al. study (and similar ones discussed below, e.g., Chick, Ritson, Connaughton, Stewart, & Chick, 1988; Chapman & Huygens, 1988) does not provide sufficient evidence to suggest that brief interventions are as effective as intensive treatments.

Edwards et al. (1977) conceded that the initial assessment procedure may have contributed significantly to the treatment effect in the advice-only group. The assessment offered more than simple advice: it allowed the participants to explore their drinking behaviour and its effect on their wives and, in turn, their relationship difficulties. (Self-reported improvements in marital relationships provided by both groups support this claim). Participants in the advice-only groups also received feedback about their drinking behaviour. They were encouraged to take responsible for their own behaviour. They were given advice about their current situation, and the assessment was delivered in an empathic style. In fact, the initial “assessment” is the same as the template used in many contemporary brief interventions.

In another study, Chapman and Huygens (1988) assigned alcohol-dependent patients presenting at an inpatient alcohol abusers clinic to one of three groups with

varying levels of intensity of treatment. The first group ( $n = 36$ ) comprised of a six-week inpatient programme. The second group ( $n = 35$ ) consisted of a six-week outpatient programme; this involved twice weekly attendance at the clinic. The third group ( $n = 34$ ) attended between one and two hours of confrontational interview. At a 6-month and 18-month follow-up, all groups had reduced their alcohol consumption, and there were no differences among the groups on this measure or on measures of abstinence or the level of alcohol-related problems.

Chick et al. (1988) also allocated patients who had been referred to an alcohol treatment clinic to one of three groups. One group consisted of standard treatment (ST); this involved five minutes of simple advice, an hour-long session with a psychiatrist, and an offer of two-to-four weeks of inpatient treatment. A second group received a less intensive, intermediate-level of treatment; it included five minutes of brief advice and an hour-long session with a psychiatrist. The third group received BT; this involved just five minutes of advice. This study had a series of three-monthly follow-ups over a two-year period. Again, the results showed no group differences on all measures of alcohol-related problems.

Zweben, Pearlman, and Li (1988) recruited alcohol-dependent participants into their study through mass media advertisement (26%) and from alcohol-services referrals (74%). Participants were allocated to two groups: members of the first group received eight sessions of conjoint marital therapy ( $n = 79$ ); members of the second received one session of an hour-and-a-half of individual counselling ( $n = 139$ ). Both groups reduced their alcohol consumption, and there were no significant differences between them.

A study by Drummond, Thom, Brown, Edwards, and Mullan (1990) at the Maudsley Hospital in London compared a ST and a BT. Forty alcohol-dependent patients, referred by a general practitioner (GP), were randomly assigned to either a ST or a BT

group; the groups were matched on severity of alcohol dependence. The BT included GP advice and the offer of a self-help booklet. The ST group received specialist clinic counselling plus routine outpatient care, but some participants received inpatient care (20%). At a six-month follow-up, both groups had significantly decreased their alcohol consumption, and there were no differences between the groups in either alcohol consumption or alcohol-related problems.

The BT studies reviewed thus far demonstrate that reducing treatment to just five minutes of advice produces similar outcomes to six-weeks of inpatient treatment. However, for several reasons, care should be taken when interpreting these results. First, ST has shown only limited success in terms of abstinence rates: more than 50 percent of patients return to drinking within three-months (Whitworth et al., 1996). Second, as Mattick and Jarvis (1994) stated, BT in these research trials often included much more than what was intended. Nevertheless, the cost differential between ST and BT, even if the BT does consist of regular brief contacts, surely supports the cost-effectiveness of these interventions.

Harris and Miller (1990) tested the hypothesis that the rigorous assessment procedures involved in many treatment trials may, in themselves, be sufficient to initiate behaviour change. These researchers randomly assigned 34 participants to one of four groups. The groups consisted of an outpatient counselling group, a minimal advice group, a control group who kept a drink diary, and a waiting-list control group. After a 10-week period, both the treatment groups showed significant reductions in alcohol consumption, whereas both of the control groups did not. Once the control groups had been treated, their treatment outcomes were equivalent to those of the other groups. This study demonstrates that assessment alone is not sufficient to bring about change. However, conclusions drawn from this study should be tentative because the small samples in each of the groups.

The largest trial of BT to date has been Project MATCH (Matching Alcoholism Treatment to Client Heterogeneity) (Project MATCH Research Group, 1997). The estimated total cost of the trial was more than \$27 Million. This study randomly assigned 1,726 participants to one BT group or two ST groups at 10 treatment sites across the United States. One ST group was given twelve-step facilitation (TSF) therapy, which was based on the principles Alcoholics Anonymous and consisted of 12 weekly sessions. The other ST group was given cognitive-behavioural therapy (CBT), which was based on social-learning theory and also consisted of 12 weekly sessions. The BT group was given motivational enhancement therapy (MET), which was based on the principles of motivational interviewing (see Chapter 2). The MET group received only four sessions across 12-weeks. The results of the study indicated that there were no differences in the level of treatment improvements among the three groups. That is, the BT was as effective as each of the ST groups. However, these results do not necessarily mean that MET is better than either CBT or TSF. The study simply demonstrated four sessions of MET was as effective as 12 sessions of either TSF or CBT. What this study did not demonstrate is whether four sessions of either TSF or CBT are as effective as four sessions of MET.

Project MATCH (1997) was primarily concerned with matching client characteristics with the treatment modality that was most effective for them. It is important to recognise that the matching of participants to treatments in Project MATCH was made retrospectively. Participants were randomly assigned to treatments and participant characteristics were assessed for *matching* effects at the end of the trial. No clear matching effects were found; however, there were some indications of possible matching effects. For instance, clients who reported more anger had more abstinent days following MET than abstinent days following CBT. Heather (2001) attributed this finding to the non-confrontational nature of MET. Another finding was that clients identified as

being in the precontemplation or contemplation stage, according to the “stages of change model” (Prochaska & DiClemente, 1992), fared better with MET than with CBT.

There have been a number of criticisms of Project MATCH in regards to the design of the study. The first criticism relates to the matching hypothesis. Marlatt (1999), amongst others, claimed that the use of a randomly controlled trial for treatment matching, as in Project MATCH, is inappropriate. He argued that a better test of treatment matching would be to first match participants to the logically best treatment programme (based on specific matching characteristics) and then compare their outcomes to participants who receive the same treatment but when not matched. This type of *foresight* matching would represent a fair test of matching as it would be conducted in routine practice.

A second criticism of the Project MATCH design is its limited ability to measure the efficacy of the treatments. The study did not include a no-treatment control group, so that it is impossible to conclude what effects, if any, would have occurred thorough assessment-only. It should be noted that the initial battery of assessment questionnaires took eight hours to complete, and participants were followed up five times in the following year. Other criticisms (e.g., Goldfried & Wolfe, 1996) are related to the study’s limited ability to generalise the findings: of the 4,481 participants originally assessed, only 1,726 were included in the study. Participants who were excluded were those who used other drugs, did not have stable housing, could not nominate at least one other person as a reliable contact to be involved in the study, or were receiving other services. Furthermore, the treatment goal of this study was total abstinence, not moderation, as is offered particularly in countries such as Australia and the United Kingdom. Additionally, the emphasis on abstinence may have been more pronounced in the TSF group than in the CBT or MET groups; all of these factors make it difficult to generalise the results.

A study similar to Project MATCH (1997) was recently completed in the United Kingdom. The United Kingdom Alcohol Treatment Trial (UKATT, 2001) was the largest ever alcohol treatment trial in the United Kingdom; it recruited more than 720 clients. UKATT investigated the effectiveness of three sessions of MET in comparison to eight sessions of social behaviour network therapy (SBNT), for alcohol dependent clients. SBNT integrates several treatment techniques, and focuses on social support for bringing about changes in drinking. The UKATT study compared a BT (i.e., MET) with a recently developed version of ST (i.e., SBNT). It also aimed to investigate client-matching effects and therapist effects, and the relative cost-effectiveness of each treatment.

Unlike Project MATCH, this study is a pragmatic trial rather than explanatory; it has investigated the most effective treatments that could be implemented in standard practice. The early indications from this trial, again like Project MATCH, are that there is no difference between the effectiveness of the two interventions.

In summary, there is ample evidence that BTs are as effective as STs.

### ***Opportunistic Brief Interventions versus No-Treatment Controls***

Recruitment for OBIs can take place in a variety of situations. For example, individuals can be recruited for OBIs after undergoing a screening in a general hospital, GP surgery, community-health clinic, or probation service. OBIs can also recruit people who respond to an advertisement (e.g., in a newspaper or on the radio) that offers advice about alcohol problems. The purpose of such advertisements and screening procedures are to detect, and thereby to intervene with, individuals who are in an early stage of alcohol abuse (i.e., heavy drinkers with low to moderate levels of dependency). Intervening at the early stage of problem drinking can prevent the later development of physical alcohol-related problems, and thus preclude the need for more intensive treatment.

Miller, Sovereign, and Krege (1988) developed one such intervention: the Drinker's Check-up (DCU). The DCU was advertised, through media campaigns in New Mexico, as a check-up for drinkers who would like to find out whether their drinking was causing them harm. The advertisement specified that the DCU was free, confidential, and not part of any treatment programme, and that it was intended for drinkers in general and not specifically for alcohol-dependent drinkers; as such, no label or diagnosis would be given.

The DCU provides clear and objective feedback about alcohol users' drinking problems. It involves approximately three hours of assessment, which is followed by one hour of feedback in a separate session. During the first part of the initial consultation, the client has a structured clinical interview; afterwards, he or she completes two alcohol usage questionnaires (the Alcohol Use Inventory—Horn, Wanberg, & Foster, 1987—and the Brief Drinker Profile, or BDP—Miller & Marlatt, 1987); finally, he or she undergoes four neuropsychological tests, two of which are sensitive to the damaging effects of alcohol. The BDP assesses the client's alcohol use in terms of his or her level of dependency, family history of drinking, alcohol-related problems, and motivation to change.

One week after the DCU assessment, the client receives feedback from the assessment. The results of the assessment are delivered in a non-judgemental and empathic way. Feedback is presented relative to population norms; however, no attempt is made to label or diagnose the person (e.g., as an "alcoholic", problem drinker, alcohol abuser). The client's reaction to the feedback is explored using the principles of motivational interviewing (see Chapter 2).

The initial evaluation of the DCU (Miller, et al., 1988) included 42 participants (30 males and 12 females), each of whom was assigned to one of three groups. One group

received DCU. A second group received the DCU and a list of alternative sources help. A third group was first assigned to a six-week waiting list; thereafter, they received the DCU. A follow-up assessment measured each participant's current level of alcohol consumption, number of alcohol-related problems, and the level of alcohol dependence; these assessments were conducted six-weeks and 18-months after the initial assessment. The outcome measures were self-reports by the participants, which were validated by collateral reports. At the six-week follow-up, the waiting-list control group had not shown a significant reduction in alcohol consumption. However, six weeks after the DCU intervention, all groups had significantly decreased their alcohol consumption (on average from 45 standard drinks per week to 33—a reduction of 27%). The reductions were maintained at the 18-month follow-up.

The DCU provides an effective intervention to reduce alcohol consumption in clients who are at risk of developing serious health risks because of alcohol misuse. The style of this intervention adheres to the FRAMES approach of brief interventions. It also provided clear guidelines for the intervention. It thereby counters the criticism of many reviewers that brief interventions often lack clear guidelines (e.g., Dunn et al., 2001; Poikolainen, 1999). Since the initial evaluation, the DCU has been applied in a number of situations, including medical settings, employee assistance programmes, and judicial services. Also, the DCU is the foundation for MET, as used in Project MATCH (1997) and UKATT (2001).

An even briefer form of OBI, which used mass media to recruit participants, was evaluated by Heather, Whitton, and Robertson (1986). They advertised free information for excessive drinkers in a tabloid newspaper in Scotland and northern England. Following responses from 785 individuals, 247 returned the completed assessment forms and were subsequently posted either a behavioural self-help manual or a general



information booklet. A sub-sample of 43 participants was contacted by telephone. Of these only two were identified as being non-alcohol dependent. After six months, the researchers were able to contact 53% of the participants who had received a booklet.

Those participants who had received the self-help manual demonstrated a greater reduction in alcohol consumption than those who had received the general information booklet.

A study by Spivak, Sanchez-Craig, and Davila (1994) corroborates the findings of Heather et al. (1986). Using a similar design to that of Heather et al., Spivak et al. recruited 140 non-alcohol-dependent participants. Participants were randomly assigned to receive a self-help booklet or a general information booklet. Spivak et al. found that the specific self-help manual (70% reduction in alcohol consumption) was superior to the general information manual (24% reduction in alcohol consumption) in reducing alcohol consumption; this was established at a 12-month follow-up.

Wallace, Cutler, and Haines (1988) demonstrated the potential of an OBI in a randomised controlled trial of a GP intervention for excessive drinkers. From 47 GP clinics, 4,203 patients were identified as drinking excessively (more than 35 units for men and more than 21 units for women) and 909 of the excessive drinkers agreed to participate. Patients were randomly assigned to either a treatment group ( $n = 448$ ) or a control group ( $n = 459$ ). The treatment group received specific advice to cut down their drinking, a booklet about drinking limits, and a drink diary. The control group received a general health booklet with no specific advice regarding their alcohol consumption.

At a 12-month follow-up, the treatment group had significantly reduced their alcohol consumption. The treatment group had reduced by 44% and 48% for males and females, respectively. The control group had reduced by 26% and 29% for males and females, respectively. The Wallace et al. study demonstrated that widespread screening and OBIs, resulting in relatively small individual treatment gains, can transfer into huge

population benefits. In fact, on the basis of their results, Wallace et al. (1988) estimated that if every GP surgery in the United Kingdom gave each excessive drinking patient brief advice about cutting down, 250,000 males and 67,500 females each year would reduce their drinking to a moderate level.

Recent meta-analyses of brief interventions, which specifically examined OBIs, by Bein et al., (1993) ( $n = 14$  studies), by Freemantle et al., (1993) ( $n = 7$  studies), and by Wilk, Jensen, and Havighurst (1997) ( $n = 12$  studies) concluded that OBIs, in comparison to no intervention, are effective in reducing alcohol consumption by at least 20%. A review by Poikolainen (1999) of 14 data sets from 7 studies conducted at primary health-care sites (e.g., GP clinics) reported that very brief interventions (5 – 20 minutes) did not significantly reduce consumption but that extended brief interventions (several visits) did significantly reduce consumption amongst females. However, Poikolainen conceded that, because of the variable methodology of the studies, it was difficult to reliably estimate effect sizes.

Babor and Grant (1992) conducted a World Health Organisation (WHO) clinical trial of brief interventions. This study was conducted in 10 countries with 1,655 patients recruited mainly from primary health-care sites. Excessive drinkers were allocated to one of three groups: a control group ( $n = 361$ ), an advice group ( $n = 350$ ), or a brief counselling group ( $n = 409$ ). The control group were given only a 20-minute health-related interview. The advice group were given a 20-minute health-related interview plus five minutes of advice on drinking. Finally, the brief counselling group were given a 20-minute health-related interview, 15-minutes of counselling, and a self-help booklet. The results showed that, in comparison to the control group, participants in the two treatment groups had significantly reduced their alcohol consumption; however, the two treatment groups did not differ from each other. Further analysis revealed that females in the two

treatment groups and the control group had significantly reduced their alcohol consumption. The authors concluded that brief interventions were more effective for males than females.

Heather (1994) criticised the WHO study for failure to adhere to a rigorous methodology. The treatment sites, he claimed, did not provide the same interventions—this is not surprising given that the sites were in different countries. Heather also criticised the method of counselling. It was based on a problem-solving model, and did not take into account each participant's readiness to change (see Chapter 2). Accordingly, using a counselling style with participants who were not contemplating reducing their drinking could have been counter-productive.

Rollnick, Heather, Gold, and Hall (1992) conducted a study that took into account the participants' readiness to change. Rollnick et al. classified problem drinkers ( $n = 141$ ), who were screened in medical settings, into readiness-to-change categories based on the stages of change model (Prochaska & DiClemente, 1992). The Rollnick et al. study identified 73% of patients being in either the precontemplation or contemplation stage. These results suggest that the WHO study may not have elicited motivation to change in the majority of the participants.

Although OBIs have proven effectiveness, their applications have had some methodological difficulties. Heather (2001) described the practical difficulties involved in implementing OBIs in medical settings, particularly in GP surgeries, as evidenced by the gap between actual practice and recommended practice. Similarly, Deehan, Marshall, and Strang (1998) highlighted both the opportunities for and obstacles to intervening in primary care. Although at least 98% of the British population are registered with a GP, and more than 70% of these are seen by their GP in any given year, very few GPs initiate any alcohol intervention. Anderson (1993) estimated that 65% of GPs treat between just

one and six patients per year for alcohol problems. From these percentages, Heather (2001) estimated that the majority of GPs intervene with just two percent of patients who drink excessively.

Deehan et al. (1998) investigated GPs' perceptions in regard to their role of intervening with patients with alcohol problems. The authors discovered that the majority of GPs do not regard intervening with patients for alcohol misuse as their role; rather, they consider it to be the role for health-promotion agencies. Given these barriers to GP interventions, research is underway (Phase IV of the WHO Collaborative Project) to develop strategies to implement brief interventions in primary care.

In sum, there are several methods of recruitment for OBI. The use of advertisements to recruit participants for OBIs has both advantages and disadvantages. It allows widespread sampling, early intervention, and participants to self-refer—thus it likely recruits more motivated individuals. However, studies using these techniques have had high rates of attrition. OBI studies differ in rates of attrition of participants; the attrition might depend on the type of intervention, the duration of the follow-up, or the type of sample included in the study. These variations among studies and differences in attrition rates make it difficult to compare the effectiveness of different OBIs. For instance, although the participants in the experimental group of the Heather et al. (1986) study had similar levels of reductions to those in the studies of Miller et al. (1988) and the Spivak et al. (1994), the Heather et al. study had a higher rate of attrition. This implies that the effectiveness of the Heather et al. study might have been exaggerated. It should be noted that the Heather et al. study, unlike both the Miller et al. and the Spivak et al., ones mostly included dependent drinkers. This might suggest that OBIs are more successful for drinkers with lower levels of dependency.

## Summary and Conclusions

Excessive drinking is a major problem in the United Kingdom. Its effects on individuals and society are a real and growing concern—particularly amongst women. Alcohol contributes to many diseases (e.g., cancers) and to many social problems (e.g., accidents, injuries). Particular patterns of consumption contribute differently to particular types of harm. Drinking alcohol in binges, for instance, significantly increases the risk of injury—again, women appear at particular risk. One study showed that the risk of injury to women who binge drank increased 9.1 times, whereas for men, the risk increased 2.1 times (McLeod et al., 1999). Wechsler et al. (1994) also demonstrated that American college students who frequently binge drank were 7 to 10 times more likely than other students to suffer consequences. Consequently, the cost to society (e.g., in terms of health-care, lost productivity, crime) from alcohol misuse is large.

It has been argued that alcohol consumption actually reduces the mortality rate in the United Kingdom by two percent (Britton & McPherson, 2001). However, the potential benefits of drinking alcohol are limited only to older drinkers who drink within sensible limits. Younger drinkers (i.e., those in the 16 – 24 year age range) are at significant risk for harm. Even younger drinkers who drink within the sensible limits risk harm—the mortality rate for these drinkers is increased by 32% for males, and 15% for females over those who do not drink (White et al., 2002).

The prevention of harm to individuals and society can take two forms: primary prevention and secondary prevention. A secondary prevention strategy (i.e., a strategy to target drinkers currently *at-risk* of harm) is perhaps the more viable strategy. Kreitman (1986) argued for primary prevention (i.e., a population-based intervention). He reasoned that the majority of alcohol-related problems occurred among moderate drinkers rather than heavy drinkers. However, the majority of alcohol-related problems occur among

those who binge drink, and these drinkers are at-risk of harm. Therefore, secondary prevention, which targets heavy drinkers and those who binge drink, is the most efficient method of prevention. Brief intervention for those at-risk of harm was the most efficacious treatment modality of the 46 modalities reviewed by Miller and Wilbourne (2002) and in a review of treatments for the Division 12 Task Force of the American Psychological Association (McCrary, 2000).

Heather (1994, 2001) distinguished between two forms of brief intervention: opportunistic brief interventions (OBI) and brief treatments (BT). However, there is great overlap between the two forms of intervention, but differences lie in (a) the target population (i.e., at-risk drinkers versus dependent drinkers), (b) the duration of the intervention (e.g., one five-minute session versus three hour-long sessions), (c) the service provider (i.e., non-specialist versus specialist workers), and (d) the comparison groups (i.e., control groups versus standard treatment groups). Common features of either form of brief intervention are those summarised by the acronym FRAMES: feedback; responsibility; advice; a menu of strategies; empathy; and, self-efficacy (Miller & Sanchez, 1993).

The evidence for BT in comparison to ST is compelling. Numerous efficacy trials support BT (Chapman and Huygens, 1988; Chick et al., 1988; Drummond et al., 1990; Project MATCH, 1997; Zweben et al., 1988). Whether these efficacy trials can produce equal results under “real world” conditions remains to be seen. The UKATT (2001) aimed to test a BT in comparison to a ST in an effectiveness trial (i.e., under “real world” conditions). In any event, the overall effectiveness of ST is poor: more than 50 percent those who receive treatment relapse within the first three months (Whitworth et al., 1996). A more accurate description for BT is tertiary prevention. Tertiary prevention is aimed at

those who are already suffering from the target behaviour (e.g., dependent drinkers) in order to alleviate their harm.

The evidence for OBI with at-risk drinkers is very promising. Reviewers of OBI such as Bein et al. (1993), Freemantle et al. (1993), and Wilk, et al. (1997) have concluded that OBI are effective in reducing alcohol consumption; Poikolainen (1999), in contrast, does not share this view. However, OBI is suitable for a large numbers of individuals within the population. Wallace et al. (1988) predicted enormous population benefits if every GP screened and administered OBI. They predicted that if every GP provided an OBI for excessive drinking patients, 250,000 males and 67,500 females would reduce their drinking to moderate levels each year.

However, OBI in primary care is not without its problems. Many GPs are reluctant to intervene and implement OBI. Anderson (1993) found that relatively few GPs intervene with patients with alcohol problems. GPs do not regard alcohol intervention as their role (Deehan et al., 1998). Nevertheless, screening and implementation of OBI, especially in health-care settings, offers huge potential. The goal now is to develop alternative avenues for OBI intervention, such as general hospital wards.

## CHAPTER 2

### Motivational Aspects of Drinking

Historically, there have many disparate models to explain alcohol misuse. They include the moral, temperance, spiritual, disease, educational, characterological, conditioning, social learning, cognitive, sociocultural, general systems, biological, and public health models (Hester & Miller, 1995). Some of these models continue to be followed, and they form the theoretical basis for various treatments. However, there is currently a consensus amongst researchers and theorists that multiple factors influence alcohol misuse (Heather, 2001). Integrative models, especially biopsychosocial ones, combine multiple factors to offer the most complete explanation of alcohol misuse. Integrative models that also consider the motivational processes underlying alcohol misuse seem to provide the most comprehensive account of the problem, and they form the basis for the most efficacious treatments.

People's motivation to change risky or harmful drinking—or their lack of it—has received much research attention in recent years (Miller & Heather, 1998). Newly developed treatments provide techniques for motivating people to change their risky behaviours. Clearly, understanding the motivational processes involved in people's use of alcohol and their ability to reduce or stop their use of it are a prerequisite for developing effective interventions.

This chapter addresses the principles involved in people's motivation to drink alcohol, and their motivation to reduce or stop their use of it. Motivation in both cases is defined as a person's goal directed behaviour—in other words, the things that people strive for and want to achieve. Although the chapter considers both people's motivation to drink



alcohol and their motivation to reduce or to stop drinking, it also considers how these two kinds of motivation are inextricably linked.

First, this chapter describes a particular biopsychosocial model of alcohol use that depicts the variables affecting the motivational pathway to alcohol use. Second, it considers how people can be motivated to reduce or discontinue their drinking by altering the motivational processes. Finally, it discusses the interrelations between motivational interventions and motivational processes.

### ***The Motivation to Drink***

The motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a) is a biopsychosocial model. It is *biosychosocial* in that it accounts for the biological, psychological, and sociocultural/environmental influences on drinking behaviour. The model explains how each of these kinds of variables can increase or decrease a person's motivation to drink. The model depicts drinking as a volitional act that is influenced by rational and emotional processes. The summation of these processes, whether they are explicit or implicit, results in a net expected change in the emotional value (or affect) from drinking. If the net expected affective change is positive, the person will decide to drink. If it is negative, the person will decide not to drink.

Before discussing the model, it is helpful to define some basic motivational terminology.

*Affective change* is a basic component of motivated behaviour. Affect, in this sense, pertains to the emotion as a person subjectively experiences it. People are motivated to obtain the things they expect will cause a *positive affective change* and to get rid of the things that increase their *negative affect*. An object or event that a person believes will bring about a positive or negative affective change is an *incentive*. A *positive*

*incentive* is something that enhances positive affect or reduces negative affect—it is something a person wants to obtain or accomplish. A *negative incentive* is something that reduces positive affect or increases negative affect—it is something a person wants to get rid of or avoid. The subset of incentives that a person is committed to pursue is that person's *goals*.

The person's motivational state between the time of becoming committed to pursuing a goal and the time that the goal is reached or relinquished is called a *current concern*. Current concerns determine the activities that people engage in order to achieve their goals. For some individuals, the goal of drinking alcohol becomes their most important current concern, and the goal is pursued at the cost of other goal pursuits in their lives. Cox and Klinger's model illustrates how this can occur.

The model shows that one important source of people's current expectations of affective change from drinking alcohol is their own past experiences with drinking. Past experiences are an example of distal factors that influence the decision to drink alcohol. A variety of these more distal factors interact with each other to either promote excessive drinking or protect people from it. These factors include: (a) people's biochemical reactions to alcohol, (b) their personality characteristics, and (c) the sociocultural environment in which they live. These factors determine the person's past reinforcement from drinking and whether it was positive or negative. Past reinforcement from drinking, therefore, influences an individual's current expectations of positive or negative consequences of drinking.

It is now well established that people vary in their biochemical reactions to alcohol because of their genetic makeup. For instance, genetic research has established that the enzyme aldehyde dehydrogenase (ALDH) influences a person's vulnerability to drink excessively (Li, 2000). When alcohol is ingested it is metabolised into acetaldehyde by

the enzyme alcohol dehydrogenase (ADH). Acetaldehyde is a toxin that can cause rapid face flushing, which in turn is associated with tachycardia, headache, and nausea.

Acetaldehyde is metabolised by the enzyme ALDH. People who are deficient in ALDH are at increased risk of suffering these negative effects after consuming alcohol.

Therefore, a deficiency in ALDH protects people from excessive drinking (Thomasson et al., 1991). Indeed, 25-40% of individuals of Asian descent are deficient in ALDH, and there are lower incidences of alcohol dependence in countries that are predominately populated by Asians in comparison to those populated by Caucasians (Lieber, 2001).

Personality factors also exert a more stable and enduring effect that can increase or decrease the risk of excessive drinking. Extensive research on personality characteristics has failed to identify an “alcoholic personality,” but it has shown that two broad constellations of personality characteristics can predate, or co-exist with, alcohol abuse (Cox, Yeates, Gilligan, & Hosier, 2002). These two personality constellations are behavioural disinhibition and negative emotionality. Behavioural disinhibition manifests itself as antisocial, aggressive, and impulsive behaviours. Negative emotionality, on the other hand, refers to negative affect such as anxiety or depression. People who have these personality characteristics are at increased risk of developing alcohol problems; conversely, people who do not have them are “protected”<sup>1</sup>.

Further distal factors that influence a person’s decision to drink are sociocultural and environmental variables. Countries vary in their level of *wetness*—the degree to which alcohol is available. Skog (1991) showed that people from a *wet* culture will consume more alcohol than those from a *dry* culture. Cultures also vary in their attitudes toward drinking: for example, societies differ in how much they will tolerate excessive

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<sup>1</sup> It is acknowledge that there are many different personality factors which can also influence a person’s motivation to drink. These are discussed more fully in Chapter 5 (pp.153-157)

drinking. The cultural influences on drinking can also be seen in the social networks of friends and families—for instance, an individual's partner or friends might have previously reinforced excessive drinking. As such, people tend to drink in a manner of those around them. Therefore, people can be subtly reinforced to drink and even ostracised for not doing so. Certainly, such influences of past reinforcement from drinking will influence a person's current decision to drink or not to do so.

The expected affective change that is based on past drinking experiences can be modified by current factors. These factors include (a) the physical setting, and (b) a person's current life situation. Physical settings can either promote or deter drinking by both the availability of alcohol and by the expected changes in affect. For instance, in some situations that promote drinking (e.g., social events) people often expect drinking to enhance the situation by making them more outgoing (i.e., the expectation of positive affective change from drinking). Other situations can deter drinking (e.g., taking exams) and so people can expect drinking to have deleterious effect on their performance (i.e., the expectation of negative affective change from drinking).

A person's current life situation is also a critical factor in determining his or her decision to drink. Expected affective change can occur from both the incentives that people have in their lives and from the direct and indirect effect of drinking alcohol. If a person is unable to derive little emotional satisfaction through other incentives in life, then he or she may consume alcohol as a means of increasing positive affect. Therefore, expected affective change from drinking occurs in the context of the emotional satisfaction derived from the person's current life situation.

Experimental studies have shown that decreasing people's access to other incentives increases their motivation to drink (Vuchinich & Tucker, 1996, 1998). A study by Man, Stuchlikova, and Klinger (1998) showed that a group of alcohol abusers had 40

percent fewer goals than demographically matched students (i.e., non-alcohol abusers).

Furthermore, the risk of relapse after treatment is increased for people who return to a stressful life situation (Moos, Finney, & Cronkite, 1990), or if they encounter negative life events such as those related to employment, finances, or interpersonal relationships (Tucker, Vuchinich, & Pukish, 1995).

People can expect drinking alcohol to change their affect either directly (i.e., the pharmacological effects) or indirectly (i.e., the instrumental effect alcohol can have on other life incentives). The direct pharmacological effects of drinking can either increase positive affect by simply making people feel good (e.g., by increasing a person's enthusiasm), or it can reduce negative affect by helping people cope with feeling bad (e.g., by helping to alleviate anxiety). However, such chemical effects are only short lived and of limited benefit. As described above, the chemical effects of alcohol can also deter drinking (e.g., alcohol flushing syndrome).

The indirect, instrumental effects of drinking can occur in four ways. In two ways the expected affective change is positive and so increases the likelihood of consumption. These can occur by (a) the belief that alcohol will enhance access to other positive incentives—for instance, the expectation that alcohol will increase a person's confidence in order to socialise more effectively; or (b), that it will reduce other negative incentives—for example, that it will reduce the risk of heart disease. In two ways the expected affective change is negative and so decreases the likelihood of consumption. These can occur by (a) the belief that alcohol will interfere with other positive incentives—for instance, that it will harm a close relationship; or (b), that it will exacerbate other negative incentives—for example, the expectation that alcohol will increase the harm of an existing disease such as diabetes.

Both a person's current life situation and his or her past reinforcement from drinking influences the person's thoughts, beliefs, and perceptions of the expected changes in affect from consuming alcohol. These cognitive processes need not be based upon rational or even conscious processes. And, whether explicit or implicit, these cognitive processes mediate the link between the distal and proximal influences of drinking. The expected changes in affect (both from drinking and from incentives) will vary according to the importance of each factor; they will differ from person to person, and can even fluctuate for the same person at different points in time. The sum of these expected changes in affect culminate in the decision to drink alcohol or not to do so: net positive affective change results in the decision to drink alcohol, whereas net negative affective change prevents it.

To summarise, Cox and Klinger's (1988, 1990, 2004a) motivational model describes alcohol use from the perspective of motivational pathways. Each person has expectations of affective change from drinking alcohol that are influenced by biological, psychological, and sociological factors. The influences stem from both the person's past experiences and his or her current life situation. The anticipated affective changes (emotional satisfaction) from non-drinking incentives are also critical. If the net sum of the expected affective change is positive then the decision will be to drink; if the net sum is negative then the decision will be not to do so.

### **The Motivation to Change**

People's motivation to change their use of alcohol has been the topic of extensive research in recent years. Prochaska and DiClemente (1983) proposed a stages-of-change model that attempts to understand motivation from people's process of change. Miller and Rollnick's (1991, 2001) Motivational Interviewing is a therapeutic approach that attempts to enhance a person's motivation to change. Challenging a person's positive expectancies

(Darkes & Goldman, 1993) or altering negative expectancies (Jones, 2004) from drinking is yet another plausible method of motivating change. Others have enhanced people's motivation towards the goals that they have in their life to bring about an indirect change in drinking (Cox & Klinger, 2004b). These approaches are not in any way contradictory with one another. Each attempts to influence a change in drinking by addressing the factors associated with different parts of the motivational model.

This section is divided into four parts that correspond to the four ways of viewing *motivation for change* described above. The first part describes Prochaska and DiClemente's (1983) stages of change model, which shows how people's motivation to change can be divided into successive stages. It also discusses the importance of matching interventions to the appropriate stage. The second section describes how the principles of Motivational Interviewing can enhance people's motivation to change (Miller & Rollnick, 1991, 2001). The third section focuses on alcohol expectancies and how the manipulation of these expectancies can influence a person's drinking. The final section describes Systematic Motivational Counselling (SMC) by Cox and Klinger (2004b). SMC is based on the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1990, 2004a) and is a method of intervention that aims to assess and change maladaptive patterns of motivation.

### ***Stages-of-Change***

In the 1980's DiClemente and Prochaska conducted series of studies to understand the processes by which people change an addictive behaviour. Their early studies focused on how change occurs in treated and untreated smokers (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). These, and subsequent, studies led to the development of the Transtheoretical Model (TTM, DiClemente & Prochaska, 1998; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992). The TTM provides a

framework for understanding and intervening with intentional behaviour change. The TTM is organised into three constructs: the stages-of-change, the process of change, and the levels of change. This section describes the first of these constructs in detail (i.e., the stages-of-change).

The *stages-of-change* model assumes that changes in addictive behaviours pass through discrete stages. Change is rarely seen as a sudden event, but usually as a gradual process. DiClemente and Prochaska (1998) described five stages of change: precontemplation, contemplation, preparation, action, and maintenance. Individuals who are in the precontemplation stage are not considering any change in their behaviour; they may or may not recognise their problematic behaviour; in any event they see the costs of changing as too great. Individuals who are in the contemplation stage appear ambivalent about changing their behaviour; to them, the benefits of change may appear equal to the costs of change. Individuals who are in the preparation stage will have decided to change their behaviour, but they will not yet have done so; such individuals perceive that the benefits of change outweighing the costs. Individuals who are in the action stage are actually in the process of changing their behaviour. The maintenance stage is defined by a successful change in behaviour from three to six months.

A key hypothesis in the stages-of-change model is that different processes of change will be used in different stages. Prochaska and DiClemente (1983) found significant differences in the process of change across stages. For instance, behavioural process tended to be used more frequently by those in the action stages. DiClemente and Prochaska (1998) stated that each stage has unique problems and tasks that individuals must produce for a successful behaviour change. For instance, the defining criteria for people to move from one stage to the next are as follows: people in the precontemplation stage should recognise the need for change; people in the contemplation stage must make



the decision to change; and, people in the action stage need to generalise and consolidate their change.

The progression through the stages of change, however, may not always occur linearly: people do not usually pass from the preceding stage directly to the next stage (e.g., the precontemplation stage to the contemplation stage) until they exit the model. In fact, DiClemente and Prochaska (1998) suggested that linear progression through the stages is rare. Thus, a person might pass through one or more successive stages and then return to an earlier stage—perhaps several times—before maintaining the change.

The stages of change model supports the possibility of modifying treatments to match people at different stages—in an effort to improve the effectiveness of the intervention. For a person who is not thinking about change (i.e., a precontemplator), an appropriate intervention might be to simply give information about the potential risk of the targeted behaviour. Such an intervention would be more acceptable for this person than would a more action oriented approach. Likewise, giving information about potential risks of a behaviour would be unsuitable for a person who is already preparing to change (i.e., a person in the preparation stage).

The TTM model has been criticised in several ways, most notably in regards to the construct of the stages of change. For example, Davidson (1998) is critical of artificially segmenting what he refers to as a naturally occurring continuum of change into stages. Nevertheless, it this aspect of the theoretical model has generated much appeal for treatment approaches (i.e., treatments can be matched to a person's stages of change). Indeed, as Stockwell (1992) suggested, the precise details of the model are not as important as the impact that the model has had on highlighting the importance of motivation in addictive behaviours.

In conclusion, the stages of change model suggests that people pass through discrete stages when changing addictive behaviours, perhaps in a cyclical manner (e.g., people might move back and forth between stages several times before making a sustained behaviour change). The model suggests that for individuals to successfully progress to later stages in the model they must complete stage specific tasks. The model highlights the importance of matching treatments to the specific stage of change.

### ***Motivational Interviewing***

Motivational interviewing (MI) is a directive client-centred counselling style that draws heavily from a combination of psychotherapy and behaviour change techniques—MI has been greatly influenced by the non-directive client-centred counselling technique of Carl Rogers, and the transtheoretical model of change by James Prochaska and Carlo DiClemente. MI was first described by Miller (1983), but more detailed descriptions have been outlined by Miller and Rollnick (1991, 2002). They describe MI as a non-judgemental and empathic approach that elicits change from the client: this is in contrast to many traditional styles of approach that attempt to persuade or coerce people to change. Miller and Rollnick (2002) maintain that, although there is a set of techniques and strategies to MI, it is the spirit of MI that is central to the approach.

The spirit of MI can be seen in a number of key points. First, the motivation for change should be elicited from the client, and should not something imposed on the client by the counsellor. Second, the client's ambivalence about change should be viewed as a normal process—people can often be caught between the benefits of change and the costs of doing so. In this, it should be the client, rather than the counsellor, who articulates his or her ambivalence about change and the reasons to resolve this ambivalence. The counsellor should avoid directly confronting the client about his or her problematic use,

and should avoid giving advice to change. The approach of MI, therefore, is non-judgemental and empathic. And finally, the relationship between the client and the counsellor should be one of a partnership rather than one of an expert/recipient role.

Miller and Rollnick (2002) have outlined four general principles that guide MI: express empathy, develop a discrepancy, roll with resistance, and support self-efficacy. As highlighted in the spirit of MI, above, a client centred and empathic approach is fundamental to the principles of MI. According to Miller and Rollnick, empathy is determined through reflective listening, and this is enhanced by seeking to understand the client's perspective without judging or blaming. The ambivalence a client has towards change should be viewed as a normal process.

Developing a discrepancy is another core principle of MI. It is the interviewer's role to develop a discrepancy between the client's actual behaviour and his or her values and goals. Here, the MI approach begins to depart from the classic client-centred approaches: MI is directive in highlighting the discrepancy between the client's actual behaviour his or her values and goals. However, this direct approach is more subtle than traditional confrontational approaches. In creating this discrepancy it is the interviewer's aim to enable the client to become "unstuck" from his or her ambivalence. Again, it is the client, and not the interviewer, who must present the reasons for change and the intention to do so.

Rolling with resistance is a term that Miller and Rollnick (2002) use to ensure the interviewer does not fall into the trap of arguing for change. The least desirable outcome is for the interviewer to argue for change while the client argues against it. This situation is counter-productive to the extent that it can actually press the client into the opposite direction for change. When faced with resistance, the interviewer must change his or her direction of approach: for instance the client may be asked to consider some new

information and new perspectives. Again, the interviewer should acknowledge the client's ambivalence towards change as a normal process, and encourage the client to be actively involved in finding solutions to resolve it.

Supporting the client's self efficacy—the belief in the ability to change—is another key element of MI. Self-efficacy is a vital element in successful behaviour change. Miller and Rollnick (2002) described a client's level of self-efficacy is a reasonably good predictor of treatment outcome. They have also argued that it is equally important for the interviewer to hold the belief that the client can change, which can then become a self-fulfilling prophecy towards change. However, the interviewer must ensure that the client is aware that the responsibility for change rests with him or her.

The effectiveness of MI has been reported in three systematic reviews (Burke, Arkowitz, & Dunn, 2002; Dunn, Deroo, & Rivara, 2001; Noonan & Moyers, 1997). Each of these reviews concluded that MI is an effective intervention for alcohol problems. However, in each of the reviews the authors had considerable difficulty in interpreting the data due to the many variations of MI—in fact these reviews reported more adaptations of MI than MI itself. Burke, Arkowitz, and Menchola (2003) defined these variations on MI, in particular those providing feedback (e.g., Drinkers Check-Up, see Chapter 1), as adaptations of MI (AMI). These authors conducted a meta-analysis of AMI and found that it was at least equivalent to existing active treatments and significantly better than no treatment at all, for problems involving alcohol, drugs, and diet and exercise. In particular, MI and AMI appear to be more effective for people who are at the precontemplative or contemplative stages of change (Heather, Rollnick, Bell, & Richmond, 1996; Miller & Rollnick, 1991).

In sum, MI is a client-centred and collaborative approach to counselling. Miller and Rollnick (2002) have stated that MI is more a way of being with people than about a

set of techniques for bringing about change. Adhering to the core principles of MI is central to the approach. It is the goal of MI to evoke the client's intrinsic motivation and resources for change. The client's ambivalence about change is viewed as a normal process, and it is the role of MI to free people from this ambivalence. People who are typically ambivalent about change are those who are initially less ready to change—MI is particularly effective for such individuals. The success of the many adaptations of MI lends further support that it is the spirit of MI that is central to its success.

### ***Alcohol Outcome Expectancies***

Alcohol outcome expectancies play a critical role in people's motivation to drink and their motivation to change. Jones (2004) has described alcohol expectancies as a person's past direct and indirect experiences of drinking, which are stored in memory. As described earlier, the motivational model shows that expectations about consuming alcohol can be either positive or negative. Positive expectancies contribute to the motivation to drink whereas negative expectancies contribute to the motivation to refrain. According to Cox and Klinger's (2004a) model alcohol expectancies are more distal determinants of drinking than are people's motives for drinking. Alcohol expectancies are the beliefs that people hold about what will happen if they (or others) drink, whereas drinking motives are the expectations that people want to get or avoid from their drinking. Nevertheless, it is clear that alcohol expectancies significantly contribute to people's motivation to drink or to abstain.

The construct of *alcohol outcome expectancies* was influenced by social learning theory. Social learning theory holds that if alcohol is positively reinforcing then its use will be maintained or increased; on the other hand, if alcohol leads to negative consequences then its use will be reduced or discontinued. The theory also suggests that

expected positive or negative consequences of alcohol use can either be learned directly (through experience), or vicariously. Such learned expectancies can be changed, thereby changing a person's motivation to drink.

Early studies of alcohol outcome expectancies focused on positive expectancies (Brown, Goldman, Inn, & Anderson, 1980). The degree to which respondents endorsed items such as, "I would be more relaxed from drinking", or "I would be more social", reliably predicted their future alcohol consumption. Respondents who endorsed more positive outcomes consumed more alcohol than other people—this even when the positive expectancies did not accurately reflect alcohol's actual effects (see Goldman, Del Boca, & Darkes, 1999, for a review).

Darkes and Goldman (1993), who assumed that reducing positive expectancies would reduce consumption, developed an intervention for reducing positive expectancies (i.e., the Expectancy Challenge). The procedure challenged drinkers' inaccurate positive expectancies about consuming alcohol. Participants were randomly assigned to receive an alcoholic or a placebo drink, which they consumed in an experimentally devised "social" setting, on two separate occasions. Those who had received the placebo (but thought they had been given alcohol) reported behavioural changes similar to those who had been given alcohol. At a third session, the participants were given a lecture on expectancy theory (e.g., the disconnection between behavioural and pharmacological effects of alcohol) and the study findings. The participants were also asked to discuss their reactions to this information.

Two further groups were included in the study: one group received traditional information-based sessions, and one group received only assessment of their drinking. At a two week follow-up, the participants in expectancy challenge group, unlike those in the other two groups, reduced both their positive expectancies of alcohol and their

consumption. However, only a few studies have replicated Darkes and Goldman's (1993) study (e.g., Darkes & Goldman, 1998; Dunn, Lau, & Cruz, 2000; Weir & Kummeling, 2001), and some have failed to replicate it (e.g., Corbin, McNair, & Carter, 2001; Jones, Silva, & Richman, 1995).

Jones, Corbin, and Fromme (2001), who reviewed studies of alcohol expectancies, concluded that it was impossible to draw any causal relationships between the reduction in positive expectancies and alcohol consumption from the Darkes and Goldman (1993, 1998) studies. They contested this for two reasons. First, these studies did not evaluate expectancies as a predictor of change in alcohol consumption. And second, Jones et al's. review showed that reductions in alcohol consumption can occur without changes in expectancies, and that reductions in expectancies does not always lead to reductions in consumption.

There has been far less research on negative alcohol expectancies, even though negative expectancies are an important influence on excessive drinkers' decisions to reduce or stop their drinking (Lee, Greely, & Oei, 1999; Tuchfeld, 1981). A possible explanation for the lack of studies on negative expectancies might be due to (a) the belief that the immediate positive consequences from drinking are more likely to influence behaviour than are the delayed negative effects, and (b) the inconsistent findings in the early studies of negative alcohol expectancies. Some early studies did not find a relationship between negative expectancies and alcohol consumption (e.g., Fromme, Stroot, & Kaplan, 1993), whereas others found a negative relationship (e.g., Fromme, Kivlahan, & Marlatt, 1986), and still others found a positive one (e.g., Jones & McMahon, 1998).

Jones and McMahon (1998) contended that the negative relationship between negative alcohol expectancies and alcohol consumption found in these early studies (i.e.,

Fromme et al., 1986), which suggested that as negative expectancies increases alcohol consumption decreases, were a result of confounds in the study design. They claimed that there were too few negative items used in the Fromme et al. study, and these were only for relatively unimportant, short-term effects. As a result the lighter drinkers probably overestimated these less severe negative consequences, whereas more experienced drinkers probably underreported them.

Jones and McMahon (1998) argued that a more representative range of negative consequences, which includes short-, medium- and longer-term negative consequences, can increase the accuracy with which negative consequences can be assessed. Jones and McMahon (1994) developed the 60-item Negative Alcohol Expectancy Questionnaire (NAEQ), which includes a broad range of negative consequences. Using this instrument, McMahon, Jones, and O'Donnell (1994) found a positive relationship between alcohol consumption and negative expectancies. They interpreted this relationship as indicating that as people drink more alcohol they experience more negative consequences. In fact, as Jones and McMahon (1998) concluded, people who enter treatment for alcohol problems, or reduce their consumption without treatment, are motivated to do so because of the large number of negative alcohol consequences that they have experienced. Therefore, in order for people to change their drinking, it seems necessary for them to experience the negative effects of drinking.

Jones and McMahon (2001) used a computerised intervention involving the NAEQ to instil drinkers' negative expectancies. A therapist gave the computerised NAEQ intervention to 60 clients prior to a 5-day outpatient treatment program for alcohol problems. The computer program presented the items from the NAEQ, such as, "If I went for a drink now...", and then asked the participant to indicate the likelihood of experiencing the negative consequence that was listed—such as, "I would become



argumentative.” They indicated the likelihood of various consequences immediately after drinking, the day after drinking, or any time in the future. Next, the computer selected the patient’s 20 most strongly endorsed items, and in the style of *motivational interviewing* (see discussion above) asked him or her to explain why they endorsed these items. At the 90-day follow-up, 38 percent of the patients who had received the computerised intervention were abstinent compared to only 9 percent of the control.

In sum, alcohol expectancies are important determinants of a person’s motivation to drink alcohol. Intervention to manipulate (i.e., to reduce) positive alcohol expectancies has shown promise, but replicating such findings has proved difficult. There have been relatively few studies manipulating (i.e., to *increase* or *highlight*) negative alcohol expectancies, although such studies have been successful (e.g., Jones & McMahon, 2001). Furthermore, Jones and McMahon have demonstrated how it is possible to manipulate negative alcohol expectancies using a brief intervention. Critically, the manipulation of negative expectancies appears to capitalise on a person’s natural motivation to change.

### ***Systematic Motivational Counselling***

Systematic Motivational Counselling (SMC; Cox, Klinger, Blount, 1996; Cox & Klinger, 2004b) is an intervention that is based on the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a). As described above, an individual’s incentives in other life areas can critically affect his or her motivation to consume alcohol. If a person is unable to gain positive affective change—emotional satisfaction—in other areas of his or her life, then he or she is more likely to consume alcohol as a means of doing so. SMC identifies a person’s incentives in various life areas that might bring the person emotional satisfaction. It helps the person resolve his or her concerns, thereby enabling the person to gain emotional satisfaction without the use of alcohol.

To study the interrelationship between a person's current concerns, goal pursuits, and the motivation to use alcohol, Klinger, Cox, and Blount (1995, 2003) developed the Motivational Structure Questionnaire (MSQ). The MSQ asks the individual to briefly describe his or her current concerns in 11 life areas (e.g., Home and Household Matters, Employment and Finances, and Health and Medical Matters; see Chapter 3). The MSQ instructions explain to the respondent that current concerns can be (a) unpleasant things that people want to eliminate or avoid, or (b) pleasant things that people want to obtain or accomplish. Respondents are asked to describe their concerns in each life area, and they indicate what they would like to do in order to resolve each concern (i.e., their goal).

The respondent rates each goal on 10 scales; each scale ranges from 0 ("not at all") to 10 ("the most I can imagine"). In the ratings scales respondents are asked to indicate: (a) how important the goal is to them; (b) how committed they are to it; (c) how likely they are to achieve it; (d) if they know what to do in order to achieve it; (e) how happy they will be if they do achieve it; (f) how unhappy they will be even if they do achieve it; (g) how long it will take to achieve it; (h) if drinking alcohol will help to achieve it; and (i), if drinking alcohol will interfere with achieving it.

The individual's motivational profile can be constructed from the completed questionnaire. The indices from which the profile is plotted can be calculated in two ways: by averaging the ratings within each life area or across all life areas; the choice depends on the depth of analysis that is desired. Previous research (Cox, Blount, Bair, & Hosier, 2000; Cox & Klinger, 2004b) has shown that an individual's motivational structure, when assessed from the ratings across all life areas, can be adaptive or maladaptive. Furthermore, Cox and Klinger (2004b) have described how adaptive motivation was negatively associated with alcohol consumption, whereas maladaptive motivation was positively correlated with it.

The results of a person's MSQ provide core clinical indices that might become the focus of change. Cox, Klinger, and Blount (1999) described how clinical indices could be grouped into six categories that are often related to motivational difficulties, such as: (a) the overall profile; (b) the desired action in relation to the goal; (c) the role of the individual in relation to his or her concerns; (d) the commitment to the goals; (e) the value placed on achieving the goals; and (f) the expectancy, efficacy, and temporal factors in achieving goals.

Potential motivational difficulties can be identified from the overall profile. For instance, the number of concerns that a person has is indicative of motivational difficulties. A large number of concerns might indicate that the individual has too many incentives to be able to derive emotional satisfaction from any. A person with too many incentives will have difficulty successfully achieving them and this may jeopardise his or her more important incentives. The counsellor should help focus the individual on a smaller number of concerns. In contrast, a small number of concerns suggest the individual has too few incentives to gain emotional satisfaction. Thus, a person may feel unfulfilled with too few incentives. It is the role of the counsellor to help the individual to identify new incentives to pursue and enjoy.

People's desired action in relation to their concerns indicates whether they are positively or aversively motivated. It is psychologically more satisfying to be positively motivated (i.e., to want to obtain or accomplish a goal) than negatively motivated. Aversively motivated people are more likely to use alcohol as a means of coping (Klinger, 1977). The counsellor can help the individual to try to reframe aversive goals as positive ones. When this is not possible, it may be appropriate for the person to disengage from the aversive goals.

The role that people play in relation to their goals is also important. People can play either a passive (i.e., they are spectators in their own goal strivings) or an active role. Those who take a passive role are less likely to derive emotional satisfaction from the non-chemical incentives in their lives. The counsellor should help the individual to take a more active role in the goal striving, thereby ensuring more emotional satisfaction from goal attainment.

A fundamental aspect of a person's motivation is the level of commitment to his or her goals. Commitment reflects the effort that a person is willing to put forth to achieve his or her goals. There are two potential difficulties concerning commitment (a) low commitment and (b) inappropriate commitment. A person who has low commitment to a goal is unlikely to achieve it. Inappropriate commitment, on the other hand, indicates that although an individual is strongly committed to achieving a goal, he or she perceives little chance of success of achieving it or perceives little emotional satisfaction from doing so. In both of the above cases (i.e., low or inappropriate commitment), the counsellor would ask the person to re-evaluate the chances of successfully achieving the goal and his or her emotional satisfaction from doing so. It might also be necessary for the individual to relinquish goals with inappropriate or low commitment.

Motivational difficulties can be related to the emotional value that a person places on the achievement of his or her goals. For instance, an important indicator is the person's perceived level of positive affect (joy) and negative affect (unhappiness) on goal achievement. If, for instance, these two indices are rated in similar intensity then a person is likely to experience ambivalence. Ambivalent goals are difficult to resolve and can lead to frustration. The counsellor should help the individual to resolve this conflict or to disengage from the goal.

There are several motivational difficulties (i.e., hopelessness, helplessness, and lack of self-efficacy) that can be identified from one index. For instance, a low score on the likelihood index indicates the person's perceived level of hopelessness. It is the role of the counsellor to help the person become more optimistic about goal attainments or to find new goals that give a greater sense of optimism. If there is a low score on perceived control, the counsellor should help the person to gain more control over his or her goals (e.g., by being more active). A low score on *knowledge of what to do* index indicates a lack of self-efficacy. The counsellor should help the individual to increase his or her knowledge about how to obtain desired goals and in doing so increase the person's belief that the goal can be achieved.

Temporal factors also influence the degree of emotional satisfaction derived from the person's goal pursuits. Long-range goals that offer little short-term reward reduce the likelihood of experiencing positive affect. The counsellor can help the individual to generate short-term goals to pursue or break long-term goals into independently rewarding sub-goals.

The clinical indices described above indicate aspects of a person's motivation that can be the focus of change. Relationships among the indices can also provide valuable information to guide the counsellor's interpretation of the profile, as described in detail in Chapter 3. In addition to the overall profile, it is useful to explore the interrelationships among the goals. For example, working to achieve a particular goal might facilitate the achievement of other goals; conversely, one goal might interfere with the achievement of other goals.

SMC should be a collaborative endeavour between the client and the counsellor. For example, it is important for the counsellor to present the results of the motivational assessment tentatively, allowing the client to modify or qualify different aspects of the

results. Similarly, treatment goals should be negotiated between the counsellor and the client.

The counsellor's aim is to assist the client to resolve the motivational difficulties. The client should be encouraged to: (a) have a realistic number of goals, (b) be positively motivated, (c) take an active role in resolving his or her concerns, (d) feel committed to achieving appropriate goals and to give up the pursuit of inappropriate ones, (e) to resolve ambivalence associated with particular goals, (f) gain a sense of control over goal attainments, (g) develop self-efficacy about achieving goals, and (h) to learn to divide long-term goals into manageable sub-goals.

In certain cases, clients should disengage themselves from inappropriate goals. This might happen when concerns cannot be resolved, when goals are unrealistic, or if goals conflict with other goals. It can be difficult for clients to disengage from goals that they have been committed to, even when they can see the advantages of doing so. In giving up a goal a person is relinquishing something that he or she values. This can lead to negative affect. To counteract these feelings alternative, positive goals should be identified. The SMC counsellor should also help the client to find new pleasurable incentives.

To summarise, SMC aims to help clients resolve motivational difficulties that promote their use of alcohol. The goal is to enable the individual to pursue healthy, realistic goals and to relinquish conflicting or inappropriate goals. It is a collaborative, non-confrontational endeavour between the counsellor and the client.

### **General Discussion**

Cox and Klinger's (1988, 1990, 2004a) biopsychosocial model of alcohol use is a motivational framework for understanding alcohol use. The model depicts the final decision to drink as a volitional act that is based on the summation of expected changes in

affect. These expectations arise from a person's past experiences and from his or her current life situation. If the net expected affective change from drinking alcohol is positive, then the decision will be to drink; if it is negative, the decision will be not to drink. Each of the motivational approaches described in this chapter is compatible with the motivational model of alcohol use.

According to the stages of change model of Prochaska and DiClemente (1986), a person's willingness to change his or her behaviour moves through discrete stages. People who are in these different stages show different processes of change. For instance, Prochaska and DiClemente suggested that people in the precontemplation stage do not think about changing. This might be because they are unaware of a need to change (i.e., they are unaware that there is any risk associated with their behaviour), or it might be because they perceive that the benefits of the behaviour outweigh the benefits of changing it. In terms of the motivational model, a precontemplator perceives the net affective change from drinking as positive; a contemplator perceives the net affective change from drinking also as positive, although expected negative affective changes from drinking are accumulating; a person in the action stage of change perceives the net affective change from drinking to be negative.

Cox, et al. (2000) also identified a strong relationship between people's readiness to change and their emotional satisfaction from other goal pursuits. They found that participants who were emotionally involved in their goal pursuits—they had an adaptive motivational structure—were more determined to change their drinking than those who were not.

Motivational interviewing (MI; Miller & Rollnick, 1991, 2002) is a style of counselling that is compatible with Prochaska and DiClemente's (1986) transtheoretical model. MI recognises that many people are ambivalent about changing their alcohol use

(i.e., they are in the precontemplative or contemplative stage). It also recognises that interventions should be matched to the person's stage of change. MI is particularly suited to people in the precontemplation and contemplation stage (i.e., those who are ambivalent about change). It recognises that ambivalence is a normal process of change and it is counter-productive to engage a person who is not yet ready to change in "change talk."

One fundamental aim of MI is to develop a discrepancy between a person's actual drinking behaviour and his or her drinking goal. In terms of the Cox and Klinger's (1988, 1990, 2004a) model, MI attempts to tip the balance in favour of change by highlighting the discrepancy between the person's goal—which is to increase positive affect or reduce negative affect through drinking—and the actual outcome (i.e., drinking is harming the person's core values). In creating this discrepancy, MI's aim is to enable the individual to gauge how drinking increases his or her negative affect, thereby tipping the balance in favour of a decision to change. Indeed, people who do change their use of alcohol without the aid of formal intervention do so because they perceive the negative consequences of their drinking as outweighing the benefits (Sobell, Ellingstad, & Sobell, 2000).

Alcohol expectancy theory is also compatible with Cox and Klinger's (1988, 1990, 2004a) model. As described above, alcohol expectancies are an important factor in the motivational model. They are the beliefs that people hold about what will happen if they or others consume alcohol; they contribute significantly to the final decision to drink or not to do so. People's expectancies from consuming alcohol directly influence the value that they place on the effects that they are trying to achieve from drinking (e.g., if a person believes that alcohol relieves stress and he or she wants to reduce stress, then a high value is placed on drinking).

People's beliefs about the positive effects of drinking alcohol (i.e., their positive expectancies) can be challenged. The Expectancy Challenge (Darkes & Goldman, 1993,



1998) is a technique that challenges a person's belief about the pharmacological effects of consuming alcohol. However, both the pharmacological and instrumental effects of alcohol can be positive (i.e., they can increase a person's positive affect). Therefore, in many cases positive expectancies can be challenged (e.g., weakened) but not eradicated. For example, in the case described above (i.e., a person who drinks alcohol to reduce stress), it would be possible only to weaken the expectancy (e.g., by highlighting the fact that alcohol use provides only temporary stress relief) rather than eradicate it. Furthermore, perhaps a more effective expectancy challenge would highlight the negative expectancies associated with drinking to alleviate stress (i.e., it can actually increase tension and anxiety).

Jones and McMahon (1998, 2001) developed an intervention for increasing drinkers' negative alcohol expectancies. As described above, people who change their alcohol use without formal intervention do so after recognising the mounting negative consequences of their drinking. Therefore, highlighting the excessive drinker's negative alcohol expectancies is likely to enhance the person's motivation to change. Like MI, an expectancy challenge tips the balance in favour of decisions to change. Jones (2004) suggested that the negative expectancy construct is a component of MI, although its use in MI is more informal and subjective than Jones and McMahon's approach.

Unlike the methods just described, SMC modifies people's motivation to drink by helping them to gain emotional satisfaction in other areas of their lives. According to Cox and Klinger's (1988, 1990, 2004a) model, the lack of emotional satisfaction in other life areas critically contributes to a person's decision to drink. SMC examines both drinking and non-drinking incentives, but it does so in a manner that is compatible with the approaches described earlier. In fact, Miller and Rollnick (1991, p188) described SMC as

a “. . . complement to our more problem-focused discussions of motivational interviewing.”

This chapter reviews people’s motivations to drink and not to drink and their motivations for changing their drinking. The motivational model of alcohol use depicts people’s motivations to drink or not to drink. The stages-of-change model, MI, the alcohol expectancy challenge, and SMC consider ways to change people’s motivation to drink. Motivations for drinking and motivations for changing drinking are inevitably interrelated. The techniques described in this chapter are used to motivate people to change their drinking by altering the processes that contribute to their decisions to drink.

## CHAPTER 3

### Intervention Components

The two intervention studies in this thesis (see Chapters 4, 5, and 6) evaluated two brief interventions for excessive drinkers: the Computerised Brief Intervention (CBI), and the Enhanced Computerised Brief Intervention (CBI-E). This chapter describes each of the interventions and the techniques used in each to motivate participants to change. The CBI was designed to motivate participants to change their current alcohol use in three ways. First, it gives participants objective feedback about their drinking. Second, it highlights the discrepancy between the participant's current status from drinking and their goal of drinking. Finally, it asks the participant to consider the future implications of not changing his or her use. The CBI-E added to the CBI an additional component that was designed to motivate participants by giving them personalised feedback about potential motivational deficits in their goal pursuits, and providing them with guidelines for overcoming such motivational deficits.

The CBI described in this chapter was developed by the current author in collaboration with staff from the alcohol agency CAIS Ltd. Therefore, there are no specific treatment manuals to deliver the intervention. However, the CBI intervention draws heavily from motivational interviewing (see Chapter 2 for a description) and basic counselling skills<sup>1</sup>. The additional component of the CBI-E intervention (i.e., the PCI; Cox & Klinger, 2004, see Chapter 2 for a description) was also adapted specifically for the studies contained in this thesis by the author. The feedback described in this chapter was

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<sup>1</sup> The author received training in motivational skills, basic counselling skills, and the Dutch Drinker's Check-Up.

guided by Cox, Klinger, and Blount's (1999) *Systematic Motivational Counselling: A Treatment Manual*<sup>2</sup>.

This chapter is divided into three sections. The first section describes each of the screens used in the CBI; the second section does so with the additional screens of the CBI-E. The final section demonstrates, from a selection of examples, how the motivational profiles used in the CBI-E are interpreted and the typical feedback that was given to participants.

### **The Computerised Brief Intervention (CBI)**

Participants were introduced to the CBI as a computer-aided interview in which they would receive personalised and objective feedback about their drinking. They were told that the interview would be administered via the computer and that their responses would be recorded into the computer by the interviewer. Although the interviewer operated the computer, the participant was encouraged to look at the screens and to confirm the accuracy of the data entered. The CBI is presented in twelve computer screen pages, which are described below.

#### **Screen 1—Welcome Page**

Screen 1, *Welcome Page*, is shown in Figure 3.1. This page outlines the main components of the intervention. The interviewer informed the participant that during the intervention an estimate of his or her peak blood alcohol concentration for a heavy drinking episode would be calculated. The participant was told that he or she would be asked to list some of the “good things” and some of the “not so good” things about his or her drinking. The participant was also told that he or she would receive two print-outs:

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<sup>2</sup> Professor Miles Cox, a clinical psychologist and joint developer of the PCI, provided the current author with clinical supervision throughout the studies in this thesis.

one of the results of the session, and one of specialist alcohol services and their telephone numbers—this latter print-out was for those people who wished to pursue further help about their drinking.

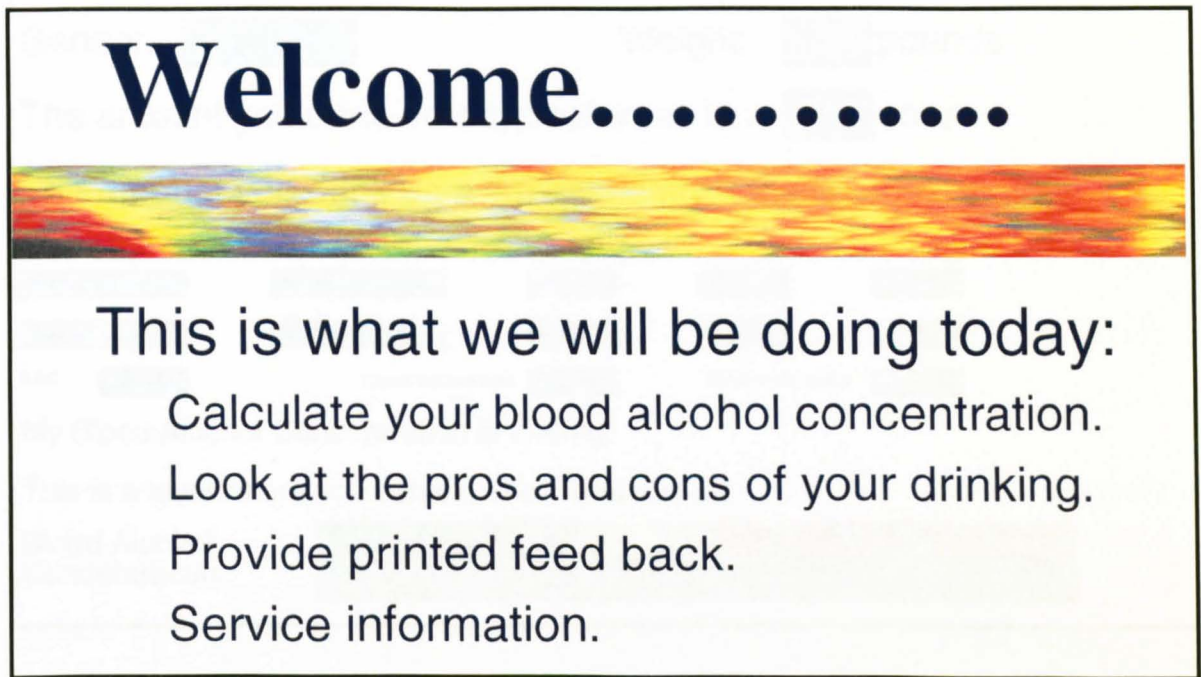


Figure 3.1. Screen 1—the Welcome Page—of the Computerised Brief Intervention.

### **Screen 2—Calculating Your Blood Alcohol Concentration**

Screen 2, *Calculating Your Blood Alcohol Concentration*, is shown in Figure 3.2. On this screen the participant's name, gender, weight, and typical weekly alcohol consumption is recorded. The participant's typical weekly alcohol consumption was recorded with the Timeline Follow-back procedure prior to taking part in intervention.

# Calculating your Blood Alcohol Concentration

Name:                       Stones:  =  pounds

Gender:                       Weight:  pounds

The amount you drink on a typical week is...  units

The amount you drink on a typical heavy drinking session is...

Drink Type	Container	Units per container	Amount	Total units
<input type="text" value="Alcopops"/>	<input type="text" value="bottle"/>	<input type="text" value="1.5"/>	<input type="text" value="6"/>	<input type="text" value="9"/>
<input type="text" value="Vodka"/>	<input type="text" value="doubles"/>	<input type="text" value="2"/>	<input type="text" value="4"/>	<input type="text" value="8"/>
BAC <input type="text" value="246.0"/>	Hours to consume <input type="text" value="4"/>	Total daily units <input type="text" value="17"/>		

My Blood Alcohol Concentration is 246mg.

This is a level where you can experience blackouts.

Blood Alcohol Concentration	0 mg per 100ml	60mg per 100ml	80mg per 100ml	100mg per 100ml	160mg per 100ml	300mg per 100ml	500mg per 100ml
		Social drinking	Drink Dive Limit	Normal level of being drunk	May experience blackouts	May lose consciousness	A fatal dose

Figure 3.2. Screen 2—Calculating Your Blood Alcohol Concentration—of the Computerised Brief Intervention.

The participant was asked to recount the details of his or her last heavy drinking episode. He or she was asked to recall the type of drink(s) consumed, the container size of the beverage (e.g., cans, glass, pint), and the quantity of the containers (e.g., bottles, cans) consumed. The computer program has space for a maximum of two types of beverages to be entered. The conversion of alcohol quantities into standard British units is conducted by the interviewer from Alcohol Concern “Alcohol Units Ready Reckoner” fact sheet (See Appendix A, p. 305). The participant was also asked to state the duration of the drinking episode. The interviewer would ask, “Can you tell me more about this drinking session? What time did you start drinking? What time did the session finish?”

An estimate of the participants’ peak Blood alcohol Concentration (BAC) for the last heavy drinking session was calculated by using the Blood Alcohol Concentration



Calculation System (BACCuS; Markham, Miller, & Arciniega, 1993), which is another computer program. This procedure takes just a few seconds to complete.

The interviewer informed the participant that a BAC level is an indicator a person's level of intoxication, which is determined from a person's gender, weight, the amount of alcohol consumed, and the length of the drinking episode. The participant was told that when people reach particular BAC levels, they usually experience distinct effects. For instance, people can feel relaxed at a BAC level not exceeding 60mg% (a level of social drinking); they may have impaired judgement at a BAC level above 80mg% (the level at which, in the U.K., it is illegal to drive a car); they might become uninhibited at a BAC level above 100mg% (the level at which, in many states in the U.S.A., a person is legally intoxicated); a person may experience blackouts at a BAC level above 160mg%; he or she can lose consciousness at a BAC level above 300mg%; and a person can die at a BAC level above 500mg%.

The interviewer would tell the participant that it is possible for people to reach (or exceed) the BAC levels highlighted above without experiencing the corresponding effects. This might be because the person has an increased tolerance of alcohol. Tolerance of alcohol is developed by regularly drinking alcohol at high levels. The development of tolerance to alcohol can cause harm to a person's health. In usual circumstances, after consuming large quantities of alcohol the body reacts to its damaging effects (e.g., feelings of nausea, hangovers) and this is a natural warning system. However, people who do not experience hangovers, or feel unwell after drinking large quantities (i.e., those who have developed a tolerance to alcohol) are often unaware of the damage to themselves.

The feedback from this screen is designed to increase the participants' awareness of the associated risks from their drinking. In doing so, this information might motivate them to think about change.

### Screen 3—Weekly Alcohol Consumption

Screen 3, *Weekly Alcohol Consumption*, is shown in Figure 3.3. This page presents a bar graph of the drinking levels of the general population (based on information from the Office for National Statistics, 2001). There are two graphs: one for males and one for females. The computer automatically selects the appropriate graph from the information entered on Screen 2.

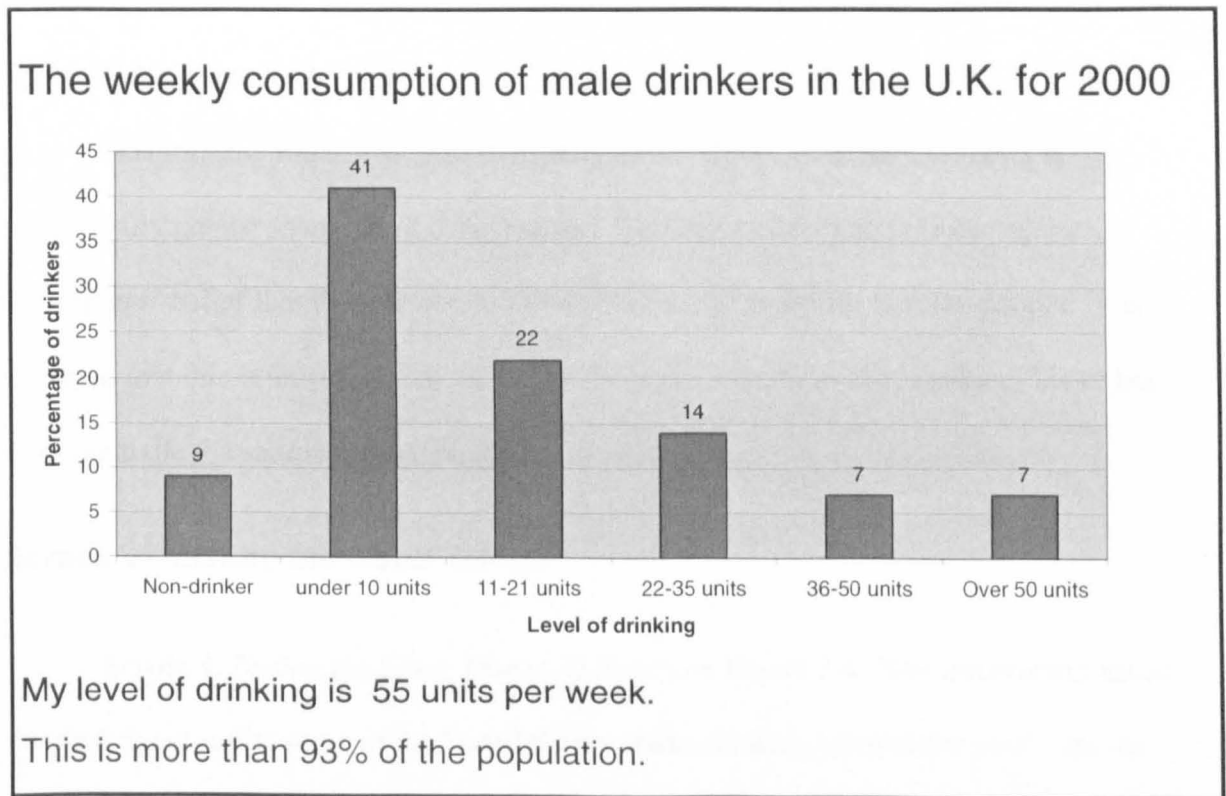


Figure 3.3. Screen 3—Weekly Alcohol Consumption—of the Computerised Brief Intervention.

The bar graph displays categories of drinking levels (on the  $x$  axis) and the percentage of the population (of males or females) who drink at these various levels in a typical week in the U.K. (on the  $y$  axis). For women, the graph displays the percentage of non-drinkers, drinkers consuming 7 units or less, 8-14 units, 15-25 units, 26-35 units, and more than 35 units in a week; for men, the graph displays the percentage of non-drinkers, drinkers



consuming 10 units or less, 11-21 units, 22-35 units, 36-50 units, and more than 50 units in a week.

The computer also automatically produced two sentences about the participant's level of drinking based on the information entered on Screen 2. These are displayed below the graph. The first sentence states, "My level of drinking is [number] units per week". The second states, "This is more than [number]% of the population". These were read aloud to the participant. The participant was also shown which category on the graph his or her drinking was in.

This information is designed to highlight how the participant's drinking is substantially greater than that of other people. The aim of doing so is to dispel the participants' belief that they simply drink as much as the majority of other people. It is expected that this information will motivate the participant to modify (reduce) his or her drinking to be the same as other people.

#### ***Screen 4—Listing the Good Things***

Screen 4, *Listing the Good Things*, is shown in Figure 3.4. The interviewer asked the participant to list some of the "good things about drinking alcohol for you". As the participant described some of these "good things" the interviewer used reflective listening techniques as taught in MI, which were described in Chapter 2. The following is an example typical session:

Interviewer: "If you had to give me a list of some of the good things about drinking alcohol for you, what would you say?"

Participant: "Well, I can go out and mix with other people better, and it helps me have a better night."

Interviewer: "It sounds like when you drink it helps you to socialise better."

Participant: "Yes, I think it does help me socialise. I mean you feel less inhibited, don't you?"

*Interviewer enters into the computer "It helps me socialise"*

Interviewer: "You say it also helps you to mix better after you've been drinking. Tell me a bit more about that."

Participant: "I think it gives me more confidence. I am able to do things I don't normally do!"

Interviewer: "So you'd say it gives you confidence?"

Participant: "Yes"

*Interviewer enters into the computer "It gives me confidence"*

Interviewer: "Are there any other good things for you?"

Participant: "I think it helps me to relax and just makes a night out more fun"

Interviewer: "So, it helps me to relax, and it makes a night out more fun?"

*Interviewer enters these last two items into the computer*

# What are the good things for you about drinking alcohol?

- 1 It helps me socialise
- 2 It gives me confidence
- 3 It helps me relax
- 4 It makes nights out more fun

Figure 3.4. Screen 4—Listing the Good Things—of the Computerised Brief Intervention.

## Screen 5—Listing the Not So Good Things

Screen 5, *Listing the Not So Good Things*, is shown in Figure 3.5. The interviewer asked the participant to list some of the “not so good things about drinking alcohol for you”. As the participants described some of these “not so good things” the interviewer used the same reflective listening techniques, described above, to summarise the items. The following is an example typical session:

Interviewer: “If, this time, you had to give me a list of some of the not good things about drinking alcohol for you, what would you say?”

Participant: “Well, I think it has got to be the morning after.”

Interviewer: “Do you mean hangovers?”

Participant: “Oh yes, I get terrible hangovers.”

*Interviewer enters into the computer "The hangovers"*

Interviewer: "Is there anything else that is not so good for you?"

Participant: "Yes the cost of it!"

Interviewer: "So it is expensive?"

Participant: "Yes"

*Interviewer enters into the computer "It's expensive"*

Interviewer: "Are there any other not so good things for you?"

Participant: "Yes I do tend to get a bit argumentative after I have had a few."

Interviewer: "So you can get into arguments. Tell me a bit more about that."

Participant: "Well sometimes I can get a bit rowdy, you know, and I might end up arguing with someone. But then my girlfriend gets on my back about it and we end up rowing."

Interviewer: "So you've noticed that you can get argumentative after you've been drinking"

*Interviewer enters "I can get argumentative."*

Interviewer: "Is there anything else?"

Participant: "No that's about it."

# What are the not so good things for you about drinking alcohol?

- 1 The hangovers
- 2 It's expensive
- 3 I get argumentative
- 4

Figure 3.5. Screen 5—List the Not So Good Things—of the Computerised Brief Intervention.

## Screen 6—Weighing-up the Two Sides

Screen 6, *Weighing-up the Two Sides*, is shown in Figure 3.6. This screen displays an image of traditional weighing scales—the type that uses two trays. One tray is labelled *Good things* and the other *Not so good things*. Each of the trays contains the items from the previous pages—the good things tray contains the items described in Screen 4, and the not so good things tray contains the items described in Screen 5. The interviewer read aloud the items in each list, first the good things and then the not so good things. The interviewer would then say the following to the participant, “When people weigh-up the two sides of their drinking, some will say, even though there are these “not so good things”, the “good things” outweigh them. For instance, they might say, I still get *more* from my drinking. Others might say, I think that the not so good things are beginning to



outweigh the good things. Others still, may say they weigh the same. How do they weigh up for you? Which side weighs the most?" The participant had the three options: *Good things*, *Not so good things*, and *Same*. The participant's answer was recorded on the screen.

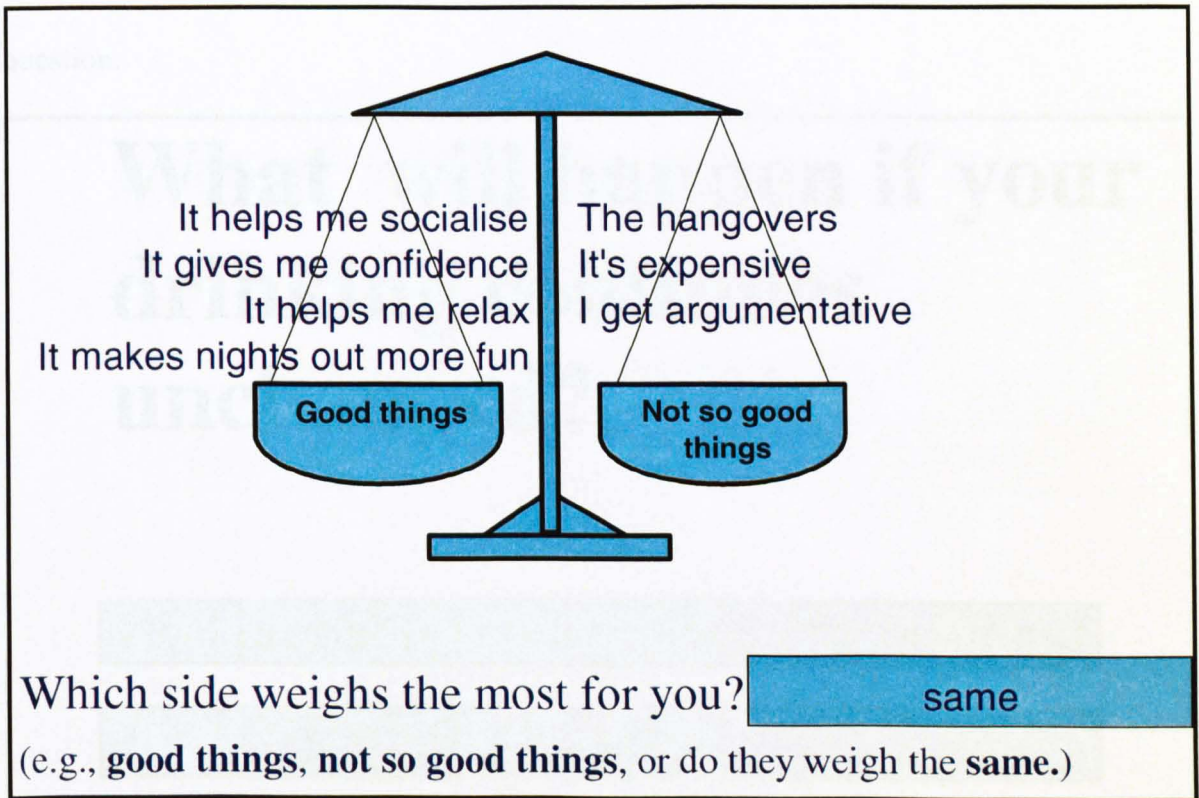
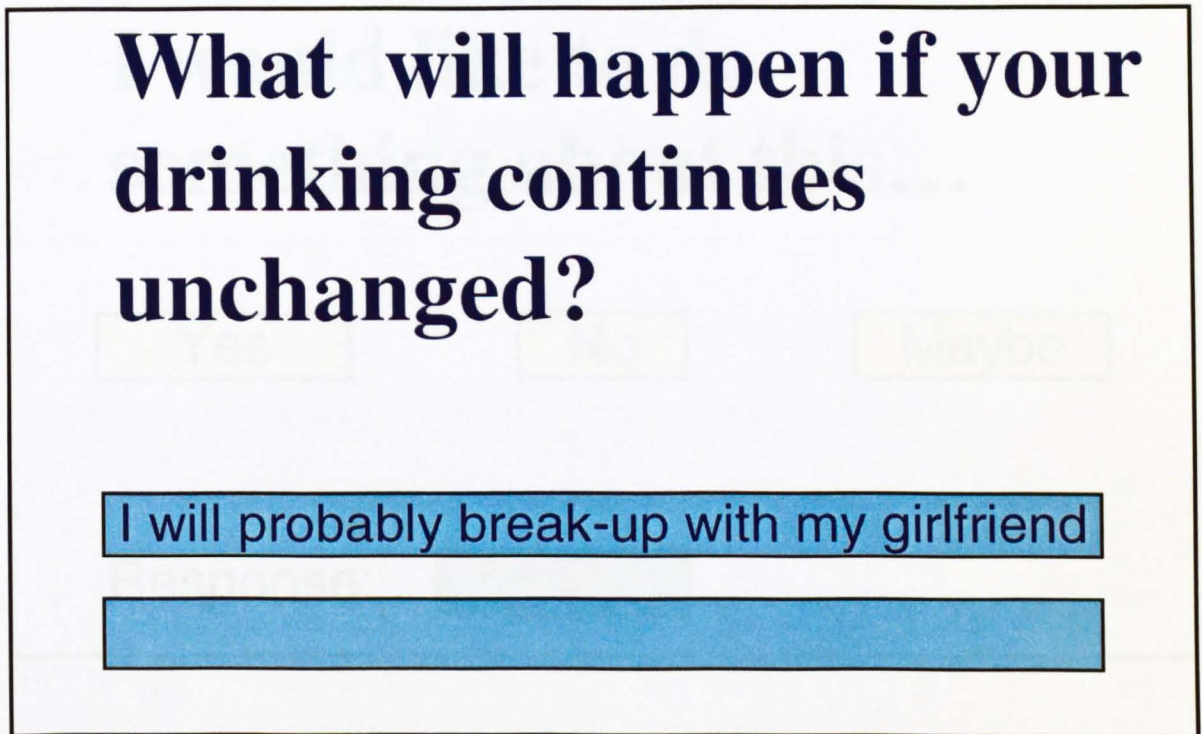


Figure 3.6. Screen 6—Weighing-up the Two Sides—of the Computerised Brief Intervention.

The weighing up of the good and not so good things is a method of motivating the participant to consider change by developing a discrepancy between the present status and his or her goal. This is a fundamental aspect of Motivational Interviewing. In Figure 3.6 the goal of drinking, in part, is to help the participant socialise better and to have a better night out. This contrasts to what can sometimes happen: the participant actually becomes argumentative after drinking. This slide objectively captures the costs and benefits of the participant's drinking.

### **Screen 7—The Future Consequences**

Screen 7, *The Future Consequences*, is shown in Figure 3.7. The interviewer asked the participant to state what he or she thought would happen in the future if he or she continued drink at the same level. The participant's answer was recorded below the question.



**What will happen if your drinking continues unchanged?**

Yes No Maybe

I will probably break-up with my girlfriend

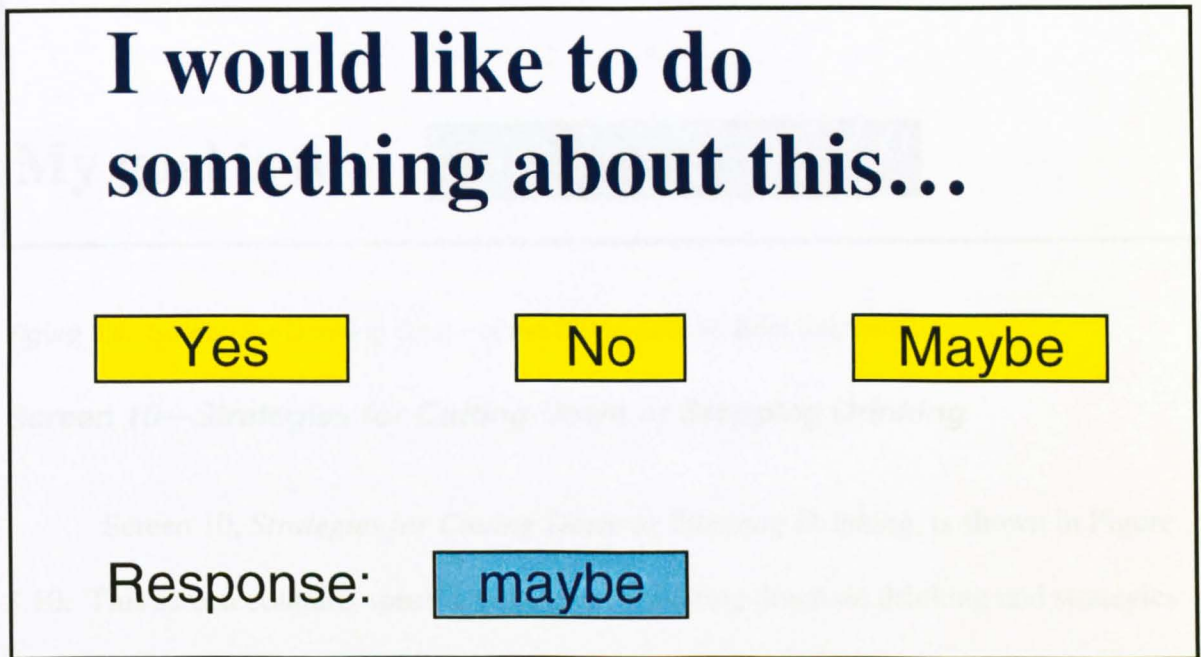
*Figure 3.7.* Screen 7—The Future Consequences—of the Computerised Brief Intervention.

This section of the intervention asks the participant to consider the future implications of his or her use. In light of the previous screens (e.g., Screen 2—the participant might have developed a tolerance for alcohol; Screen 3—he or she might be drinking considerably more than the rest of the population; and Screen 5—the participant had considered the costs of drinking for him or her personally), this screen helps the participant to identify a need for change.



### Screen 8—Do You Want to Change?

Screen 8, *Do You Want to Change?*, is shown in Figure 3.8. The interviewer asked the participant, “Would you like to change your use of alcohol?” The participant was asked to select one of three answers: “Yes”, “No”, or “Maybe”. The answer was recorded on the screen.



**I would like to do  
something about this...**

**Yes**      **No**      **Maybe**

Response: **maybe**

Figure 3.8. Screen 8—Do You Want to Change—of the Computerised Brief Intervention.

### Screen 9—Drinking Goal

Screen 9, *Drinking Goal*, is shown in Figure 3.9. The interviewer asked the participant, “What would you like to do about your drinking? Would you like to cut down, stop, or stay the same?” The interviewer recorded the participant’s answer on the screen.



# What would you like to do about your drinking?

Cut down

Stop

Stay the same

My goal is to cut down

Figure 3.9. Screen 9—Drinking Goal—of the Computerised Brief Intervention.

### Screen 10—Strategies for Cutting Down or Stopping Drinking

Screen 10, *Strategies for Cutting Down or Stopping Drinking*, is shown in Figure 3.10. This screen contains specific strategies for cutting down on drinking and strategies for stopping drinking. The interviewer asked the participant to consider this sheet in accordance with his or her selection on the previous screen. For instance, if the participant had selected *stop* on the Drinking Goal screen then he or she was directed only to the “How to stop drinking” section of the screen. If the participant wanted to cut down on drinking then he or she was asked to consider both strategies for cutting down and strategies for stopping—because the strategies for stopping can also be helpful when people are cutting down. If the participant did not want to reduce or stop drinking, then he or she was asked to consider the strategies that might be useful if he or she did decide to change in the future.

## Strategies for cutting down or stopping drinking.

If you were to cut down or stop drinking how would you do this?

<u>How to cut down on drinking:</u>	<u>Select the strategies that you would try:</u>
1. Reduce the number of days that I drink. * Try to have at least two drink free days per week.	<input type="checkbox"/> yes
2. To change the way that I drink. * Delay the onset of drinking perhaps by going out a bit later. * Avoid buying drinks in rounds. * Alternate non-alcoholic drinks between alcoholic ones. * Don't drink alcohol to quench thirst.	<input type="checkbox"/> yes
<b><u>How to stop drinking:</u></b>	
* To engage in activities incompatible with heavy drinking.	<input type="checkbox"/> yes
* To seek support from family and friends.	<input type="checkbox"/> no
* To avoid contact with heavy drinkers.	<input type="checkbox"/> yes
* To contact specialist services.	<input type="checkbox"/> no

Figure 3.10. Screen 10—Strategies for Cutting Down or Stopping Drinking—of the Computerised Brief Intervention.

The participant was told, “these are some strategies that other people have used when cutting down or stopping drinking.” Participants who indicated that they wanted to cut down on drinking were asked to consider the first strategy: cutting down by *reducing the number of days drinking in a week*. More specifically participants were informed that they should try to have at least two drink-free days per week.

Next, the participant was asked to consider a second strategy for cutting down by *changing the way that I drink*. There are four sub-categories to *changing the way that I drink*: two techniques are based on slowing down the drinking rate—either by drinking non-alcoholic drinks between alcoholic ones or by first quenching thirst with non-alcoholic drinks. Another strategy asked the participant to think about delaying the time of the onset of drinking rather than attempting to control drinking after it has started. A final strategy highlighted the risk of excessive drinking that can occur when buying and drinking in *rounds* with others. The participants were asked if either of these strategies (e.g., *reducing*

*the days that I drink* or *changing the way that I drink*) are ones that they would try and their reply (i.e., yes or no) was entered in the answer box.

The *How to Stop Drinking* sub-section of the screen contains four strategies for stopping drinking. The first strategy states, “*To engage in activities incompatible with heavy drinking.*” The participant was told an example of this strategy would be to take up a new hobby or to re-establish an old hobby. Hobbies that require a high degree of concentration or physical effort can deter drinking in two ways: first, alcohol might have a deleterious effect on the new desired behaviour; and second, this new activity might fill the vacuum left from not drinking.

The second strategy states, “*To seek support from family or friends.*” The participant was informed that the use of this strategy might increase a person’s commitment to the desired goal of stopping drinking.

The third strategy states, “*To avoid contact with heavy drinkers.*” The interviewer would tell the participant that it can be difficult for some people to stop drinking when they continue to have contact with friends who drink heavily.

The fourth strategy states, “*To contact specialist services.*” The interviewer would tell the participant that some people find it useful, when stopping drinking, to contact specialist services for people who drink excessively. The interviewer recorded the participants’ preferred strategies in the answer box.

The strategies sheet was printed for the participant at the end of the session.

### **Screen 11—Positive Action**

Screen 11, *Positive Action*, is shown in Figure 3.11. The interviewer asked the participant, “Can you think of one positive thing you can do when you leave here?” The participant was asked to answer this question in relation to his or her drinking goal. For



instance, if the participant intended to cut down or stop drinking, then he or she would be asked to state a positive way of doing this. On the other hand, if the participant intended to continue to drink at the same level, he or she was asked to record any future positive action (e.g., working on an assignment, doing some revision).

**Can you think of one  
positive thing you could  
do when you leave here?**

**What would this be?**

**I am going to join the gym again**

Figure 3.11. Screen 11—Positive Action—of the Computerised Brief Intervention.

### **Screen 12—Feedback Sheet**

Screen 12, *Feedback Sheet*, is shown in Figure 3.12. This page summarises the CBI intervention. The screen is fully updated from the previous pages of the intervention; it did not require any further input from the interviewer or the participant. The screen presents the participant's name, level of weekly alcohol consumption, and the number of units contained in his or her preferred drink(s)—this from Screen 2. It displays a gender-specific graph of population levels of weekly alcohol consumption, the percentage of males or females in the U.K. above which the participant drinks—this from Screen 3; it also stated the recommended weekly consumption guidelines for men or women.

Name: **John** **My personal feed back/goals sheet**

The weekly consumption of male drinkers in the U.K. for 2000

Level of drinking	Percentage of drinkers
Non-drinker	9
under 10 units	41
11-21 units	22
22-35 units	14
36-50 units	7
Over 50 units	7

My level of drinking is 55 units per week.  
This is more than 93% of the population.

Men who drink above 21 units per week may be harming their health.

- \* Note a bottle of Alcopops = 1.5 units
- \* Note a doubles of Vodka = 2 units

How things weigh up for you:	For me the sides weigh the same
------------------------------	---------------------------------

**Blood alcohol concentration.**

60mg per 100ml	Social drinking
80mg per 100ml	Drink drive limit
100mg per 100ml	Normal level of being drunk
160mg per 100ml	You may experience blackouts
300mg per 100ml	You may lose consciousness
500mg per 100ml	Can be fatal

When I drink 17 units in 4 hours	My Blood Alcohol Concentration is 246mg.	This is a level where you can experience blackouts.
----------------------------------	--	---

If my drinking continues unchanged	I will probably break-up with my girlfriend
------------------------------------	---

I would like to do something about this...	maybe	My goal is to	stop
--	-------	---------------	------

My positive thing to do is:	I am going to join the gym again
-----------------------------	----------------------------------

Figure 3.12. Screen 12—Feedback Sheet—of the Computerised Brief Intervention.

The feedback sheet presents the participant’s view of the future effects that his or her drinking will have if it continues unchanged—this from Screen 7. It states the participant’s intention to change his or her drinking—this from Screen 8—and his or her drinking goal—from Screen 9. Finally, the participant’s positive future action is displayed—from Screen 11. The interviewer guided the participant through the feedback sheet by recapping each of the points discussed during the intervention. The participant received a hard copy of the feedback sheet at the end of the interview.

### The Enhanced Computerised Brief Intervention (CBI-E)

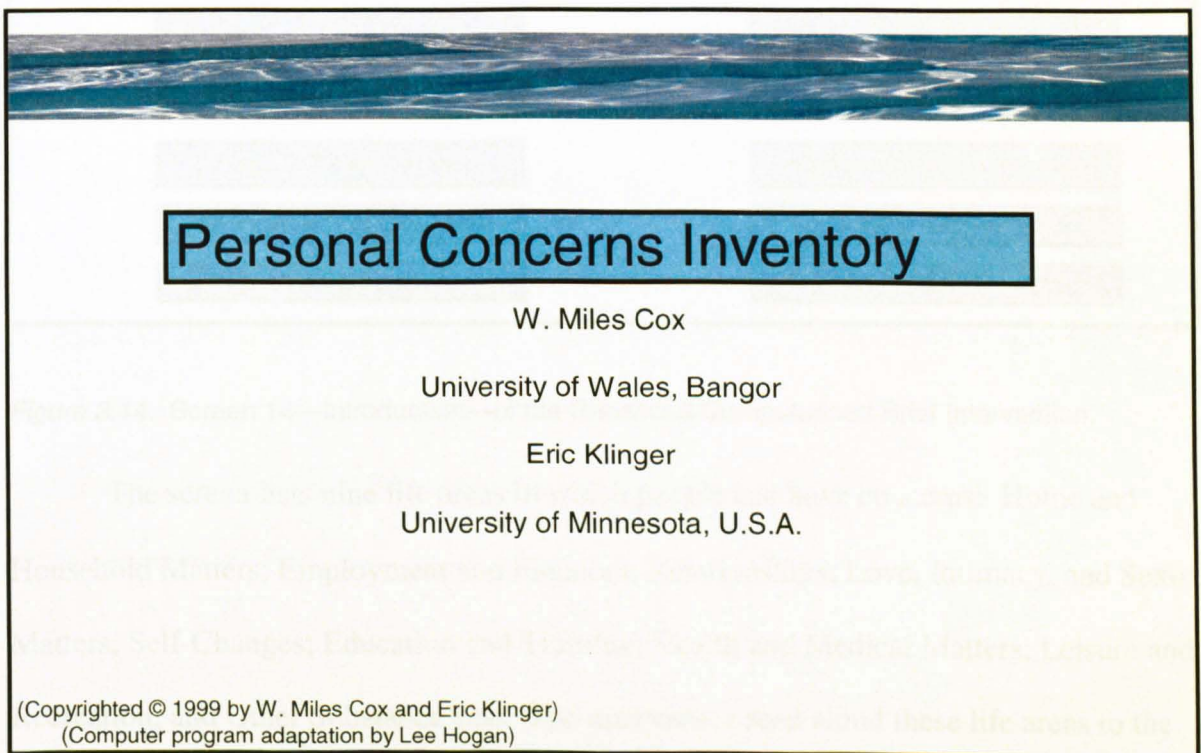
Participants were introduced to the CBI-E as a computer task that was designed to give them personalised and objective feedback of their drinking and feedback about other, more general, aspects of their lives. The CBI-E was presented in a minimum of 17 screens and a maximum of 28 screens—the exact number of screens depended upon the number of



concerns that the participant had—each concern was on a different screen. The first 12 screens were the same as those used in the CBI; the additional screens of the CBI-E are described below.

### **Screen 13—Personal Concerns Inventory (PCI)**

Screen 13, *Personal Concerns Inventory (PCI)*, is shown in Figure 3.13. This screen displays the title of the next section of the intervention, the authors of the PCI, and their academic affiliations.



*Figure 3.13.* Screen 13—Personal Concerns Inventory (PCI)—of the Enhanced Computerised Brief Intervention.

### **Screen 14—Introduction**

Screen 14, *Introduction*, is shown in Figure 3.14. This screen introduces the PCI. It contains three paragraphs of text. They explain respectively: (a) the rationale for the

PCI, (b) what the PCI aims to explore, and (c) the first of the three steps necessary to complete the PCI. The three introductory paragraphs were read aloud to the participant.

Name: John Introduction

Undoubtedly, you have concerns about different areas of your life. You may also have in mind things that you would like to change in order to resolve these concerns. If these changes were to happen, it might make it easier for you to change your use of alcohol.

By concerns we do NOT mean only problems. You might have concerns about unpleasant things that you want to 'get rid of,' 'prevent,' or 'avoid.' Or you might have concerns about pleasant things that you want to 'get,' 'obtain,' or 'accomplish.'

Read through the Areas of Life listed below, and think carefully about each of them. Then think about the areas in which you have important concerns or things that you would like to change.

Home and Household Matters	Education and Training
Employment and Finances	Health and Medical Matters
Partner, Family, and Relatives	Spiritual Matters
Friends and Acquaintances	Hobbies, Pastimes, and Recreation
Love, Intimacy, and Sexual Matters	Other Substance Use
Self Changes	Other Areas (not included above)

Figure 3.14. Screen 14—Introduction—of the Enhanced Computerised Brief Intervention.

The screen lists nine life areas in which people can have concerns: Home and Household Matters; Employment and Finances; Relationships; Love, Intimacy, and Sexual Matters; Self-Changes; Education and Training; Health and Medical Matters; Leisure and Recreation; and Other Substance Use. The interviewer read aloud these life areas to the participant. The participant was then given verbal examples of appetitive goals (i.e., positive things people are trying to get or accomplish) and aversive goals (i.e., negative things people are trying to avoid or get rid of). These were as follows:

*Home and Household* (appetitive). A person may have a concern about the style of decoration of a room in his or her house. The person may want to re-decorate that room.

*Home and Household* (aversive). A person may have a concern about being evicted from his or her home. The person may want to avoid being evicted.



*Employment and Finances* (appetitive). A person may have a concern about the lack of opportunities for promotion at work. The person may want to get a new job.

*Employment and Finances* (aversive). A person may have a concern about his or her poor finances. The person may want to avoid getting further into debt.

The participant was informed that people can have one or more concerns in some life areas, and no concerns in others. The interviewer asked the participant to take a few moments to think about the life areas where he or she might have concerns, before proceeding to the next screen.

### **Screen 15—Selecting Concerns**

Screen 15, *Selecting Concerns*, is shown in Figure 3.15. This screen lists the life areas that are presented on the previous page. The participant was instructed to select a life area where he or she had a concern. There was no instruction to choose any particular life area first; this is left to the participant's preference—some people started at the top of the list and considered each life area in turn; others preferred to start with their most important concerns first.



## Your Concerns

These are the areas where you may have concerns

Home and Household Matters  
 Employment and Finances  
 Relationships  
 Love, Intimacy, and Sexual Matters  
 Self Changes  
 Education and Training  
 Health and Medical Matters  
 Leisure and Recreation  
 Other Substance Use

Please can you list your concerns below according to the life areas listed above.

	Life area	Concern
Concern 1	Education and Training	The level of my grades
Concern 2	Employment and Finances	I haven't got a part-time job
Concern 3	Health and Medical Matters	I suffer from ME
Concern 4	Leisure and Recreation	My football isn't going well
Concern 5		
Concern 6		
Concern 7		
Concern 8		
Concern 9		
Concern 10		
Concern 11		
Concern 12		

Figure 3.15. Screen 15—Selecting Concerns—of the Enhanced Computerised Brief Intervention.

The participant would select his or her first life area, and this was recorded on the screen. The participant was then asked to state his or her concern in this life area, and it was typed into the program. This process was repeated until the participant had named all of his or her concerns or a maximum of 12 concerns.

### **Screens 16 to 27—Concerns 1 to 12**

Screen 16, *Concern 1*, is shown in Figure 3.16. The heading of this screen is automatically updated with the name of the participant's first chosen life area from Screen

15. Beneath the heading, the screen illustrates the three steps needed to complete the PCI. Step 1 required the participant to write his or her concern—this had been completed on Screen 15 and so was automatically updated to the *concern box* on this screen. Step 2 asked the participant what he or she would like to do to resolve the concern (i.e., his or her goal). Step 3 instructed the participant to rate each goal on several indices.



# Education and Training

When you think of this area what comes to mind?

**Step 1: Write your concerns:**

**Step 2. Describe what you want to happen:**

**Step 3. Choose numbers from the Rating Scale and tick in the boxes:**

Concern #1
The level of my grades

What you would like to happen is
I would like to improve the level of my grades

<b>Commitment:</b>	How committed do I feel to make things turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is no commitment at all, and 10 is strong commitment										

<b>Importance:</b>	How important is it to me for things to turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is not important at all, and 10 is very important										

<b>How likely:</b>	How likely is it that things will turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is not likely at all, and 10 is very likely										

<b>Control:</b>	How much control do I have in causing things to turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is not control at all, and 10 is much control										

<b>What to do:</b>	Do I know what steps to take to make things turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is not knowing at all, and 10 is knowing exactly										

<b>Joy:</b>	How much joy would I get if things turn out the way I want?									
0	1	2	3	4	5	6	7	8	9	10
0 is no joy at all, and 10 is great joy										



<b>Unhappiness:</b> Sometimes we feel unhappy, even if things turn out the way we want. How unhappy would I feel if things turn out the way I want?										
0	1	2	3	4	5	6	7	8	9	10
1										
0 is no unhappiness at all, and 10 is a great unhappiness										

<b>When will it happen?</b> How long will it take for things to work out the way I want?					
Today	Days	Weeks	Months	Years	Never
			2		
Please indicated the number of days, weeks, months, or years.					

<b>Will alcohol help?</b> Will using alcohol help things turn out the way I want?										
0	1	2	3	4	5	6	7	8	9	10
	1									
0 is not helpful at all, and 10 is very helpful										

<b>Will alcohol interfere?</b> Will using alcohol interfere with things turning out the way I want?										
0	1	2	3	4	5	6	7	8	9	10
		1								
0 is not interfere at all, and 10 is interfere very much										

Figure 3.16. Screen 16—Concern 1—of the Enhanced Computerised Brief Intervention.

The participant was asked to complete Step 2. The participant indicated what he or she would like to happen to resolve the stated concern—this was the participant’s goal.

The answer was then typed into the computer.

The participant was next asked to begin Step 3. This required him or her to rate the goal on 10 different scales: *Commitment*, *Importance*, *How likely*, *Control*, *What to do*, *joy*, *Unhappiness*, *When will it happen?* *Will alcohol be helpful?*, and *Will alcohol be unhelpful?* The participant was asked to rate the goal in the following way:

*Commitment.* The interviewer asked, “How committed are you to achieving... [the goal named in Step 2]”. The rating scale ranged from 0 (“no commitment at all”) to 10 (“a strong commitment”).

*Importance.* The interviewer asked, “How important is it for you achieve... [the goal named in Step 2]”. The rating scale ranged from 0 (“not important at all”) to 10 (“very important”).

*How likely.* The interviewer asked, “How likely is it that you will achieve... [the goal named in Step 2]”. The rating scale ranged from 0 (“not likely at all”) to 10 (“very likely”).

*Control.* The interviewer asked, “How much control do you have in achieving... [the goal named in Step 2]”. The rating scale ranged from 0 (“no control at all”) to 10 (“much control”).

*What to do.* The interviewer asked, “Do you know what steps to take in order to achieve... [the goal named in Step 2]”. The rating scale ranged from 0 (“not knowing”) to 10 (“knowing exactly”).

*Joy.* The interviewer asked, “How much joy will you have if you do achieve... [the goal named in Step 2]”. The rating scale ranged from 0 (“no joy at all”) to 10 (“great joy”).

*Unhappiness.* The interviewer asked, “How much unhappiness will you have even if you do achieve... [the goal named in Step 2]”. It was explained to the participant that even when people do get the things they want they can sometimes still feel unhappy (e.g., getting a new job, which can be highly rewarding, might result in losing contact with work friends, which can be upsetting). The rating scale ranged from 0 (“no unhappiness at all”) to 10 (“great unhappiness”).

*When will it happen.* The interviewer asked, “How long will it take you to achieve... [the goal named in Step 2]”. The scale recorded the length of time in terms of the number of *days, weeks, months, or years, or never.*

*Will alcohol be helpful?* The interviewer asked, “Will drinking alcohol help you to achieve... [the goal named in Step 2]?” The rating scale ranged from 0 (“not at all helpful”) to 10 (“very helpful”).

*Will alcohol be unhelpful?* The interviewer asked, “Will drinking alcohol interfere with your achieving... [the goal named in Step 2]?” The rating scale ranged from 0 (“it will not interfere at all”) to 10 (“it will interfere very much”).

The interviewer continued in this manner with each of the remaining concerns—each on a different page.

### **Screen 28—PCI Feedback**

Screen 28, the first sheet of the *PCI Feedback*, is shown in Figure 3.17. The screen displays each of the concerns in the same way—this was the first concern. Beneath the stated concern and goal, the screen summarises each of the indices in a written statement. Each statement automatically changes according to the corresponding rating. There were six possible statements for each of the indices. The computer modifies the statements by changing just one word in the statement—this according to the participant’s given rating on each scale. Table 3.1 shows the full list of the possible statements for each of the indices.

Participant Name: John

Date:

04/07/2003

## My Personal Concerns

#1 Education and Training

**Concern**

The level of my grades

**Goal**

I would like to improve the level of my grades

- 1 I am very committed to make things turn out the way I want.
- 2 This is very important to me.
- 3 I feel that this is moderately likely to happen.
- 4 I feel that I have a lot of control in making this happen.
- 5 I know some steps to take to make it happen.
- 6 I would feel great joy if things turn out the way I want.
- 7 I would feel no unhappiness if things turn out the way I want.
- 8 It will take 2 months for me to reach my goal
- 9 Alcohol will be somewhat unhelpful in reaching my goal.
- 10 Alcohol will hardly interfere with reaching my goal.

**To help me reach this goal I will...**

I will do more background reading.  
 Work harder for essays.  
 Seek help if I need it.

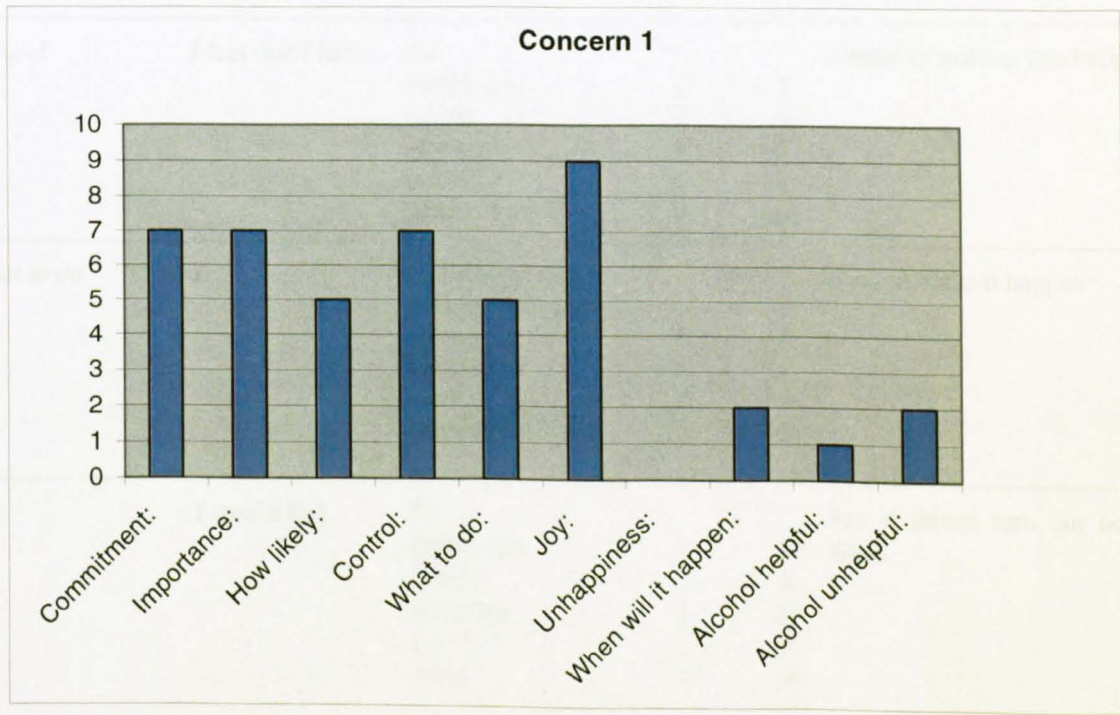


Figure 3.17. Screen 28—PCI Feedback—of the Enhanced Computerised Brief Intervention.



Table 3.1

*The Statements for Each of the Ratings from the PCI*

Index	Statement beginning	Modifying word	Rating	End of Statement
<i>Commitment</i>	I am	<i>not</i>	0	committed to make things turn out as I want.
		<i>hardly</i>	1 - 2	
		<i>slightly</i>	3 - 4	
		<i>moderately</i>	5 - 6	
		<i>very</i>	7 - 8	
		<i>strongly</i>	9 - 10	
<i>Importance</i>	This is	<i>not at all</i>	0	important to me.
		<i>not very</i>	1 - 2	
		<i>somewhat</i>	3 - 4	
		<i>moderately</i>	5 - 6	
		<i>very</i>	7 - 8	
		<i>extremely</i>	9 - 10	
<i>How likely</i>	I feel that this is	<i>not at all</i>	0	likely to happen.
		<i>not very</i>	1 - 2	
		<i>somewhat</i>	3 - 4	
		<i>moderately</i>	5 - 6	
		<i>very</i>	7 - 8	
		<i>extremely</i>	9 - 10	
<i>Control</i>	I feel that I have	<i>No</i>	0	control in making this happen.
		<i>hardly any</i>	1 - 2	
		<i>a little</i>	3 - 4	
		<i>moderate</i>	5 - 6	
		<i>a lot of</i>	7 - 8	
		<i>almost total</i>	9 - 10	
<i>What to do</i>	I	<i>don't know what</i>	0	steps to make it happen.
		<i>know hardly any</i>	1 - 2	
		<i>know a few</i>	3 - 4	
		<i>know some</i>	5 - 6	
		<i>know most</i>	7 - 8	
		<i>know exactly what</i>	9 - 10	
<i>Joy</i>	I would feel	<i>No</i>	0	Joy if things turn out how I want.
		<i>hardly any</i>	1 - 2	
		<i>a little</i>	3 - 4	
		<i>moderate</i>	5 - 6	
		<i>a lot of</i>	7 - 8	
		<i>great</i>	9 - 10	
<i>Unhappiness</i>	I would feel	<i>No</i>	0	unhappiness if things turn out how I want.
		<i>hardly any</i>	1 - 2	
		<i>a little</i>	3 - 4	
		<i>moderate</i>	5 - 6	
		<i>a lot of</i>	7 - 8	
		<i>great</i>	9 - 10	



Index	Statement beginning	Modifying word	Rating	End of Statement
<i>When will it happen?</i>	It will take	<i>Today</i> <i>[number] days</i> <i>[number] weeks</i> <i>[number] months</i> <i>[number] years</i> <i>never</i>		for me to reach my goal.
<i>Alcohol helpful</i>	Alcohol will	<i>be unhelpful</i> <i>be somewhat unhelpful</i> <i>not be helpful</i> <i>make no difference</i> <i>be very helpful</i> <i>be extremely helpful</i>	0 1 - 2 3 - 4 5 - 6 7 - 8 9 - 10	in reaching my goal
<i>Alcohol interfere</i>	Alcohol will	<i>not interfere</i> <i>hardly interfere</i> <i>make no difference</i> <i>somewhat interfere</i> <i>probably interfere</i> <i>totally interfere</i>	0 1 - 2 3 - 4 5 - 6 7 - 8 9 - 10	with reaching my goal

The PCI feedback screen also summarises each rating for each concern on a bar graph. The *x*-axis of the graph lists each PCI index; the *y*-axis ranges from 0 to 10. The bar graph is automatically updated from the participant's answer on each of the scales from the preceding concern page. The *when will it happen?* answer is not easy to interpret on a 10-point scale: the participant was asked to estimate the length of time it would take for the concern to be resolved—in number of days, weeks, months, or years, or never. Table 3.2 displays the conversion values to enable this scale to be represented on the 10-point scale.

Table 3.2

*Conversion Values of the Time to Goal Resolution*

Score	Goal Duration		
0	Less than two weeks		
1	Two weeks	-	Less than four weeks
2	Four weeks	-	Less than three months
3	Three months	-	Less than six months
4	Six month	-	Less than one year
5	One year	-	Less than three years
6	Three years	-	Less than five years
7	Five years	-	Less than seven years
8	Seven years	-	Less than ten years
9	Ten years or more		
10	Never		

The graph (e.g., see Figure 3.17) of the indices provided a motivational profile for each concern. The profile allows the interviewer to identify maladaptive motivational patterns that are likely to impede successful goal resolution. The interviewer explained to the participant the graphic representation of the concern by giving feedback on the motivational difficulties—if any existed—that might make it difficult for the participant to resolve the concern. The interviewer and the participant then devised the steps that the person needed to take to resolve the concern. The interviewer then proceeded to the next concern. At the end of the interview, the participant was given a print-out of the PCI feedback on which each concern was printed on a separate page.

### Detailed Feedback of the PCI

This section contains examples of concerns from four participants. These concerns illustrate the diversity of motivational profiles and the potential problems that the PCI procedure uncovers.

### Participant 1—Concern 1

Table 3.3 displays the participant's first concern (i.e., a life-threatening illness), and his goal (i.e., to have regular physical check-ups). Figure 3.18 shows a graph of the participant's goal for resolving the first concern.

Table 3.3

*A Concern Related to Health and Medical Matters and the Corresponding Goal*

Life Area	Concern	Goal
Health and Medical Matters	A life threatening illness	Go for regular check-ups

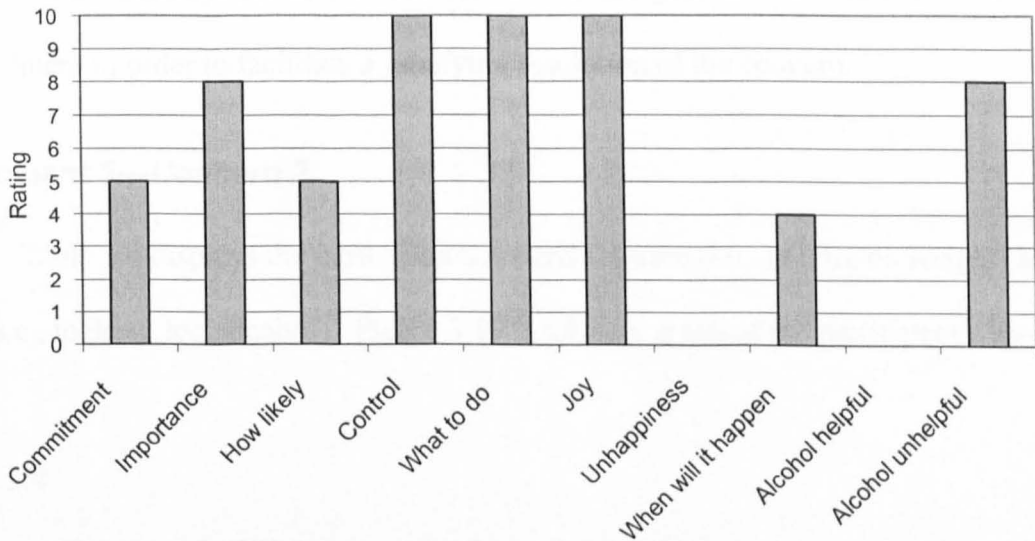


Figure 3.18. A profile of Concern 1 for Participant 1

The profile showed that this goal was *very* important to the participant. He believed that he had *almost total* control over reaching the goal, and he thought that he knew *exactly* what steps to take to achieve it. He thought that he could achieve this goal in the relatively near future and that doing so would bring him *great* joy and *no* unhappiness. He felt that alcohol would be *unhelpful* to him in reaching his goal and that it would *probably interfere* with his reaching it. However, there were two relatively low scores—those on his commitment to the goal and his expected chances of reaching the goal.

This profile can be interpreted in two ways: (a) the participant was *moderately* committed to get regular check-ups because he thought that they were only *moderately* likely to happen; or (b) the participant felt that his goal was only *moderately* likely to happen because he was only *moderately* committed to it. The latter interpretation seems the more plausible, given that the participant had *almost total* perceived control over going for check-ups.

In summary, this profile indicated that the participant felt only moderately committed to a goal that he considered very important. This suggests a dysfunctional pattern that would impede his resolution of the concern. The interviewer explored the reasons for the participant's lack of commitment to this goal and how he could increase his commitment in order to facilitate a satisfying resolution of the concern.

### ***Participant 1—Concern 2***

Table 3.4 displays the participant's second concern (i.e., putting on weight) and his goal (i.e., to drink less alcohol). Figure 3.19 displays a graph of the participant's second goal.

Table 3.4

*A Concern Related to Self Changes and the Corresponding Goal*

Life Area	Concern	Goal
Self Changes	Putting weight on	Drink less alcohol

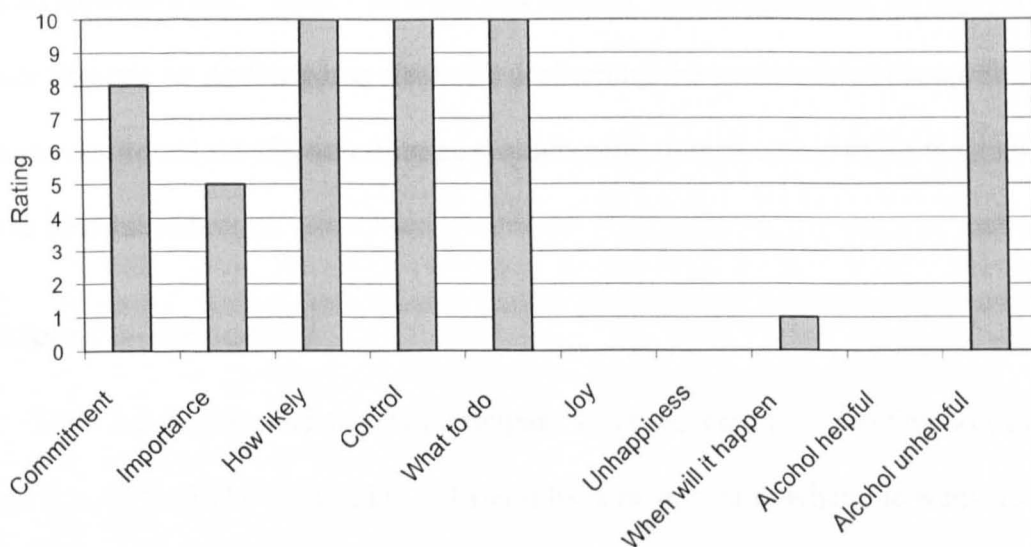


Figure 3.19. A profile of Concern 2 for Participant 1

This profile showed that the participant believed that he knew *exactly* what steps to take to achieve his goal. He thought that he had *almost total* control over reaching it and that it was *extremely* likely to happen. Understandably, considering what the goal was, he felt that his use of alcohol would be *unhelpful* to him in reaching this goal and that it would *totally interfere* with reaching it. This was a short-term goal that the participant thought he would achieve in less than two weeks. He expected *no* unhappiness from goal attainment.

There are two notable aspects of this profile. First, although the participant felt this goal was only *moderately* important to him, he was *very* committed to it. This suggested that either (a) the participant's level of commitment to a relatively unimportant goal is inappropriate, or (b) the participant should increase his level of importance to this goal. Second, and more important, the participant perceived that he would feel *no* joy from reaching his goal of drinking less. It is highly unlikely that a goal that has no intrinsic value will be successfully achieved—in contrast to the participant's view.

The interviewer encouraged the participant to reframe the goal from an aversive one as an appetitive one. Thus: “to drink less alcohol” was reframed as “to enjoy a healthier lifestyle by drinking less alcohol”. Reframing the goal enabled the participant to gain some emotional satisfaction from goal attainment; thus, it would make the goal more likely to be achieved.

**Participant 2—Concern 1**

Table 3.5 displays the second participant’s first concern (i.e., moving house) and his goal (i.e., to find a house that his girlfriend likes in an area in where he wants to live). Figure 3.20 displays a graph of the participant’s first concern.

Table 3.5

*A Concern Related to Home and Household Matters and the Corresponding Goal*

Life Area	Concern	Goal
Home and Household Matters	I am thinking of moving house	To find a nice house my girlfriend wants in the area I want to live

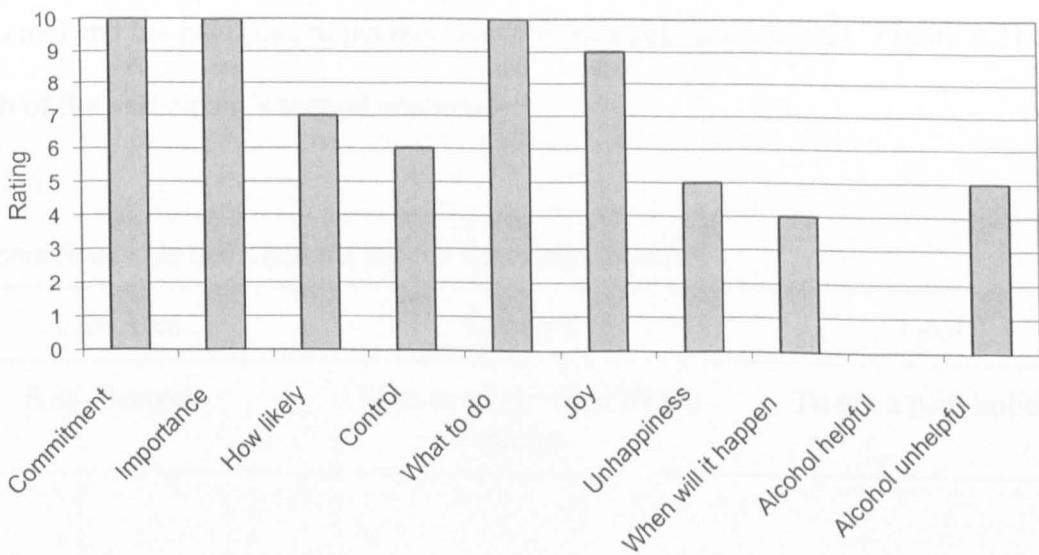


Figure 3.20. A profile of Concern 1 of Participant 2

This profile shows that the participant felt *strongly* committed to this goal, and he viewed it as *extremely* important. He thought that he knew *exactly* what steps to take to achieve his goal, and that it was *very* likely to happen. The participant expected to achieve this goal in the relatively near future, and he believed that doing so would bring him *great* joy. He thought his use of alcohol would be *unhelpful* to him in reaching this goal and it would *somewhat* interfere with achieving it. The participant perceived just *moderate* control over obtaining the goal—this was perhaps because to achieve the goal the participant must negotiate with his girlfriend.

The participant expected *great* joy and *moderate* unhappiness if he did obtain this goal. Therefore, the participant had felt of ambivalent about his goal attainment. Ambivalent goals can be difficult to resolve. Such goals can lead to frustration. The interviewer highlighted this discrepancy to the participant and encouraged him to resolve this ambivalence.

### **Participant 2—Concern 2**

Table 3.6 displays the second participant's second concern (i.e., working when he had exams) and his goal (i.e., to get paid leave so he could study more). Figure 3.21 shows a graph of the participant's second concern.

Table 3.6

#### *A Concern Related to Self Changes and the Corresponding Goal*

Life Area	Concern	Goal
Self Changes	I have to work when I have exams	To get a paid holiday

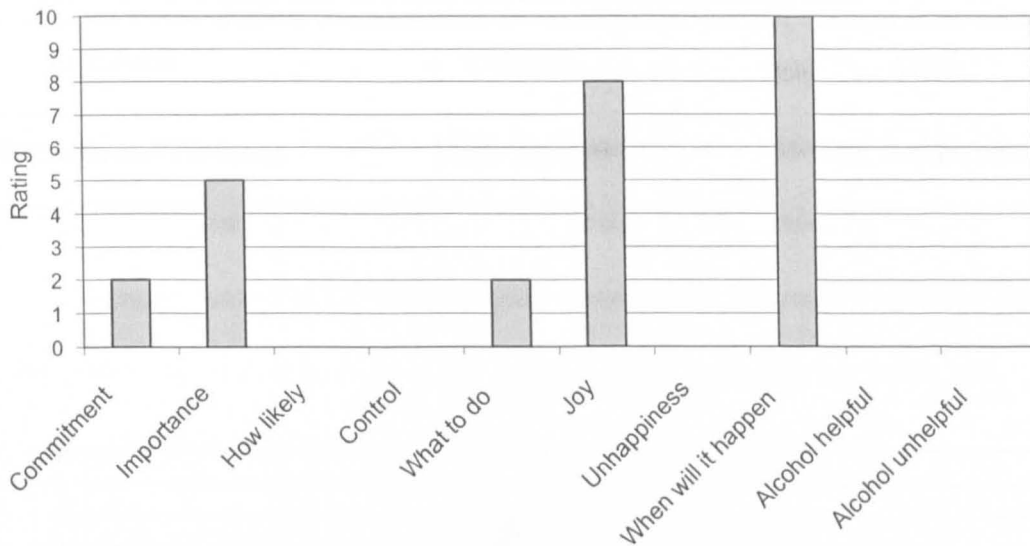


Figure 3.21. A graph of Concern 2 of Participant 2

This profile demonstrates that this goal was almost a fantasy. The participant was *hardly* committed to this goal, but even so the goal was *moderately* important. He felt he had *no* control over achieving it, and that it was *not at all* likely to happen. He knew *hardly any* of the steps to take to achieve this goal, although if it did happen he perceived feelings of *a lot of* joy and *no* unhappiness. The participant did not feel that his use of alcohol would be either helpful in achieving the goal, or interfere with it. Consistent with the unrealistic nature of this goal, the participant felt it would *never* actually happen.

The participant decided to disengage from this goal probably because he realised he would never attain it.

### **Participant 3—Concern 1**

Table 3.7 displays the third participant's first concern (i.e., she hated her job) and her goal (i.e., to gain more control over her job). Figure 3.22 displays a graph of the participant's first concern.



Table 3.7

*A Concern Related to Employment and Finances and the Corresponding Goal*

Life Area	Concern	Goal
Employment and Finances	I hate my job	I want to take control

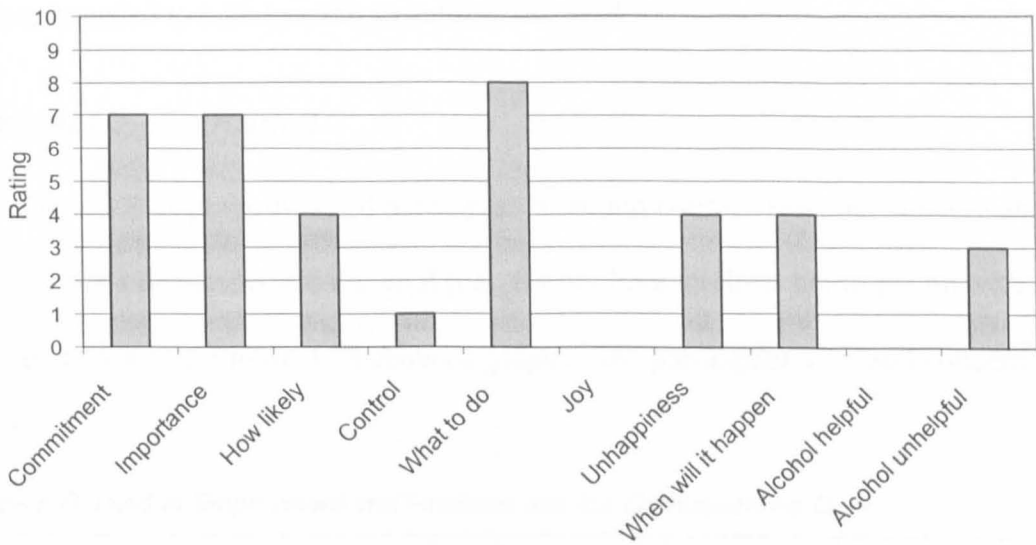


Figure 3.22. A profile of Concern 1 for Participant 3

This profile shows that the participant was *very* committed to her goal; it was *very* important to her. The participant felt that she could achieve this goal the near future; and she expected to experience *a lot of* joy and no unhappiness if she did achieve it. She thought that using alcohol would be *unhelpful* to her in reaching her goal, but it would *make no difference* in interfering with reaching it.

The participant perceived that she had *hardly any* control over achieving this goal—of gaining more control over her job. She knew just *a few* steps to take to achieve her goal, and she felt it was only *somewhat* likely to happen.

This profile shows the participant's perceived lack of control over her job—this is the main reason why she disliked her job. Obtaining more control over her job should make her job more challenging and enjoyable (as evidenced by the high rating of joy if this happened). The participant did not know what to do to achieve her goal, and she did not feel that she was likely to achieve it.

The interviewer and the participant looked at ways in which she could increase her control over her job. This was achieved by establishing the appropriate steps the participant needed to take in order to achieve her goal.

### ***Participant 3—Concern 2***

Table 3.8 displays the third participant's second concern (i.e., her concern about her supervisor's demands) and her goal (i.e., for her boss to allow her to get on with her job in her own way). Figure 3.23 shows a graph of the participant's second concern.

Table 3.8

*A Concern Related to Employment and Finances and the Corresponding Goal*

Life Area	Concern	Goal
Employment and Finances	My boss	For him to leave me alone

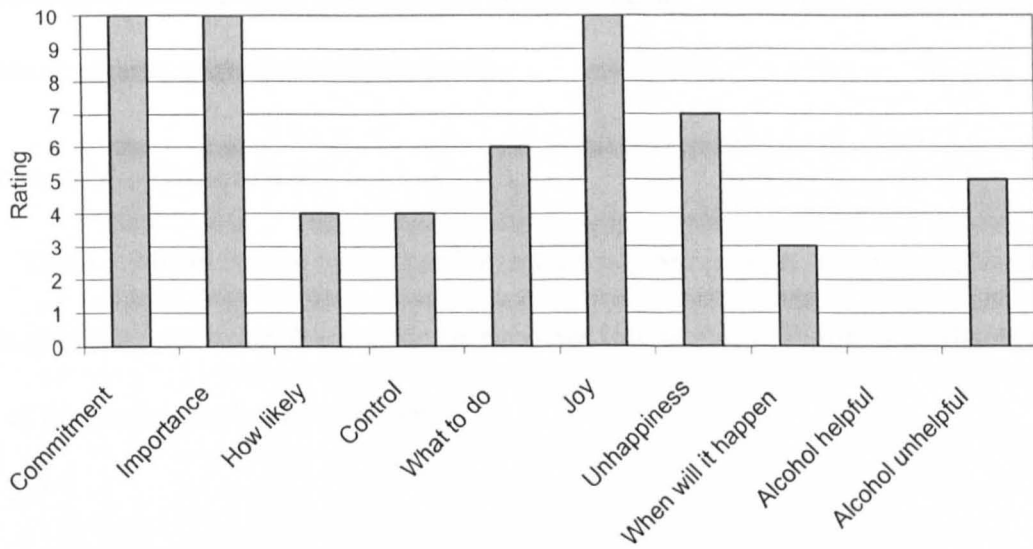


Figure 3.23. A profile of Concern 2 for Participant 3

This profile shows that the participant was *strongly* committed to this goal, and it was *extremely* important to her. The participant expected to achieve this goal in the near future. She also expected *great* joy if she achieved the goal. She felt that her use of alcohol could have some impact on this goal (e.g., it would be *unhelpful* in reaching her goal and could *somewhat interfere* with reaching it). The participant perceived only *a little* control over obtaining this goal, and thought it was only *somewhat* likely to happen. She knew *some of* the steps to take to achieve this goal, and expected *a lot of* unhappiness if she *did* achieve it.

The participant demonstrated a high degree of ambivalence for this goal: obtaining this goal would bring great joy, but it would involve much unhappiness—to achieve this goal the participant would have to confront her boss. Although she knew most of the steps to take, she was not confident that she would reach this goal.

The interviewer suggested to the participant that in order to resolve this concern she would need to resolve the ambivalence about this goal. Achieving this goal might facilitate resolution of the previous concern.

### **Participant 4—Concern 1**

Table 3.9 displays the fourth participant's first concern (i.e., his use of cannabis) and his goal (i.e., not to smoke it when he becomes intoxicated). Figure 3.25 displays a graph of the participant's first concern.

Table 3.9

*A Concern Related to Other Substance Use and the Corresponding Goal*

Life Area	Concern	Goal
Other Substance Use	I smoke dope when I am drunk	Not to get stoned when I am drunk

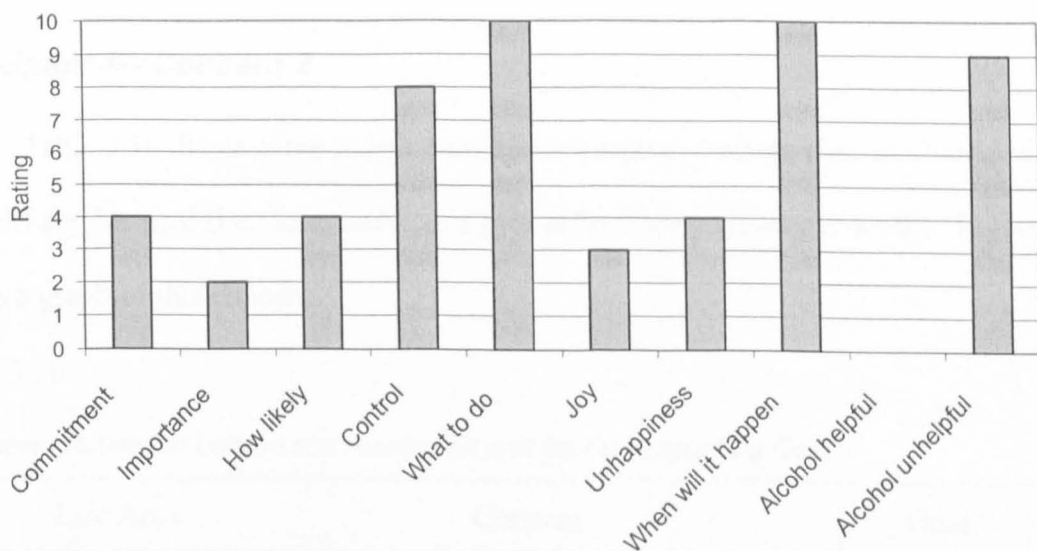


Figure 3.24. A profile of Concern 1 for Participant 4

This profile shows that this participant was only *slightly* committed to this goal. He perceived the goal as *not very* important to him and felt that it was only *somewhat*

likely to happen. He believed he had *a lot of* control over making this happen, and he knew *all* the steps to make it happen. He perceived only *a little* joy if he reached his goal, and *moderate* unhappiness if he did. He thought that his use of alcohol would have an impact on this goal: it would be *unhelpful* in reaching the goal and it would *totally interfere* with reaching it. The participant believed he would *never* reach his goal.

The participant appeared to be discounting the value of this goal: although he felt this was a concern, he did not see it as important and was not committed to it. Although he thought that he had control over his goal and he knew how to resolve it, he thought that he would never achieve it. This is consistent with his ambivalence towards the goal: he felt that there would be more unhappiness than happiness if he did achieve this goal.

The interviewer and the participant identified a number of positive outcomes if the participant were to achieve this goal—see Concerns 2 and 3, below. Increasing the participant's positive expectancies of change would increase the importance of the goal and his commitment to it.

#### **Participant 4—Concern 2**

Table 3.10 displays the fourth participant's second concern (i.e., not being active enough) and his goal (i.e., to exercise in a gym at least three times per week). Figure 3.26 shows a graph of this concern.

Table 3.10

#### *A Concern Related to Leisure and Recreation and the Corresponding Goal*

Life Area	Concern	Goal
Leisure and Recreation	I am not active enough	I would like to go to the gym at least three times per week

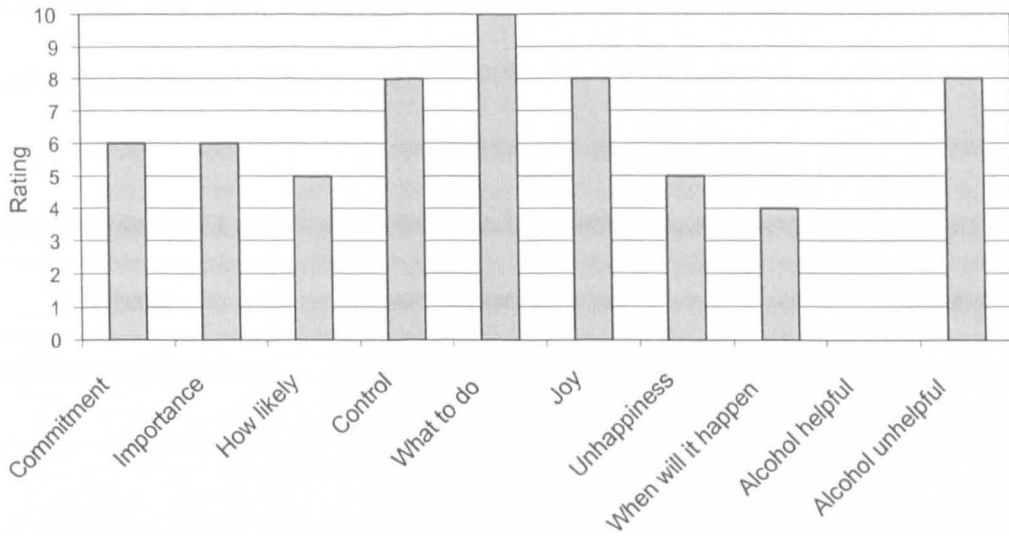


Figure 3.25. A profile of Concern 2 for Participant 4

This profile shows that the participant thought that this concern was *moderately* important to him, and that he was *moderately* committed to it. Although he knew *exactly* what steps to take to achieve it and he had *a lot of* control over achieving it, he believed that it was only *moderately* likely to happen. The participant expected to gain *great* joy and *a lot of* unhappiness if he did achieve this goal. He expected to achieve this goal in the relatively near future. He felt that his use of alcohol would affect his ability to achieve this goal: alcohol would be *unhelpful* and would *probably interfere* with achieving it.

Like with his last concern, the participant felt ambivalent about resolving this concern. Training three times per week may have been too ambitious for this participant; he perceived that it was not likely to occur. The interviewer explored with the participant the perceived *costs* (effort to be expended) of reaching this goal. The resolution of this concern may be related to the participant's first concern.

### Participant 4—Concern 3

Table 3.11 displays the fourth participant's third concern (i.e., losing his motivation to study) and his goal (i.e., to become more motivated to study). Figure 3.27 displays a graph of the participant's third concern.

Table 3.11

*A Concern Related to Education and Training and the Corresponding Goal*

Life Area	Concern	Goal
Education and Training	I have lost all my motivation to study	I would like to get more motivated to study

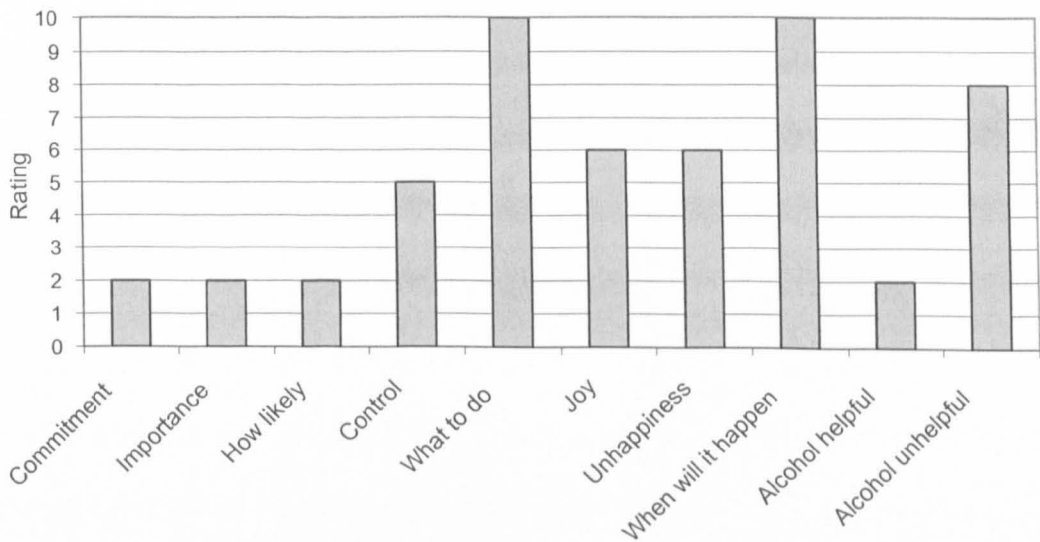


Figure 3.26. A profile of Concern 3 for Participant 4

This profile shows that the participant felt that the concern was *not very* important to him and he was *hardly* committed to it. Although the participant knew *exactly what* steps to take to achieve it and he had *moderate* control over making it happen, he did not think it very likely to happen. The participant indicated he would *never* reach his goal. He also felt ambivalent about achieving this goal: if he did reach this goal he would feel

*moderate* joy and *moderate* unhappiness. He thought that his use of alcohol would be *somewhat unhelpful* and would *probably interfere* with reaching this goal.

The participant felt ambivalent about reaching this goal, as he did about his previous two goals. The participant's lack of motivation to study is clearly shown in the profile: he had low scores on commitment, importance of the goal, and chances of succeeding. The interviewer pointed out that his lack of motivation about obtaining his goals was probably affected by his use of alcohol and cannabis.



## CHAPTER 4

### **Study 1: Evaluating Two Brief Interventions for Excessive Drinking With University Students**

Brief Interventions have been used effectively with non-treatment-seeking college students in the United States (Dimeff, Baer, Kivlahan, & Marlatt, 2002), but there are no published reports of brief interventions with British students. This chapter reviews the research on student drinking in both the United States and the United Kingdom. It highlights the similarities in the drinking levels of students in these two countries. This chapter will also present the results of an empirical study of two brief interventions with non-treatment seeking British students.

In the United States, more than 1,400 college students, aged 18-24, die every year as a result of hazardous drinking; in the same age range, 500,000 students suffer unintentional injuries, and 600,000 are assaulted by another student who has been drinking (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). In the United Kingdom, there are no such statistics specifically related to university students; however, the majority of excessive drinkers in the U.K. are in the university age range: 41% of males and 33% of females aged 16 – 24 years drink excessively (Office of National Statistics, ONS, 2001). The risk of mortality is greater in this age range by 32% for males and 15% for females (White, Altmann, & Nanchahal, 2002). A recent review of undergraduate students in the U.K. suggests that their drinking might be more hazardous than their non-student peers (Gill, 2002).

College students' drinking has been studied extensively in the United States (see, e.g., Engs, Diebold, & Hanson, 1996; Johnston, O'Malley, & Bachman, 1994, 1996, 1998, 2003; Presley, Meilman, Cashin, & Lyerla, 1996; Wechsler, Lee-Kuo, Seibring, Nelson, &

Lee, 2002; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). The major studies include the Monitoring the Future Survey (1975–2002)—see Johnston et al. (2003)—which compiled more than 25 years of survey data on student drinking and illicit drug use (since 1991 its surveys have been conducted on 43,000–51,000 students annually). The Core Alcohol and Drug Survey (Volume IV, 1992-1994) has surveyed 45,632 students—see Presley et al. (1996), which is the latest of four surveys conducted since 1989. The Harvard School of Public Health College Alcohol Study (CAS) series, conducted in 1993, 1997, 1999, and 2001 by Wechsler and colleagues, has collected data from more than 54,000 students. Engs et al. (1996) surveyed a national sample of more than 12,000 students' drinking habits.

The results of these surveys demonstrate that the majority of American students drink alcohol, and many do so at hazardous levels. Presley et al. (1996) and Johnston et al. (2003) reported that more than 80% of the students surveyed had drunk alcohol in the previous year, and that more than 68% had drunk alcohol in the 30 days prior to the survey. By contrast, 60.1% of the non-student peers reported consuming alcohol in the 30 days period prior to the survey (Johnston et al.). According to Presley et al., students consumed on average 4.5 drinks (6.6 units) per week (6.8 drinks for males, and 2.8 drinks for females), with 8.5% of males reporting having consumed an average of 20 or more drinks (29.3 units) per week, and 9.6% of females reporting having consumed an average of 10 drinks (14.7 units) per week. Engs et al. (1996) reported even more hazardous consumption: the students drank an average of 9.6 drinks (14.1 units) weekly; 31% of males consumed 21 drinks (30.8 units) or more weekly, and 19.2% of females consumed 14 drinks (20.5 units) or more weekly.

Binge drinking can be particularly hazardous. Wechsler, Davenport, Dowdall, and Rimm (1995) defined binge drinking as the consumption, on one occasion in a two-week period, of five or more drinks (7.3 units) for men, and four or more drinks (5.9 units) for women. Wechsler et al. (2002) showed that, in the two weeks prior to the CAS, approximately 44% of the students had drunk in binges—43.9% in 1993, 43.2% in 1997, 44.5% in 1999, and 44.4% in 2001. Johnston et al. (2003) and Presley et al. (1996) reported lower rates of binge drinking by students in the two weeks prior to their surveys (40% and 38.3%). However, both of these surveys set the binge criterion for females at five drinks in a row, not four, as had Wechsler et al.; this might explain their lower rates. As mentioned, Johnston et al. found that more students engaged in binge drinking than did their non-student (age-related) peers (35.1%).

The American surveys of student drinking behaviour confirm the negative consequences of excessive alcohol consumption. Perkins (2002), reviewing the surveys, divided problematic drinking into three categories: *damage to self*, *damage to others*, and *institutional costs*. To Perkins, damage-to-self includes academic impairment, experiencing personal injury or illness, unintended or unprotected sexual activity, impaired driving, and legal problems. Damage to others includes property damage, fights or other interpersonal violence, and noise disturbance. Institutional costs include property damage and student attrition.

Engs et al. (1996) reported that heavy drinkers had more academic problems than other drinkers. The authors classified drinkers as *low risk* if they were male and drank 21 drinks or fewer per week, or if they were female and drank 14 drinks or fewer. They classified students who drank greater amounts as *high-risk* drinkers. Of the low-risk drinkers, 11% had missed a class because of a hangover, and 3% reported receiving a lower grade because of their drinking; conversely, more than 50% of the high-risk drinkers

had missed a class because of a hangover, and 15% had noticed receiving a lower grade. Presley et al. (1996) also explored the relationship between academic achievement and alcohol consumption. Students who reported, on average, receiving *A* grades drank 3.4 drinks per week; the respective figures for students who reported average grades of *B*, *C*, or *D* were 4.5 drinks per week, 6.1 drinks per week, and 9.8 drinks per week.

Wechsler et al. (1994) also identified students who reported academic problems arising from their binge drinking. The authors categorised students as *non-binge drinkers* if they had consumed alcohol in the previous two weeks but had not met their criterion for bingeing; as *infrequent binge drinkers* if they had binged one or two times in the previous two weeks; as *frequent binge drinkers* if they had three or more binges in the previous two weeks. Eight percent of the non-binge drinkers had missed a class in the past year, compared to 30% of the infrequent binge drinkers and 61% of the frequent binge drinkers. Similarly, 6% of the non-binge drinkers reported getting behind in their school work, compared to 21% of the infrequent binge drinkers and 46% of the frequent binge drinkers.

Drinkers often suffer personal injuries and illness. Presley et al. (1996) reported that 15% of the drinkers surveyed had experienced injuries because of alcohol or other drug use in the previous year; the authors also reported that 47% of drinkers had had at least one hangover during the previous year and that 56% had felt nauseous or had vomited after drinking. Wechsler et al. (1994) examined the relationship between experiencing personal injury or illness and the frequency of binge drinking. In Wechsler et al.'s survey, 30% of the non-binge drinkers had experienced a hangover during the past year, compared to 75% of the infrequent binge drinkers and 90% of the frequent binge drinkers. Non-binge (2%), infrequent binge (9%), and frequent binge drinkers (23%) reported similar incidences of being injured as a result of their drinking during the past year. Alcohol use increases the likelihood of risky sexual behaviours. Wechsler et al. (2002) found that

21.6% of students who drank alcohol engaged in unplanned sexual activities; 10.3% of them reported having unprotected sex. For frequent binge drinkers, the incidence of unplanned or unprotected sexual activities increased by seven times over that of non-binge drinkers (Wechsler, et al., 1994). Fourteen percent of the female students reported that they have been sexually coerced as a result of their drinking, and 12% of the males admitted having taken sexual advantage of a female as a result of their own drinking (Presley et al., 1996).

A large proportion of students drive automobiles while under the influence of alcohol. According to Presley et al. (1996), 32.6% of the students admitted having driven while under the influence in the past year. Wechsler et al. (1999) reported that 40.6% of frequent binge drinkers had driven after having binged in the past year. Engs et al. (1996) found that 56% of male and 43% of female high-risk drinkers (i.e., males consuming more than 21 drinks and females consuming more than 14 drinks per week) in their sample admitted to having driven while under the influence in the past year.

Violent and aggressive behaviour and vandalism are also regularly reported to accompany alcohol consumption. Presley et al. (1996) noted that 35% of students who drank alcohol had been involved in an argument or fight in the previous year as a result of their drinking or drug use. Not surprisingly, 11.7% of these students reported having been in trouble with the police or campus authorities (Presley et al., 1996).

The negative effects of excessive drinking are not restricted to the individual drinker: abstinent students and non-binge drinking students report *second-hand* effects. Wechsler et al. (2002) found that 29.3% of these students had been insulted or humiliated by intoxicated students; 19% had quarrelled with intoxicated students; 47.6% had taken care of a drunken student; 60% had had their studying or sleep disturbed by intoxicated students; and 19.5% had had an unwanted sexual advance from an intoxicated student.

Studies of student drinking in the United Kingdom have been smaller in number and scope than those in the United States. The largest survey—that of Webb, Ashton, Kelly and Kamali (1996)—included just 3,075 students at only 10 universities. Other studies have been even smaller: Orford, Waller, and Peto (1974), for instance, surveyed 1,323 students at Oxford University; File, Mabbutt, and Shaffer (1994) surveyed 774 medical students at two medical schools; Webb, Ashton, Kelly, and Kamali (1998) studied 754 second-year students from seven medical schools; Norman, Bennett, and Lewis (1998) assessed the prevalence of binge drinking in 136 Welsh undergraduates; Underwood and Fox (2000) studied 199 dental students; Pickard, Bates, Dorian, Greig, and Saint (2000) recruited 136 second-year medical students; and Newbury-Birch, White, and Kamali (2000) studied the drinking behaviour of 194 first-year medical students prior to their admission to university. Although each study is small compared to studies in the United States, the studies in the United Kingdom have collectively involved a large number of British students.

The British surveys, like those in the U.S.A., confirm the widespread use of alcohol by students. Orford et al. (1974) reported that approximately 95% of their sample had drunk alcohol in the previous year. Webb et al. (1996), 22 years later, reported a similar figure of 89%—94% of white students and 48% of non-white students. File et al.<sup>1</sup> (1994) reported the abstinence rates of only Asian students ( $n = 271$ ); of these, only 46% of the males and 34.5% of the females reported drinking alcohol—a similar consumption rate to that of Webb et al.'s (1996) non-white sample. Webb et al. (1998) reported similar rates of consumption as in 1996: 94.2% of white students and 56.7% of non-white students drank

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<sup>1</sup> In comparison to white students, non-white students drink considerably less. The proportion of non-white students in the File et al. study (35%) was far greater than the national proportion of non-white university students (15%) (UCAS Statistics Archive, 1996). File et al.'s study, therefore, may not be representative of student drinking in the U.K.

alcohol. Pickard et al. (2000) and Underwood and Fox (2000) reported that more than 86% of their samples consumed alcohol.

Two studies reported students' average weekly consumption: Webb et al. (1996) reported that males drank 31.8 units and females 17.3 units. Newbury-Birch et al. (2000) reported a lower average weekly consumption. Males reported consuming an average of 27.6 units and females 13.9 units; recall, however, that these students reported their drinking before their admission to university.

The British surveys, again like those in the U.S.A, have reported extensive binge drinking by students. In the most representative of the U.K. studies, Webb et al. (1996) showed that 28% of students (31% of males and 24% of females) were binge drinkers. The authors defined binge drinking as 10 units or more on one occasion for men, and 7 units or more for women—these criteria are higher than those used by Wechsler et al. (1994). Norman et al. (1998) reported that 46.3% of students (64% of males and 32.5% of females) binge drank at least once per week. Underwood and Fox (2000) reported a similar proportion of binge drinkers: 49.9% of students (46% of males and 53% of females) reported binge drinking at least once per week. Pickard et al. (2000) found that 58.1% of students (50% of males and 63% of females) reported binge drinking, although these authors did not specify any time period in which the binge drinking had occurred. Newbury-Birch et al. (2000) found that fewer students (18.29%) reported binge drinking (27% of males and 14% of females). Again recall that these students reported their drinking behaviour before their university admission. The mean percentage of male students, across all of these recent studies, who binged on alcohol was 43.6%; for females it was 37.3%.

Several British studies have reported the incidence of heavy or hazardous drinking. For instance, Webb et al. (1996) reported that 31.5% of male students drank 35 or more

units a week, and 26% of the females drank more than 21 units per week. Pickard et al. (2000) found similar levels of heavy drinking: 23.9% of males exceeded 35 units, and 21.1% of females exceeded 21 units per week. Underwood and Fox (2000) defined heavy drinking as 50 units or more for men and 35 units or more for women. Using these criteria, the authors reported that 10% of the male students and 6.3% of the female students were heavy drinkers—again, these criteria for heavy drinking are higher than those used by U.S. researchers (cf. Presley et al., 1996).

In comparison to their non-student peers, British students drink more excessively and at more hazardous levels. The Office for National Statistics (ONS, 2001) reported that people in the 16–24-year age range were the largest consumers of alcohol. Of these, 41% of males exceeded the low risk weekly consumption guideline of 21 units. Five studies reported the proportion of males consuming more than 21 units: 50.8% (Norman et al., 1998), 48.3% (Webb et al., 1998), 45% (Newbury-Birch et al., 2000), 41% (Pickard et al., 2000), and 51% (Underwood & Fox, 2000). Averaging across the studies ( $M = 47.2\%$ ) indicates that more male students than their non-student peers drink excessively. The ONS (2001) reported that 33% of the females in the 16–24-year age group exceeded the low risk weekly consumption guideline of 14 units. The above-mentioned five studies reported the proportion of females consuming more than 14 units thus: 16.9% (Norman et al., 1998), 38.3% (Webb et al., 1998), 39% (Newbury-Birch et al., 2000), 41% (Pickard et al., 2000), and 38% (Underwood & Fox, 2000). Averaging across the studies ( $M = 34.6\%$ ) indicates that slightly more female students than their non-student peers are drinking excessively.

British students also binge drink more frequently than their non-student peers. The General Household Survey (GHS) has, since 1996, defined binge drinking as the consumption of eight or more units on one occasion for a male, and six or more units for a female. The GHS (1998) indicated that 37% of males and 23% of females in the 16–24-



year age range were binge drinking. Again, a comparison of the results of the five latest U.K. studies with those of the GHS survey suggests that the mean proportion of student males and females who binge drink is 43.6% and 37.3%. Even with a more stringent criterion for binge drinking (10 or more units for males and seven or more units for females), these studies demonstrate that a greater proportion of students binge drink than do their non-student peers.

There are no large-scale British surveys of student drinking; consequently, it is difficult to draw direct comparisons between British and American students' drinking habits. This difficulty is confounded by the different definitions of binge drinking and heavy drinking used by different researchers. Nonetheless, studies of British students' drinking, in general, suggest that their drinking is more frequent and more hazardous than that of their American counterparts. More British students reported consuming alcohol in the previous year than have American students (e.g., ~88% in comparison to ~80%; see above). In comparison to the data presented by Presley et al. (1996), the proportion of male students in the U.K. who reported binge drinking was lower than that in the U.S.A. (43.6% compared to 48.4%); however, the binge criterion for male students in the U.K. was 10 units; in the U.S., it was 7.3 units. The proportion of female students in the U.K. who reported binge drinking was higher than that of their American counterparts (37.3% compared to 30.7%); the binge drinking criterion for British female students was 7 units; it was 7.3 units for American female students.

More British students have reported heavier and more hazardous drinking than did the American students studied by Presley et al. (1996). Approximately three times as many male students and twice as many female students in the U.K. reported heavy drinking than did the students in the U.S.A. The mean proportion of drinkers with hazardous consumption (defined as weekly consumption of more than 35 units for males

and 21 units for females) reported by Pickard et al. (2000) and Webb et al. (1996) was 27.7% for males and 23.6% for females. Presley et al. reported that 8.5% of male students in the U.S.A. consumed more than 29.3 units per week, and 9.6% of female students consumed more than 14.7 units per week. Other American researchers have reported different findings. According to Engs et al. (1996), 31% of male students drank more than 30.8 units per week. This is a higher percentage than U.K. students, although these authors used a lower criterion for heavy drinking. Also, according to Engs et al., 19.2% of females drank more than 20.5 units—a lower percentage than British students, using a comparable criterion.

Direct comparison of British and American students' drinking levels is problematic due to the varying criteria used to define risky drinking—not just between the two countries but also across studies within the same country. Nevertheless, such studies demonstrate that British students have similar drinking patterns as American students, and students' drinking patterns in both countries cause considerable harm.

In the U.S.A., the problem of excessive drinking amongst students has prompted the National Institute on Alcoholism and Alcohol Abuse (NIAAA) to form a special task force—Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism (2002)—to make recommendations to address the problem. Their recommendations are to intervene with: (a) the individual at risk for developing alcohol problems, (b) the student body as a whole, and (c) the college and surrounding area. In the U.K., there are no such initiatives.

In conclusion, student drinking has been studied extensively in the U.S.A. It has been described as both excessive and the cause of considerable harm. Consequently, in the United States student drinking is regarded as a serious problem, which has led to the introduction of prevention programmes. In the U.K., by comparison, student drinking has

received scant attention, despite the fact that the level of student drinking in the U.K. is as high as, if not higher than, that in the U.S.A. Furthermore, studies suggest that British university students drink alcohol at more hazardous levels than do their non-student peers. This is even more alarming given that young people represent the largest consumers of alcohol in the U.K.

The present study aimed to intervene with individuals at-risk for developing alcohol problems. The NIAAA task force suggested that effective interventions for college students can be of three forms: (a) cognitive-behavioural skills combined with motivational enhancement techniques; (b) brief motivational-enhancement interventions; and (c) alcohol expectancies challenged through information and experiential learning. The two interventions tested in the present study can best be classified as brief motivational-enhancement; they were described in detail in Chapter 3.

## Method

### *Participants*

A total of 90 students at the University of Wales, Bangor volunteered to take part in the study. A power calculation was conducted to prior to the study implementation. Moyer et al. (2002) found that for studies of brief intervention versus no treatment—measured at three month follow-up periods—effect sizes were in the medium to large range. Thus, with a 15 percent attrition rate and an effect size of  $f = .36$ , to achieve a statistical power of .80, and  $p < .05$ , while considering the total number of groups ( $groups = 3$ ), a sample size of 90 participants was needed.

The recruitment of participants took two forms: (a) participants received cash payments, or (b) course credits. Participants who were recruited for cash payments ( $n = 63$ ) responded to advertisements placed on the university Intranet, posters in each of the

main academic departments of the university, leaflets distributed to students on registration day and during student welcome-week events, and leaflets left in bars, cafes, the university library, and at computer terminals. Participants who were recruited for course credit ( $n = 27$ ) did so as part of a requirement for their degree in psychology.

Inclusion criteria were that men drink more than 21 units per week or 8 or more units on one occasion at least weekly, and women drink more than 14 units per week or 6 or more units on one occasion at least weekly. The initial advertisement that recruited participants for payment called the study, “Free Drinker’s Check-Up for Heavy Social Drinkers”, and included the drinking inclusion criteria. The study was described as consisting of two sessions: Session 1 would last approximately 90 minutes; Session 2 (which would occur three months after the first session) would last 45 minutes. The advertisement stated that those who completed the first session would be entered into a draw for £50 and that those who attended the follow-up session each would receive £10. The advertisement is shown in Appendix B (p. 306).

After 10 weeks, just 12 participants had had been recruited for payment.

Accordingly, this method of recruitment was revised: participants now were both entered into the £50 prize draw and received a payment of £5 for completing the first of the two sessions and an additional £5 for completing the second one. The study title was changed to “Drinkers Needed for Research”; information regarding the drinking criteria was not advertised; potential participants were informed of the drinking criteria when they contacted the experimenter. The number of participants recruited increased. In approximately five weeks, 52 participants had been recruited for payment.

Participants were randomly assigned to one of three groups: Computerised Brief Intervention (CBI), Enhanced Computerised Brief Intervention (CBI-E), or Control Group.

To ensure an equal distribution of gender across the groups, the male and female participants were separately randomly assigned to the groups.

Two participants who were recruited and tested were later excluded because they were not students. The final sample who completed the first session included 88 students, 54 (61.5%) of whom were female. The mean age of the final sample was 21.05 years ( $sd = 4.42$ ).

Seventy-five participants completed the follow-up session; of these, 60% were female. In the CBI group ( $n = 27$ ), 16 (60%) were female; in the CBI-E group ( $n = 22$ ), 15 (68%) were female; in the control group ( $n = 26$ ), 14 (54%) were female. Thus, the three groups were balanced on gender. The mean age of participants who completed the follow-up session was 21.24 years ( $sd = 4.7$ ).

### ***Collateral Informants***

Collaterals' reports were used to verify the accuracy of participants' self-reports of their drinking. Collaterals were a friend or family member of the participant who was familiar with the participant's drinking habits. Although self-reports of drinking measures have consistently been found to be valid and reliable when obtained under research conditions (Sobell & Sobell, 1992), collateral reports are a useful added measure to confirm the accuracy of self-reports. It was also important that the participant was aware that someone else would estimate the participant's drinking. Each collateral estimated the participant's alcohol consumption in terms of (a) the usual amount consumed per week, (b) the most amount consumed per week, (c) the frequency of usual consumption per week, and (d) the frequency of maximum consumption per week.

## **Instruments**

*Short Alcohol Dependency Data Questionnaire (SADD)*<sup>2</sup>. The SADD (Davidson & Raistrick, 1986) is a 15-item questionnaire designed to identify a person's level of alcohol dependency from his or her current drinking habits. Each of its items asks the respondent to indicate the frequency of a variety of possible outcomes that can occur among people who drink excessively. The respondent can choose one of four response options: *never* = 0, *sometimes* = 1, *often* = 2, and *nearly always* = 3. Respondents with a total score of 1–9, 10–19, or 20–45 are classified as low, medium, or high on dependency, respectively.

Davidson and Raistrick (1986) confirmed the concurrent validity of the SADD in two ways: first the SADD was tested against several biological measures of alcohol dependency; and second, the SADD significantly correlated ( $\rho = .83$ ) with the more extensive and well established Severity of Alcohol Dependence Questionnaire (SADQ; Stockwell, Hodgson, Edwards, Taylor, & Rankin, 1983). Davidson, Bunting, and Raitrick (1989) also reported strong support SADD as a unidimensional scale. Using three separate samples Davidson et al., using confirmatory factor analyses, showed the model was a good description of the data. The adjusted goodness of fit was .87, .81, and .82 in the three studies.

*Readiness to Change Questionnaire (RTCQ; Appendix C, p.307)*. The RTC (Heather, Gold, & Rollnick, 1991) is a 12-item questionnaire designed to assess the respondent's level of commitment to change his or her drinking. The questionnaire asks the respondent indicate the degree to which he or she agrees with each statement, as follows: *strongly disagree* = -2, *disagree* = -1, *unsure* = 0, *agree* = 1, *strongly agree* = 2.

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<sup>2</sup> The SADD Questionnaire is copyrighted, therefore it is not included in the Appendices.

The RTC questionnaire is based on Prochaska and DiClemente's (1986) stages-of-change model. The respondent is assigned to one of three stages of change—*precontemplative, contemplative, or action*—according to his or her highest total score. If two of the scores are equal and higher than the other one, the respondent is assigned to the stage furthest along the continuum of change. A respondent with equal scores on all three stages is assigned to the action stage. A summary score can also be obtained by adding the respondent's answers to the 12 items, after the answers to the precontemplation items have been reverse-scored (Heather, Rollnick, & Bell, 1993). The higher the score, the greater is the commitment to change.

Rollnick, Heather, Gold, and Hall (1992) reported that the internal consistency of the items for each of the three subscales was good, as was the test-retest reliability. Cronbach's alpha coefficient was as follows: precontemplation = .73, contemplation = .80, and action = .85. Correlations between repeated administrations was as follows: precontemplation = .82, contemplation = .86, and action = .78.

*Drinking Motives Questionnaire* (DMQ; Appendix D, p. 308). The DMQ (Cooper, 1994) is a 20-item questionnaire that assesses the respondent's motives for drinking. The questionnaire asks the respondent to indicate how often he or she drinks for each of the reasons, by choosing from one of five categories: *almost never/never* = 1, *some of the time* = 2, *half of the time* = 3, *most of the time* = 4, *almost always/always* = 5. The Drinking Motives Questionnaire is based on Cox and Klinger's (1988) conceptual model. The questionnaire measures four motives for drinking: *social, coping, enhancement, and conformity*.

Cooper (1994) reported that the internal consistency of the items for each of the four subscales was good. Cronbach's alpha coefficient was as follows: social = .85, coping = .84, enhancement = .88, and conformity = .85.

*Alcohol Timeline Followback (TLFB)*. The TLFB (Sobell & Sobell, 1992) is a method of retrospectively estimating daily drinking episodes over a given period of time. The TLFB method uses a calendar to help the respondent recall the amounts of alcohol consumed on each day during the period. The calendar assists the respondent to recall any specific, memorable events that occurred on certain dates (e.g., a friend's birthday; a public holiday). This technique increases the respondent's memory for events, and of drinking episodes at these times.

The TLFB technique was modified for the purpose of this study. In addition to the type and amount of alcoholic beverage consumed on each day, the respondent was asked to estimate the duration of each drinking episode. From these additional measures, the respondents' blood-alcohol concentration could be estimated.

*Quantity/Frequency Alcohol Consumption Questionnaire (QF)* (Appendix E, p. 309). The QF Questionnaire was devised specifically for this study. It is based on a simplified version of the TLFB for recording alcohol consumption. In the present study, the QF Questionnaire was used to record the participants' alcohol consumption during the 12-weeks prior to their inclusion into the study. Like the TLFB, the QF uses a calendar to assist the respondent to recall the amounts of alcohol consumed in a given time period. Unlike the TLFB, the QF concentrates on weekly drinking rather than daily drinking. The participant is asked to estimate (a) the *usual* amount of alcohol consumed during the week and the number of *days* this usual amount was consumed, and (b) the *most* amount of alcohol consumed during a week and the number of *days* this most amount was consumed.

*Drinker's Inventory of Consequences (DrInC-2R)*; Appendix F, p. 310). The DrInC-2R (Miller, Tonigan, & Longabaugh, 1995) is a 50-item questionnaire designed to measure a variety of problems that excessive drinkers frequently experience. It asks about negative consequences of drinking that occurred during the prior three months. There are



comparable versions of the questionnaire for lifetime consequences, drug *and* alcohol consequences (recent and lifetime), and collateral reports of recent and life-time consequences.

The DrInC–2R asks respondents to indicate *how often* during the past three months each of 23 negative consequences has happened to them. The respondents can choose one of four categories: *never* = 0, *once or a few times* = 1, *once or twice a week* = 2, and *daily or almost daily* = 3. Seventeen items ask respondents to state *to what extent*, during the past three months, they have been affected by a particular event. The respondent can choose one of four response options: *not at all* = 0, *a little* = 1, *somewhat* = 2, and *very much* = 3. Ten items ask respondents to *indicate whether these things have happened* during the past three months. The respondent can choose one of four answers: *no* = 0, *almost* = 1, *yes, once* = 2, *yes, more than once* = 3.

The DrInC–2R has five subscales that assess negative consequences in the following areas: physical, intrapersonal, social responsibility, interpersonal, and impulse control. It also has a *control* subscale. This subscale identifies respondents who might deny the occurrence of problems (e.g., a response bias) by using items that are reverse-scored. For example, an item such as ‘*I drank alcohol normally, without any problems*’ is likely to be endorsed by someone who is denying alcohol-related problems. The DrInC–2R can be interpreted in terms of either the total overall score or the total subscale scores.

Miller et al. (1995) confirmed the internal reliability and test-retest reliability of the DrInC–2R. They reported Cronbach coefficients for the consequences combined ( $\alpha = .94$ ) and for each of the subscales (physical = .74, social responsibility = .80, intrapersonal = .86, interpersonal = .85, and impulse control = .70). Correlations between repeated administrations were as follows: total consequences = .93, physical = .92, social responsibility = .93, intrapersonal = .96, interpersonal = .91, and impulse control = .79.

*Short Tridimensional Personality Questionnaire (Short-TPQ; Appendix G, p. 311).* The Short-TPQ is a 44-item questionnaire designed to measure three personality dimensions: Novelty Seeking (NS), Harm Avoidance (HA), and Reward Dependence (RD) (Sher, Wood, Crews, & Vandiver, 1995). It describes people's *attitudes, opinions, interests, or other personal feelings* and asks respondents to state whether or not each item applies them.

The Short-TPQ was derived from the 98-item Tridimensional Personality Questionnaire (Version 4) (TPQ-4; Cloninger, 1987). The personality dimensions identified by the Short-TPQ (and the TPQ-4) are related to two subtypes of alcohol abuse (Cloninger, 1987). Type 1 includes passive-dependent or anxious individuals who are characterised by high RD (eager to help others and emotionally dependent), high HA (cautious, pessimistic, and shy), and low NS (rigid and attentive to details). Type 2 individuals often have an antisocial personality and are characterised by high NS (impulsive and excitable), low HA (confident and uninhibited), and low RD (socially detached and independently self-willed).

Sher et al. (1995) reported that the internal consistency of the items for each of the three subscales was good, as was the test-retest reliability. Cronbach's alpha coefficient was as follows: novelty seeking = .79, harm avoidance = .85, and reward dependence = .72. Correlations between repeated administrations was as follows: novelty seeking = .80, harm avoidance = .82, and reward dependence = .85.

*Follow-Up Questionnaire (Appendix H, p. 312).* A follow-up questionnaire was designed to assess participants' perceptions of their experience in the study. The questionnaire comprises nine items. It asks respondents to describe their present level of drinking compared to what it was initially, by selecting: *stopped, a lot less, slightly less, the same, slightly more, or a lot more*. It asks them to describe what aspects of the

intervention they remember from the first session. If they reduced their drinking, they describe how they did so, or if not, what prevented this. It asks if they gained anything from taking part in the study. Finally, it asks if there was any information that they received that made them think more about their drinking.

### **Procedure**

Each participant was scheduled for two interviews.<sup>3</sup> All interviews took place in a quiet room in the university. On arrival at the designated room, the participant read and signed a consent form and was asked to name a *collateral*—a friend or family member—who could answer questions about the participant's drinking. The participant was informed that 10% of the collaterals whom all of the participants had nominated would be contacted. Each participant agreed to nominate a collateral.

Participants were then tested individually in the following order: Demographic, SADD, RTC, and Drinking Motives questionnaires were administered; the QF interview was conducted; the DrInC-2R and Short-TPQ questionnaires were given. Participants in the control group were then dismissed. Participants in the CBI or CBI-E groups completed the computerised intervention (as described in Chapter 3). Experimental participants received a printed summary of the results of the intervention<sup>4</sup>.

Approximately 12 weeks later ( $M = 85.1$  days,  $sd = 7.8$ ), each participant was re-administered the RTC and DrInC-2R. Participants were re-interviewed about their drinking during the prior 12-weeks with the Alcohol Timeline-Followback method, and were asked to fill out the follow-up questionnaire. All participants completed the computerised PCI. Participants who had been assigned to the control group were then

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<sup>3</sup> The assistance of MSc. students Sarita Cooper and Laura Purdy in conducting a portion of the interviews is gratefully acknowledged.

<sup>4</sup> Each of the experimental participants completed their intervention; there were no refusals to participate or withdrawals from the procedure. In every case the intervention appeared acceptable to participants.

offered the opportunity to complete the CBI intervention. Participants were thanked, debriefed, and dismissed.

## Results

### **Baseline Analyses**

The mean weekly consumption of males was 35.0 units ( $sd = 22.7$ ), and for females it was 25.9 units ( $sd = 18.1$ ). As expected, males drank significantly more than females,  $t(86) = 2.097, p = .039$ . The mean number of binge episodes during the previous 12 weeks (defined as 8 or more units on one occasion for males and 6 or more units for females) was 23.5 ( $sd = 12.7$ ) for males and 22.61 ( $sd = 16.0$ ) for females; the two sexes did not differ,  $t(86) = .283, p = .78$ . A full list of baseline data is presented in Appendix I.

Correlations between participants' and collaterals' reports of participants' drinking ( $n = 10$ ) are shown in Table 4.1. Each of the consumption variables was significantly correlated with each other, thus confirming the accuracy of the participants' self-reports. Furthermore, there were no obvious discrepancies between the participants' and collaterals' reports.

Table 4.1

*Intercorrelations Among Participants' and Collaterals' Reports of Participants' Drinking*

Drinking Index	
Frequency of Usual Amount	.916 <sup>***</sup>
Quantity of Usual Amount	.754 <sup>**</sup>
Frequency of Most Amount	.764 <sup>**</sup>
Quantity of Most Amount	.689 <sup>*</sup>
Mean Weekly Amount	.644 <sup>*</sup>

Note.  $n = 10$ .  $p < .05$ .  $**p < .01$ .  $***p < .001$ .

The mean number of total negative consequences from the DrInC was 20.7 ( $sd = 11.5$ ) for males and 23.2 ( $sd = 15.4$ ) for females; the two sexes did not differ,  $t(86) = .812$ ,

$p = .42$ . Table 4.2 displays the ten most frequently reported negative consequences.

Students cited hangovers as the single most frequent negative consequence. More than 94% indicated that they had experienced a hangover during the past three months; almost 66% of the sample had felt “bad about themselves” because of their drinking. Students scored highest on the DrInC *negative-physical-consequences* sub-scale, followed by *social responsibility, impulse control, intrapersonal consequences, and interpersonal consequences*, respectively.

Table 4.2.

*The Percentage and Number of Participants' Ten Most Frequently Endorsed DrInC Items in the Last Three Months*

Ten most frequently endorsed DrInC items	Lowest Endorsement		Middle Endorsement		Highest Endorsement		Total Endorsed	
	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>
I have had a hangover or felt bad after drinking <sup>†</sup>	56.8	50	36.4	32	1.1	1	93.4	83
While drinking I have said or done embarrassing things <sup>†</sup>	53.4	47	28.4	25	3.4	3	85.2	75
I have spent too much or lost a lot of money because of my drinking <sup>†</sup>	52.3	46	18.2	16	9.1	8	79.6	70
Because of my drinking I have not eaten properly <sup>†</sup>	63.6	56	5.7	5	2.3	2	71.6	63
I have been sick or vomited after drinking <sup>†</sup>	63.6	56	6.8	6	1.1	1	71.6	63
When drinking, I have done impulsive things that I regretted later <sup>†</sup>	60.2	53	5.7	5	2.3	2	68.2	60
I have felt bad about myself because of my drinking <sup>†</sup>	53.4	47	10.2	9	2.3	2	65.9	58
I have broken things while drinking or intoxicated <sup>*</sup>	18.2	16	29.5	26	9.1	8	56.8	50
I have had money problems because of my drinking <sup>†</sup>	35.2	31	15.9	14	5.7	5	56.8	50
I have smoked tobacco more when I am drinking <sup>‡</sup>	13.6	12	9.1	8	30.7	27	53.4	47

Note. Lowest Endorsement = †has happened once or a few times; ‡has happened a little; \*has almost happened.

Middle Endorsement = †has happened once or twice a week; ‡has happened somewhat; \*has happened once.

Highest Endorsement = †has happened daily or almost daily; ‡has happened very much; \*has happened more than once.

To determine whether participants' level of alcohol consumption was related to the number of alcohol-related problems that they had experienced, they were allocated to one of three groups based on their level of consumption<sup>5</sup>: low-risk drinkers had an average weekly alcohol consumption at or below 21 units for men and 14 units for women<sup>6</sup>; hazardous-risk drinkers were men who consumed 22 to 49 units or women who consumed 15 to 35 units; and harmful-risk drinkers were men who consumed 50 units or more or women who consumed 35 units or more. The mean total DrInC scores for low-risk, hazardous-risk, and harmful-risk drinkers are displayed in Figure 4.1.

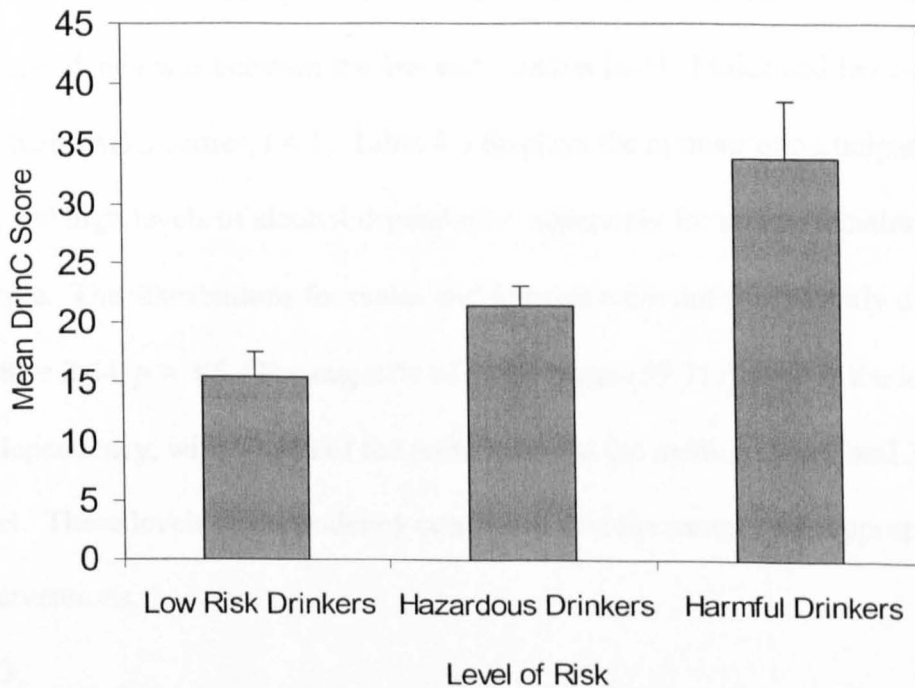


Figure 4.1. Mean total DrInC scores and standard error for low-risk drinkers ( $N = 22$ ), hazardous-risk drinkers ( $N = 50$ ), and harmful-risk drinkers ( $N = 16$ ).

<sup>5</sup> Groups were based on the definition of the Medical Research Council (1998).

<sup>6</sup> Participants could be included in the study if their average weekly drinking was at the low-risk level if they met the criterion for binge drinking.

One-way analysis of variance (ANOVA) was used to determine if the groups differed in their total DrInC score. First, it was confirmed that the assumptions of the test were met: the data were normally distributed, and Levene's test of equality of variances showed that the groups were homogeneous. The analysis indicated that the groups differed significantly,  $F(2,87) = 8.240, p = .001$ . Tukey's HSD post hoc tests showed that the low-risk group ( $M = 15.45, sd = 9.40$ ) had significantly lower total DrInC scores than both the hazardous drinking group ( $M = 21.46, sd = 11.65$ ),  $p = .022$ , and the harmful drinking group ( $M = 33.81, sd = 18.82$ ),  $p < .001$ , but that the hazardous and harmful drinkers did not differ from each other.

Both males' ( $M = 9.12, sd = 3.73$ ) and females' ( $M = 9.37, sd = 5.11$ ) mean level of alcohol dependency was between the *low* and *medium* level. Males and females did not differ in their SADD scores,  $t < 1$ . Table 4.3 displays the number of participants with low, medium, and high levels of alcohol dependency, separately for males, females, and the total sample. The distributions for males and females were not significantly different  $\chi^2(2, n = 88) = 2.64, p > .05$ . The majority of participants (59.7%) were at the low level of alcohol dependency, with 37.5% of the participants at the medium level, and 3.4% at the high level. These levels of dependency confirmed that the sample was appropriate for the brief interventions.

Table 4.3

*Distributions of Three Levels of Alcohol Dependency (Derived From the SADD Questionnaire) Separately for Males, Females, and the Total Sample*

Level of Alcohol Dependency	Males ( $N = 34$ )		Females ( $N = 54$ )		Total ( $N = 88$ )	
	$N$	%	$N$	%	$N$	%
Low	21	61.8	31	57.4	52	59.1
Medium	13	38.2	19	35.2	32	37.5
High	0	0	4	7.4	4	3.4

## Main Analyses

The groups (CBI, CBI-E, Control) were examined for baseline differences on each of the following variables: Alcohol Dependence, Readiness to Change, Social Motives, Coping Motives, Enhancement Motives, Conformity Motives, Novelty Seeking, Harm Avoidance, Reward Dependence, number of binge episodes, average weekly consumption, and the DrInC Physical, Interpersonal, Intrapersonal, Social Responsibility, Impulse Control, and the DrInC total score. There were no group differences on any of the variables at baseline.

Table 4.4 shows males' and females' mean weekly consumption, number of binges, and number of negative consequences at baseline and follow-up, separately for the Control, CBI and CBI-E groups.

Table 4.4

*Means and Standard Deviations of Weekly Alcohol Consumption, Number of Binges, and Drink-Related Problems at Baseline (t1) and Follow-up (t2) for Males and Females in the Control, CBI, and CBI-E Groups*

Variable	Control				CBI				CBI-E			
	Male ( <i>n</i> = 12)		Female ( <i>n</i> = 14)		Male ( <i>n</i> = 11)		Female ( <i>n</i> = 16)		Male ( <i>n</i> = 7)		Female ( <i>n</i> = 15)	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>Sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
Weekly units t1	37.32	33.10	23.29	12.10	35.11	17.12	25.26	20.85	37.39	13.00	23.02	9.85
Weekly units t2	29.34	18.33	15.70	8.15	22.74	14.37	12.10	7.20	14.60	7.41	17.60	12.25
Binge <sup>†</sup> total t1	20.08	13.53	19.71	8.99	25.00	12.83	23.38	21.03	27.71	12.75	20.20	8.14
Binge <sup>†</sup> total t2	18.92	12.70	15.07	10.30	17.45	10.66	10.44	9.04	9.75	6.45	16.00	13.32
DrInC total t1	20.83	14.86	25.29	14.52	18.36	7.76	22.88	19.02	23.29	13.50	21.40	12.39
DrInC total t2	20.33	13.34	15.43	8.15	19.36	11.53	14.63	11.64	19.14	10.57	18.80	12.06

*Note.* <sup>†</sup>Binge criteria were that males consumed eight units or more on one occasion and females, six units or more on one occasion.

Table 4.5 displays the participants' Readiness to Change (RTC). The distributions of stage-of-change for each of the three groups were not significantly different  $\chi^2$  (4, *n* =



88) = 2.34,  $p > .05$ . The majority of participants were in either the Pre-contemplation of Contemplation stage-of-change. Just 22% of the sample was in the Action stage of change.

Table 4.5

*Distributions of Three Stages-of-Change (Derived From the RTC Questionnaire) Separately for the CBI-E, CBI, Control Group and the Total Sample*

Stage of Change	CBI-E		CBI		Control		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Pre-contemplation	12	44.0	10	31.0	11	38.0	33	37.0
Contemplation	8	30.0	15	47.0	13	45.0	36	41.0
Action	7	26.0	7	22.0	5	17.0	19	22.0

Reductions in average weekly alcohol consumption from baseline to the three-month follow-up were examined for differences among the groups and between the genders. For ease of interpretation, mean weekly alcohol consumption at baseline and follow-up for the control, CBI, and CBI-E groups are displayed separately for males and females in Figures 4.2 and 4.3, respectively. The data were examined for violations of the assumptions of ANOVA. The dependent variables, average weekly consumption at baseline (Time 1) and at follow-up (Time 2), were not normally distributed. Average weekly consumption at baseline ( $M = 29.01$ ,  $sd = 19.72$ ) was skewed (skew statistic = 2.70) as was alcohol consumption at the follow-up ( $M = 18.42$ ,  $sd = 12.91$ , skew statistic = 1.63). Logarithmic transformation<sup>7</sup> of these variables corrected the data to fit a normal distribution both at the baseline ( $M = 1.39$ ,  $sd = .26$ , skew statistic = -.01) and at the follow-up ( $M = 1.16$ ,  $sd = .33$ , skew statistic = -.70). Levene's test of equality of variances showed the groups to be homogeneous at baseline  $F(2,69) = .65$ ,  $p = .66$  and at the follow-up  $F(2,69) = .25$ ,  $p = .94$ .

<sup>7</sup> Howell (1997) recommends logarithmic transformations whenever the standard deviation is proportional to the mean or the data are positively skewed.

The repeated-measures ANOVA included one within-participants factor and two between-participants factors: the within-participants factor was time of testing (baseline and follow-up); the two between-participants factors were group (control, CBI, and CBI-E) and gender. There was a significant main effect for time; participants significantly reduced their consumption from baseline ( $M = 29.0, sd = 19.7$ ) to the follow-up ( $M = 18.4, sd = 12.9$ ),  $F(1,69) = 51.59, p < .001$ .

There was a significant time-by-group interaction,  $F(2,69) = 3.67, p = .04$ ; CBI-E participants' average consumption at baseline was  $M = 27.6 (sd = 12.6)$  and at the follow-up was  $M = 16.6 (sd = 10.9)$ ; CBI participants' average consumption at baseline was  $M = 29.4 (sd = 19.7)$  and at the follow-up was  $M = 16.4 (sd = 11.7)$ ; control participants' average consumption at baseline was  $M = 29.8 (sd = 24.7)$  and at the follow-up was  $M = 22.0 (sd = 15.2)$ .

There was a non-significant time-by-gender interaction,  $F(1,69) = .22, p = .643$ ; male participants' average consumption at baseline was  $M = 36.7 (sd = 23.5)$  and at the follow-up was  $M = 23.5 (sd = 15.6)$ ; and female participants' average consumption at baseline was  $M = 23.9 (sd = 14.9)$  and at the follow-up was  $M = 15.1 (sd = 9.5)$ .

There was a significant time-by-group-by-gender interaction,  $F(2,69) = 3.26, p = .044$ . To examine the three-way interaction, two repeated-measures ANOVAs were conducted separately for males and females; the within-participants factor was time, and the between-participants factor was group. For males, there was a significant main effect for time,  $F(1,27) = 23.92, p < .001$ , and a significant two-way group-by-time interaction,  $F(2,27) = 4.42, p = .022$ . The source of the two-way interaction was examined with paired-samples *t*-tests. For male participants in the CBI-E group, there was a significant reduction in alcohol consumption from the baseline ( $M = 37.4, sd = 13.0$ ) to the follow-up ( $M = 14.6, sd = 7.4$ ),  $t(6) = 3.69, p = .01$ . For male participants in the CBI group, there

was a significant reduction in alcohol consumption from the baseline ( $M = 35.1, sd = 17.1$ ) to the follow-up ( $M = 22.7, sd = 14.4$ ),  $t(10) = 3.07, p = .012$ . However, there was a non-significant reduction for male participants in the control group from the baseline ( $M = 37.3, sd = 33.1$ ) to the follow-up ( $M = 29.3, sd = 18.3$ ),  $t(11) = .96, p = .357$ .

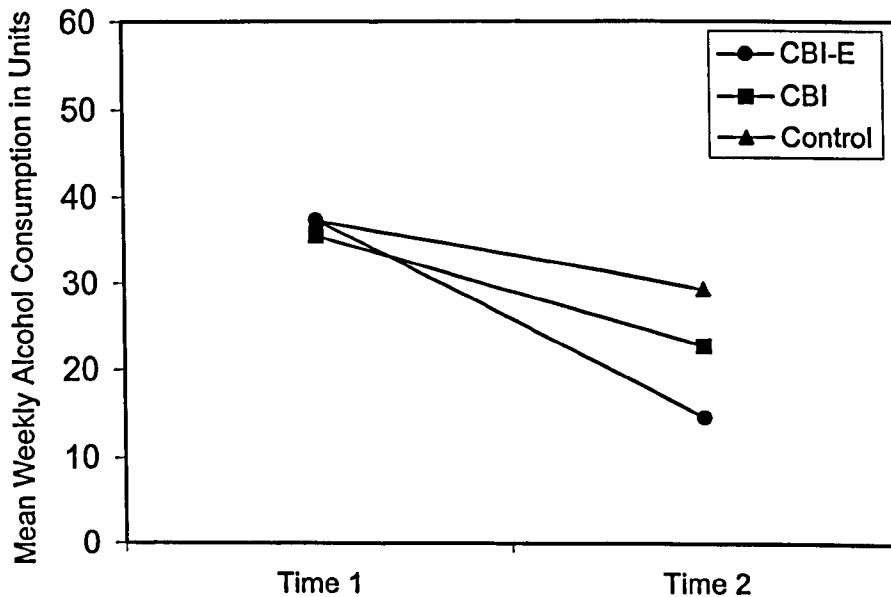
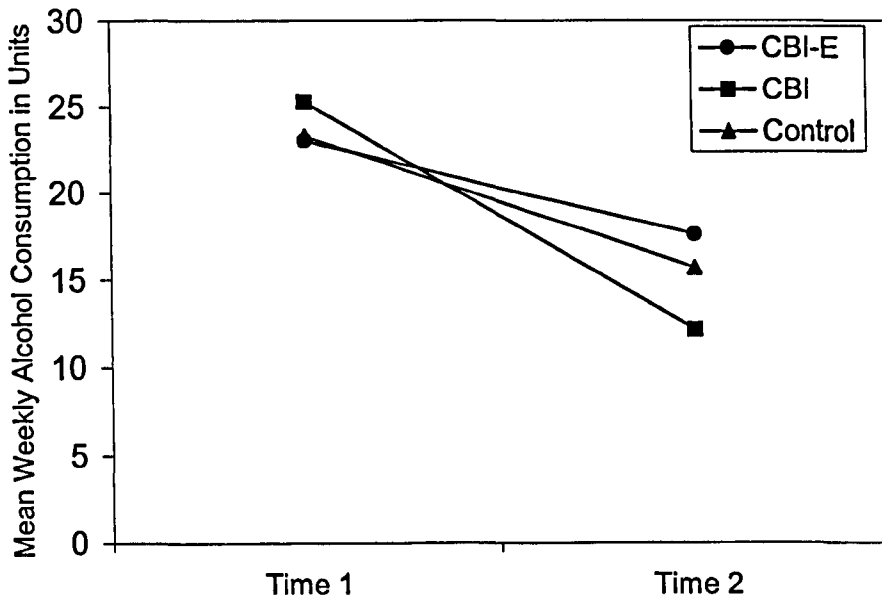


Figure 4.2. Mean weekly alcohol consumption at Time 1 (baseline) and Time 2 (follow-up) for males in the CBI-E, CBI, and control groups.

For females, there was a significant main effect for time; females significantly reduced their consumption from baseline ( $M = 23.9, sd = 14.9$ ) to the follow-up ( $M = 15.1, sd = 9.5$ ),  $F(1,42) = 29.081, p < .001$ . However the group-by-time interaction was not significant; females in each group reduced consumption from baseline (CBI-E  $M = 23.0, sd = 9.9$ ; CBI  $M = 12.1, sd = 7.2$ ; control  $M = 23.3, sd = 12.1$ ) to the follow-up (CBI-E  $M = 17.6, sd = 12.3$ ; CBI  $M = 25.3, sd = 20.9$ ; control  $M = 15.7, sd = 8.2$ ),  $F(2,42) = 1.36, p = .27$ .



*Figure 4.3.* Mean weekly alcohol consumption at Time 1 (baseline) and Time 2 (follow-up) for females in the CBI-E, CBI, and control groups.

Figures 4.4 and 4.5 shows males' and females' average weekly alcohol consumption in each group (CBI, CBI-E, control) for the week prior to the study and for each of the 12 post-intervention weeks. The graphs provide a comprehensive picture of the effects of the interventions.

For males, after a steady reduction in drinking during the first three weeks after their inclusion into the study, the weekly consumption of each of the groups stabilised. Individuals in the CBI-E group consistently drank less alcohol than the other two groups, and the CBI group drank less than the control group. The average weekly consumption for males who received the CBI-E intervention was below the Department of Health's recommended limit of 21 units per week for each of the 12 weeks following the intervention. Males in the CBI group were below this limit on just four of these weeks. Males in the control group exceeded this limit on each of the 12 weeks.

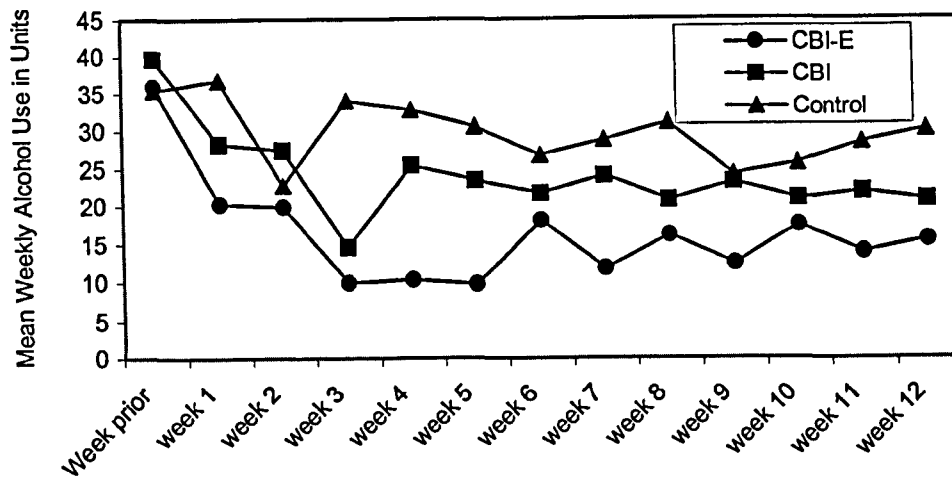


Figure 4.4. Mean weekly alcohol consumption for males in the CBI-E, CBI, and control groups in the week prior to inclusion into the study and for each of the 12 weeks before the follow-up.

For females the picture is different. Group differences in the pattern of consumption are less distinct than for the males. Participants in all three groups considerably reduced their average weekly consumption after inclusion into the study. The females in the CBI group had the greatest reductions, and these were maintained during the following weeks; however, the level of consumption for females in the CBI-E group and control group overlapped during much of the follow-up period. The average consumption of females in the CBI group was below the Department of Health's recommended limit of 14 units per week for 10 of the 12 weeks following the intervention; females in the control group were below this limit during just three weeks, and females in the CBI-E group exceeded this limit during each of the 12 weeks.

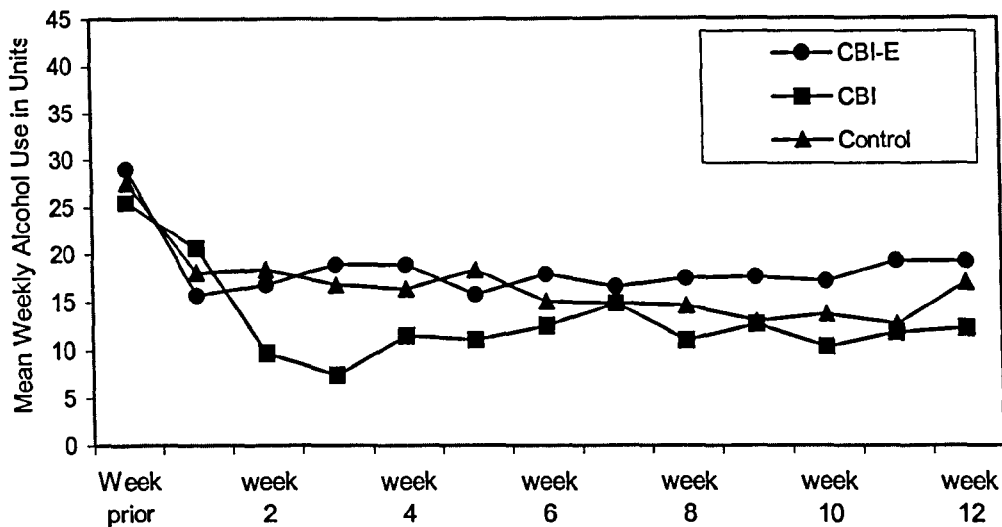


Figure 4.5. Mean weekly alcohol consumption for females in the CBI-E, CBI, and control groups in the week prior to inclusion into the study and for each of the 12 weeks to the follow-up.

The mean number of binge episodes in the CBI-E, CBI, and control groups at Time 1 and at Time 2 is shown in Figure 4.7. Changes in the mean number of binge episodes from the baseline to the follow-up were analysed by groups and gender. First, the distribution of binge episodes at Time 1 and Time 2 were examined for violations of the assumptions of ANOVA. At baseline, binge drinking ( $M = 22.17$ ,  $sd = 13.64$ ) was positively skewed (skew statistic = 1.55), as was binge drinking at the follow-up ( $M = 14.72$ ,  $sd = 11.06$ , skew statistic = 1.93). Logarithmic transformation<sup>8</sup> of these variables, at the baseline ( $M = 1.30$ ,  $sd = .24$ , skew statistic = .00) and at the follow-up ( $M = 1.07$ ,  $sd = .37$ , skew statistic = -.69) corrected them to fit a normal distribution. Levene's test of equality of variances showed the groups to be homogeneous at baseline  $F(2,69) = .98$ ,  $p = .44$  and at the follow-up  $F(2,69) = 1.46$ ,  $p = .22$ .

<sup>8</sup> Howell (1997) recommends logarithmic transformations whenever the standard deviation is proportional to the mean or the data are positively skewed.

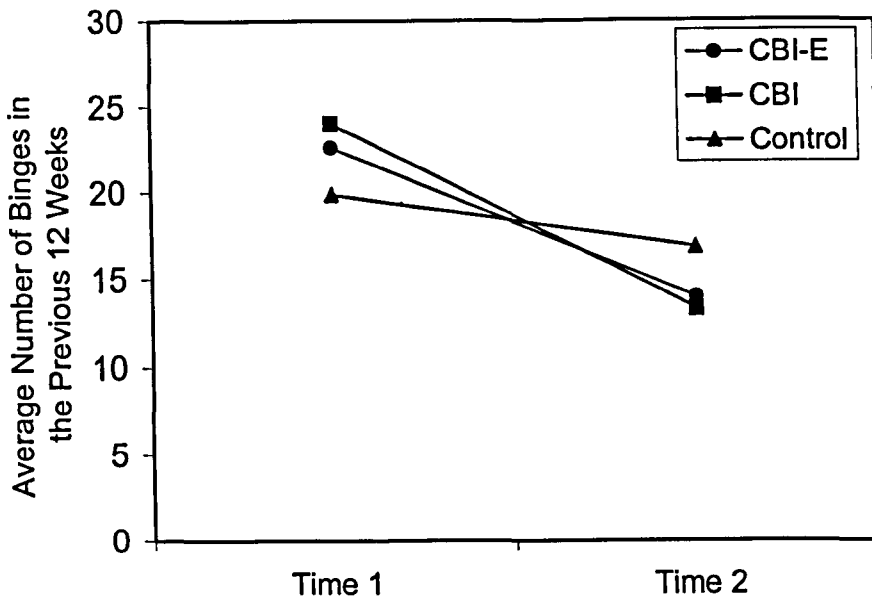


Figure 4.7. Mean number of binges at Time 1 and Time 2 for participants in the CBI-E, CBI, and control groups.

A repeated measures ANOVA yielded a significant main effect for time; participants significantly reduced their number of binge episodes from baseline ( $M = 22.2$ ,  $sd = 13.6$ ) to the follow-up ( $M = 14.7$ ,  $sd = 11.1$ ),  $F(1,69) = 30.46$ ,  $p < .001$ .

The group-by-time interaction closely approached significance,  $F(2,69) = 3.07$ ,  $p = .053$ . Although the group-by-time interaction was just outside the alpha level of .05, it was considered sufficiently close to warrant further examination. The two-way interaction was explored with a series of paired  $t$ -tests. Paired  $t$ -tests revealed that participants in the CBI-E group significantly reduced the number of binge episodes from Time 1 ( $M = 22.59$ ,  $sd = 10.17$ ) to Time 2 ( $M = 13.95$ ,  $sd = 11.81$ ),  $t(21) = 3.86$ ,  $p = .001$ —a reduction of 38%. Likewise, participants in the CBI group significantly reduced their number of binge episodes from Time 1 ( $M = 24.04$ ,  $sd = 17.86$ ) to Time 2 ( $M = 13.30$ ,  $sd = 10.16$ ),  $t(26) = 4.17$ ,  $p < .001$ —a reduction of 44.5%. Participants in the control group did not reduce the number of binge episodes from Time 1 ( $M = 19.88$ ,  $sd = 11.07$ ) to Time 2 ( $M = 16.85$ ,  $sd =$

11.40),  $t(25) = 1.44, p = .16$ . Therefore, participants in both of the intervention groups significantly reduced the number of binge episodes, whereas participants in the control group did not.

There was a non-significant time-by-gender interaction,  $F(1,69) = .16, p = .688$ ; male participants' number of binge episodes at baseline was  $M = 23.7$  ( $sd = 13.0$ ) and at the follow-up was  $M = 16.2$  ( $sd = 11.1$ ); and female participants' number of binge episodes at baseline was  $M = 21.2$  ( $sd = 14.1$ ) and at the follow-up was  $M = 13.7$  ( $sd = 11.0$ ).

There was also a non-significant group-by-gender-by-time interaction,  $F(2,69) = 2.03, p = .139$ . Male participants in each group reduced consumption from baseline (CBI-E  $M = 27.7, sd = 12.8$ ; CBI  $M = 25.0, sd = 12.8$ ; control  $M = 20.1, sd = 13.5$ ) to the follow-up (CBI-E  $M = 9.6, sd = 6.5$ ; CBI  $M = 17.5, sd = 10.7$ ; control  $M = 18.9, sd = 12.7$ ). Females in each group reduced consumption from baseline (CBI-E  $M = 20.2, sd = 8.1$ ; CBI  $M = 23.4, sd = 21.0$ ; control  $M = 19.7, sd = 9.0$ ) to the follow-up (CBI-E  $M = 16.0, sd = 13.3$ ; CBI  $M = 10.4, sd = 9.0$ ; control  $M = 15.1, sd = 10.3$ ).

Changes in the number of negative consequences of drinking (from the DrInC questionnaire) from baseline to the three-month follow-up were examined for group and gender differences. Before proceeding with the ANOVA, the dependent variables were examined for violations of the assumptions of the test. The DrInC total score at baseline (Time 1) and at follow-up (Time 2) were not normally distributed. The DrInC score at baseline ( $M = 22.18, sd = 14.13$ ) was skewed (skew statistic = 1.69) as was the DrInC score at the follow-up ( $M = 17.64, sd = 11.19, skew statistic = 1.57$ ). Square root transformation<sup>9</sup> and the omission of two outliers enabled the data to fit a normal distribution both at baseline ( $M = 4.47, sd = 1.46, skew statistic = .25$ ) and at the follow-up

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<sup>9</sup> Howell (1997) recommends square root transformations for data that is *count data* (e.g., that which is derived from Likert scales).



( $M = 3.94$ ,  $sd = 1.47$ , skew statistic =  $-.34$ ). Levene's test of equality of variances showed the groups to be homogeneous at the baseline  $F(2,67) = 1.12$ ,  $p = .36$  and at the follow-up  $F(2,67) = .91$ ,  $p = .48$ .

A repeated-measures ANOVA of the mean number of negative consequences yielded a significant main effect for time; participants significantly reduced the number of negative consequences they experienced at baseline ( $M = 22.1$ ,  $sd = 14.1$ ) to the follow-up ( $M = 17.6$ ,  $sd = 11.2$ ),  $F(1,67) = 11.08$ ,  $p = .001$ .

There was a non-significant two-way group-by-time interaction,  $F(2,67) = .22$ ,  $p = .804$ ; CBI-E participants' number of reported negative consequences at baseline was  $M = 22.0$  ( $sd = 12.5$ ) and at the follow-up was  $M = 18.9$  ( $sd = 11.4$ ); CBI participants' number of reported negative consequences at baseline was  $M = 21.0$  ( $sd = 15.4$ ) and at the follow-up was  $M = 16.6$  ( $sd = 11.6$ ); and control participants' number of reported negative consequences at baseline was  $M = 23.2$  ( $sd = 14.6$ ) and at the follow-up was  $M = 17.7$  ( $sd = 11.0$ ).

There was a significant two-way gender-by-time interaction,  $F(1,67) = 4.25$ ,  $p = .043$ . The mean DrInC scores for males and females at baseline and follow-up are shown in Figure 4.8. For males at Time 1, the mean DrInC score was  $M = 20.5$  ( $sd = 12.1$ ), and at Time 2 it was  $M = 19.7$  ( $sd = 11.7$ )—a reduction of 4%. For females at Time 1, the mean DrInC score was  $M = 23.1$  ( $sd = 15.4$ ), and at Time 2 it was  $M = 16.3$  ( $sd = 10.8$ )—a reduction of 29.5%. Paired *t*-tests showed that females reported significantly fewer negative consequences at Time 2 than at Time 1,  $t(43) = 3.99$ ,  $p < .001$ , whereas males' reduction was not significant,  $t(28) = .75$ ,  $p = .46$ .

There was a non-significant group-by-gender-by-time interaction for,  $F(2,67) = 1.56$ ,  $p = .217$ . Male participants in each group reported negative consequences that remained stable from baseline (CBI-E  $M = 23.3$ ,  $sd = 13.5$ ; CBI  $M = 18.4$ ,  $sd = 7.8$ ; control

$M = 20.8$ ,  $sd = 14.9$ ) to the follow-up (CBI-E  $M = 19.1$ ,  $sd = 10.6$ ; CBI  $M = 19.4$ ,  $sd = 11.5$ ; control  $M = 20.3$ ,  $sd = 13.3$ ). Females in each group reported negative consequences that reduced from baseline (CBI-E  $M = 21.4$ ,  $sd = 12.4$ ; CBI  $M = 22.9$ ,  $sd = 19.0$ ; control  $M = 25.3$ ,  $sd = 14.5$ ) to the follow-up (CBI-E  $M = 18.8$ ,  $sd = 12.1$ ; CBI  $M = 14.6$ ,  $sd = 11.6$ ; control  $M = 15.4$ ,  $sd = 8.1$ ).

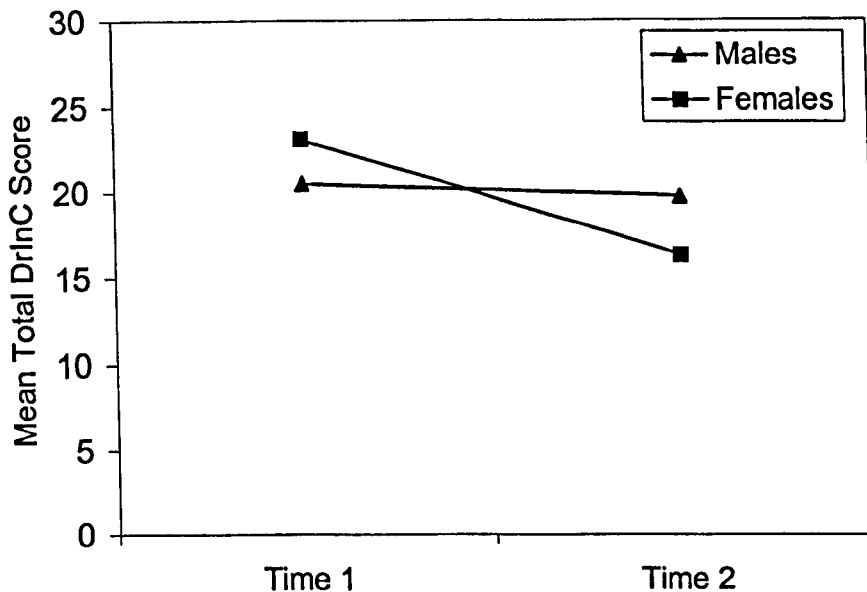


Figure 4.8. Mean Total DrInC Score at Time 1 and Time 2 for males and females.

The number of negative consequences experienced by participants was examined according to their level of alcohol consumption. Comparing males' and females' absolute level of alcohol consumption in relation to negative consequences has limited value because of alcohol's differential detrimental effects for males and females. Negative consequences occur at lower levels of consumption for females than for males (Miller et al., 1995). As demonstrated in the baseline analyses, drinking at hazardous levels (e.g., weekly alcohol consumption more than 21 units per week for males and 14 units for females) significantly increased the number of negative consequences that participants

reported. Participants who drank more than the Department of Health's recommended gender-specific safe limits were defined as *hazardous drinkers* and those below it as *low-risk drinkers*.

An independent samples *t*-test confirmed that at the follow-up (as at the baseline) hazardous drinkers had significantly higher DrInC scores ( $M = 22.29$ ,  $sd = 10.50$ ) than low-risk drinkers ( $M = 14.36$ ,  $sd = 10.29$ ),  $t(71) = 3.39$ ,  $p = .001$ . The proportion of male hazardous drinkers at Time 1 and Time 2 was 73.7% and 47%, respectively; the proportion of female hazardous drinkers at Time 1 and Time 2 was 75.6% and 37.8%, respectively. Despite the large difference in percentages, the proportion of hazardous male drinkers at Time 2 did not differ from the proportion of female ones,  $\chi^2(3, n = 75) = 2.82$ ,  $p = .420$ .

Examining improvements in the drinkers' risk level (from hazardous-risk or harmful-risk to low-risk drinking) from Time 1 to Time 2 gives a further indication of the treatment effects. The proportion of drinkers who moved from at-risk drinking (i.e., hazardous-risk or harmful-risk drinking) to low-risk drinking is shown in Table 4.6. For male drinkers, the greatest improvement occurred in the CBI-E group, where 86% of drinkers moved to low-risk drinking; the males in the CBI group improved by 18%, whereas the control group showed no improvement. For female drinkers, the improvements were less clearly related to group membership: the greatest improvement was for the CBI group in which 43% of the drinkers reduced to a safe level. The CBI-E group had a similar improvement of 40%, and the controls improved by 28%.

Table 4.6

*Frequencies and Proportions of Low-Risk and At-Risk Drinkers (Defined by Average Weekly Consumption) at Time 1 and Time 2 for Each Group With the Corresponding Level of Improvement*

	Male				Female				Total			
	Low Risk		At Risk		Low Risk		At Risk		Low Risk		At Risk	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
CBI-E Time 1	0	0	7	100	3	20	12	80	3	14	19	86
CBI-E Time 2	6	86	1	14	9	60	6	40	15	68	7	32
<i>Improvement</i>	6	86			6	40			12	54		
CBI Time 1	4	36	7	64	4	25	12	75	8	30	19	70
CBI Time 2	6	54	5	46	11	68	5	32	17	63	10	37
<i>Improvement</i>	2	18			7	43			9	33		
Control T1	4	33	8	67	4	29	10	71	8	30	18	70
Control T2	4	33	8	67	8	57	6	43	12	46	14	54
<i>Improvement</i>	0	0			4	28			4	16		

The greatest group improvement, regardless of gender, was in the CBI-E group, where 54% of the drinkers reduced to low-risk consumption,  $\chi^2(1, n = 22) = 55.58, p < .001$ . The CBI group improved by 33%,  $\chi^2(1, n = 27) = 14.39, p < .001$ . The control group improved by 16%, which was a non-significant change,  $\chi^2(1, n = 26) = 2.89, p = .09$ .

## Discussion

The baseline analyses confirmed that the sample was suitable to receive a brief intervention. The students were heavy drinkers: the average weekly alcohol consumption of males and females was one and one-half times the Department of Health's (1995) specified safe level, and participants had an average of two binge episodes per week. Accordingly, students reported a large number of drink-related negative consequences. More than 94% of the participants had experienced a hangover, and more than 71% had been sick or had vomited from drinking during the previous three months. The majority of

the students had a low or medium level of dependency, for which brief interventions are considered appropriate (Heather, 2001).

The results fully support the first hypothesis for male participants, but not for females. Male participants who received a brief intervention significantly reduced their alcohol consumption, unlike those male participants who did not receive a brief intervention. In contrast, female participants reduced their alcohol consumption irrespective of whether they received a brief intervention or not. There was a non-significant trend for male participants in the CBI-E group to reduce their drinking more than males in the CBI group. Furthermore, in contrast to male participants in the CBI and control groups, male participants in the CBI-E group consistently met the Department of Health's criterion for low-risk drinking in the subsequent weeks following the intervention.

The gender difference found in the present study is consistent with the findings of the World Health Organisation's brief intervention study, which is one of the largest such study ever conducted (Babor & Grant, 1992). The WHO study reported that females in both the control group and the intervention groups significantly reduced alcohol consumption. Males, on the other hand, reduced alcohol consumption only if they received a brief intervention. However, other experimental studies (see Marlatt et al. 1998; Wallace, Cutler, & Haines, 1988) and meta-analyses (see Moyer, Finney, Swearingen, & Vergun, 2002; Poikolainen, 1999) of brief interventions have not reported a gender difference in reductions in alcohol consumption.

Scott and Anderson (1991) reported that at a 12-month follow-up, there was no difference between women in a control group—who reduced their consumption by 26%—and women who received a brief intervention—who reduced their consumption by 27%. Anderson and Scott (1992), however, reported a significant difference at a 12-month

follow-up between men who received a brief intervention—who reduced consumption by 18%—and those who were in a control group—who reduced consumption by just 5%. Interestingly, women in the first study reduced their consumption more than did men in the second study. Chang (2002), who reviewed prior studies of brief interventions with women, concluded that brief interventions are not consistently more helpful to women than participation in a control condition. Therefore, unlike men, women seem to respond as favourably to an assessment only as they do to an assessment combined with an intervention.

In the present study, the participants answered detailed questions about their drinking, drinking-related problems, reasons for drinking, and commitment to changing their drinking. It is likely that the assessment itself caused the participants to become acutely aware of how much alcohol that they drank and the negative consequences that they had experienced as a result of their excessive drinking. Participants defined as punishment avoidant are those who are more inclined to avoid such threatening behaviours as they become aware of them. For punishment avoidant individuals the assessment itself could be regarded as a brief intervention. In the present study—which replicated the findings of Nixon and Parsons (1989) and Sher, Wood, Crews, and Vandiver (1995)—the female participants scored significantly higher on harm avoidance than did the males.

The plots of alcohol consumption during the week prior to participants' inclusion into the study and during the subsequent 12-weeks, lend further support to the view that women, unlike men, reacted more "favourably" to the assessment. In all three of the groups, there was a dramatic reduction in women's alcohol consumption just after their inclusion into the study, and the reductions remained relatively stable throughout the post-intervention period. In contrast, men in the control group initially decreased their

consumption but resumed consumption at a level similar to that during the week prior to their entry into the study.

The present study fully supported its second hypothesis: students who received a brief intervention (either CBI-E or CBI) significantly reduced their number of binge drinking episodes, unlike students who do not receive a brief intervention. Thus, women in the control group, although they reduced consumption, continued to binge drink at similar level to their baseline levels. Perhaps the interventions were so effective in reducing participants' binge drinking because participants in the intervention groups received specific information about excessive levels of drinking and strategies for reducing them.

The results did not support the study's last hypothesis: students who received a brief intervention did not reduce the number of their alcohol-related problems more than those in the control group. Nevertheless, the female students, unlike the males, reported fewer drink-related problems at the follow-up assessment than at baseline, regardless of whether or not they had received a brief. Other similar studies have reported this finding. For instance, Marlatt et al. (1998) reported a gender difference in drinking problems in a sample of college students who had received a brief intervention. Participants assigned to the brief intervention group had a greater reduction in alcohol-related problems from baseline to follow-up than the control group, but there was also interaction between gender and group assignment. Females had a significantly greater reduction in problems than males at the one-year and two-year follow-ups. Anderson and Larimer (2002), who evaluated a brief intervention in a workplace setting, also found that females, unlike males, showed a significant reduction in drinking problems. Interestingly, both of these studies reported significant reductions in alcohol consumption for both male and female participants, even though male participants continued to experience problems.

In the present study, it was surprising that there was a reduction in drinking-related problems only for females, even though both males and females significantly reduced their alcohol consumption and binge drinking. However, it will be recalled that females scored significantly higher than males on harm avoidance. People who scored high on this dimension might have been more inclined to avoid such behaviours in the future. Wechsler and colleagues (1994, 1999, & 2002) also showed that students who frequently binge drank experienced significantly more negative consequences of drinking. It will be recalled that Wechsler et al. (1994) defined binge drinking as men consuming on one occasion in a two-week period five or more drinks for men, and women, four or more drinks. The students in the present study binge drank an average of once per week at levels consistent with Wechsler's definition throughout the study. Male participants had an average of 16.2 binges during the 12-week follow-up period; females had an average of 13.7 binges. This frequency of bingeing was probably sufficient to continue to cause negative consequences.

Drinking at weekly hazardous levels, like binge drinking, also increases the risk of drinkers experiencing drink-related problems. Examination of the data from the follow-up assessment revealed that there were more male drinkers than female drinkers who continued to drink at hazardous levels, although this trend was non-significant. Therefore, the greater proportion of male hazardous drinkers than female hazardous ones probably accounts for the greater number drink-related problems among the male drinkers.

The success of the interventions can be measured in terms of how many participants moved from hazardous-risk to low-risk drinking. The interventions were designed to highlight the risky drinking patterns of the respondents and to give them strategies to change these patterns. Participants in the CBI-E group showed the greatest percentage of change from risky drinking to safe drinking levels: 54% of them did no. A



significant number of the participants the CBI group (33%) also made this change. This change in drinking status of participants in the control (at 16%) was not significant.

### Limitations

There are a number of limitations to the present study. For example, the sample size was relatively small, and although the sample had sufficient power to test the main hypotheses, there were small sub-groups for addressing the secondary hypotheses.

The study outcome measures were based on self-report, whose reliability and validity might be questioned. However, the reliability and validity of self-reported alcohol consumption for research purposes has received widespread support (for reviews see Babor, Brown, & Del Boca, 1990; Maisto, McKay & Connors, 1990; Midanik, 1982; Sobell & Sobell, 1990).

Sobell and Sobell (1990) specified guidelines to ensure that self-reports of alcohol consumption are valid and reliable. First, when reporting consumption, respondents should not be intoxicated: individuals tend to underreport their consumption when intoxicated. Second, respondents should be assured that their responses will be confidential. Third, interviews should be conducted in a clinical or research setting in order to prevent biased estimates of consumption. A biased estimate may occur if a report of lower consumption is more desirable, as in an interview with the probation service. Finally, the wording of questions should be clear and understandable.

The present study adhered closely to each of these points. Furthermore, the validity of the self-reports was verified through collateral reports. There was a strong agreement between the student reports of their drinking and those of the collaterals.

The time of year when the study was conducted may have influenced the results. For the majority of the participants, the follow-up period coincided with the end of the academic year. This was at a time when many students were undertaking examinations,

and the students might have decreased their consumption to revise for their examinations. However, the plots of weekly alcohol consumption indicated no decrease in consumption during the examination period.

### Summary

Unlike control participants, excessive-drinking male students who participated in the brief interventions significantly reduced their alcohol consumption. There was a tendency for males who received the enhanced brief intervention to reduce their consumption more than those who received the standard brief intervention. Male students in the control group did not reduce their consumption. However, female students reduced their consumption regardless of whether or not they received an intervention. The extensive baseline assessments were themselves sufficient to motivate drinking reduction, and no further improvement resulted from the interventions.

Unlike control participants, students who received a brief intervention significantly reduced the frequency of their binge drinking episodes. Perhaps this was because the brief interventions used in this study deliberately focused on strategies to reduce binge drinking. Female students had significantly reduced the number of alcohol-related problems they experienced whereas male students did not. This may have been as a consequence of the greater number of male students, in comparison to female, who were drinking at hazardous levels at the follow-up period. Significantly more students drank at safe levels if they received a brief intervention than if they did not. Again, as with binge drinking, the brief interventions gave direct feedback about hazardous drinking levels and strategies to prevent this. There was a trend for students who received the enhanced brief intervention, in comparison to the standard intervention, to drink at low-risk levels. Future studies with larger sample sizes might detect a significant difference between the two interventions.

The present study supports the view that brief interventions are successful in reducing (a) the alcohol consumption of male students, (b) the frequency of binge drinking of both male and female students and (c) the alcohol consumption of students to low-risk. The results also indicate that merely taking a comprehensive alcohol assessment can reduce the total alcohol consumption of female drinkers and the number of alcohol-related negative consequences that they experience, but not the frequency with which they binge drink.

## CHAPTER 5

### Study 1: Predictors of Students' Drinking Status

There are a range of factors that determine people's excessive use of alcohol. Biopsychosocial factors cumulatively influence people's decision to drink or not to drink (see Chapter 2 for a description of a motivational model of alcohol use; Cox & Klinger, 1988, 1990, 2004). Therefore, there are several major factors that, individually or in combination, place people at risk for excessive drinking. Research has established that the following factors place people at risk of developing alcohol *dependence*: a family history of alcohol dependence (e.g., Jacob & Leonard, 1994); a genetic predisposition to alcohol dependence (e.g., Cook & Gurling, 2001); personality characteristics (e.g., Cox, Yeates, Gilligan, & Hosier, 2001); and cultural influences (e.g., Vaillant & Milofsky, 1982).

As described in the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a; see Chapter 2), factors influencing the use of alcohol can have either a more distal or a more proximal influence on the decision to drink. According to the model, personality factors (i.e., relatively stable factors) exert a more distal influence than other variables such as motives or reasons for drinking (i.e., more malleable factors), which are viewed as exerting a more proximal influence. For instance, a person who is predisposed to negative emotionality might drink alcohol to cope with such negative feelings.

The manner in which people strive to obtain their goals and resolve their concerns is another important influence on people's decision to drink. The way in which people resolve their concerns, according to Cox and Klinger (2004b, see Chapter 2), is called their motivational structure. People with a maladaptive motivational structure are less actively engaged in their goal pursuits and derive little emotional satisfaction from them; they are

inclined to drink excessively. A person's motivational structure is neither as trait-like as is a personality characteristic nor as malleable as is one's motives for drinking.

These various risk factors have obvious implications for the prevention and treatment of alcohol problems. The following three sections consider the impact of three factors that influence excessive drinking: personality factors, motivational structure, and drinking motives.

## Personality

The role of personality in the development and maintenance of alcohol dependence has been studied extensively. Although no "alcoholic personality" has been found, certain personality measures can be used to distinguish alcoholics in treatment from non-clinical samples (Cox et al., 2001). Furthermore, certain personality traits can also distinguish *pre-alcoholics*—non-alcoholic individuals who later become alcoholics—from their peers (Cox, 1983, Masse & Tremblay, 1997). Interestingly, the personality traits that distinguish alcoholics from non-alcoholics and pre-alcoholics from their peers are not the same. This section discusses the factors in the latter category.

The relationship between personality and alcohol abuse is complex. Because there are many criteria used to define alcohol abuse (e.g., those based on quantity or frequency of use; those based on the type and number of alcohol-related problems), there are several models to explain the influence of personality. For instance, some models emphasize three personality dimensions. One such model is based on the Eysenck Personality Questionnaire (EPQ, Eysenck & Eysenck, 1975), which has dimensions of neuroticism versus emotional stability, extraversion versus introversion, and psychoticism versus superego control. Another three-factor model is based on Cloninger's Tridimensional Personality Questionnaire (TPQ, Cloninger, 1987). This model uses the constructs harm avoidance, reward dependence, and novelty seeking. However, there are also models that

use five dimensions, such as Goldberg's (1990) model that comprises surgency, agreeableness, conscientiousness, emotional stability, and intellect or Costa and McCrae's (1992) model with the dimensions extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience.

The strongest relationship between alcohol-use and personality factors has been found for dimensions related to impulsivity/disinhibition (Sher, Trull, Bartholow, & Vieth, 1999). Along with impulsivity, this dimension includes factors such as sensation seeking, aggressiveness, and psychoticism. Cloninger, Sigvardsson, and Boham (1988) reported that children who were judged to be high on novelty seeking (e.g., impulsive or excitable) at age 11 were at elevated risk for early-onset alcohol abuse. However, although high levels of impulsivity during childhood have been consistently related to later alcohol misuse (e.g., Caspi, Begg, Dickson, Harrington, Langley, Moffit, & Silva, 1995; Cloninger et al., 1988; Hawkins, Catalano, & Miller, 1992; Pederson, 1991), it should be noted that such traits are also closely linked to childhood conduct disorder. Zucker, Fitzgerald, and Moses (1995) suggested that childhood conduct disorder is also implicated in other etiological processes related to alcohol misuse, such as poor academic achievement and relationship problems. Therefore, it is difficult to establish the separate contributions of impulsivity, conduct disorder, and these other etiological factors to alcohol misuse.

The relationship between impulsivity/disinhibition and excessive drinking amongst university students is also strong. For instance, Valliant and Scanlan (1996) demonstrated that students with high scores on psychopathic deviance and mania, from the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & Mckinley, 1943), were at increased risk of alcohol abuse. Cammatti and Nagoshi (1995), using the Eysenck I.7 Scale (Eysenck, Pearson, Easting, & Allsop, 1985), reported that college students' scores on venturesomeness and impulsivity were positively correlated with their alcohol use.

Interestingly, these scores on venturesomeness and impulsivity were not correlated with alcohol-related problems, but scores on depression, stress, and irrational beliefs were. This study showed, then, that negative emotionality better predicted alcohol-related problems than did impulsivity.

Negative emotionality (e.g., neuroticism, high rates of anxiety, mood disorder) is associated with clinical alcoholism (Sher, et al., 1999). It is debateable to what extent negative emotionality is a *cause* or *consequence* of alcoholism. Kammeier, Hoffamn, and Loper's (1973) archival study suggests the former. These authors compared the personality profiles of 32 men who were hospitalised for alcoholism with those of 148 of their college classmates. All participants had completed the Minnesota Multiphasic Personality Inventory (MMPI) 13 years earlier. The pre-alcoholics showed elevated scores on Depression, Hysteria, and Psychasthenia scales of the MMPI.

Early signs of negative emotionality have also been linked to hazardous drinking. Zimmerman, Wittchen, Höfler, Pfister, Kessler, and Leib (2003) conducted a longitudinal study of more than 2,500 adolescents and young adults over a four-year period. These authors found that anxiety disorder significantly predicted later hazardous drinking and alcohol-use disorders. A cross-sectional study of undergraduates also found that negative emotionality was linked to problem drinking (Lewis & O'Neill, 2000). The latter authors showed that problem drinkers had lower levels of self-esteem and higher levels of anxiety than non-problem drinkers. Cloninger, et al. (1988) found that extreme scores on negative affect at age 11—identified on a harm-avoidance scale—differentially predicted early- or late-onset alcoholism. They suggested that low scores on Harm Avoidance (e.g., cautiousness or apprehension) predicted early-onset, whereas high scores predicted late-onset alcoholism.

This differential diagnosis of alcoholism (i.e., late- or early-onset alcoholism) is fundamental to Cloninger's typology of alcoholism (Cloninger, 1987). According to Cloninger (1987), people who experience late-onset—or Type I—alcoholism have an *anxious* type of personality. That is, these individuals score high on Reward Dependence (RD), indicating that they are emotionally dependent and sensitive; they score high on Harm Avoidance (HA), indicating that they are cautious or inhibited; they have low scores on Novelty Seeking (NS), indicating that they are rigid and orderly. In contrast, people who experience early-onset—or Type II—alcoholism have high scores on NS (e.g., they are impulsive and disorderly) and low scores on HA (e.g., they are confident and optimistic) and low scores on RD (e.g., they are socially detached and emotionally calm).

This theoretical model proposed by Cloninger (1987) has received mixed support (see Cox et al., 2001), although the TPQ has largely been shown to have good reliability and validity with student samples (Sher, Wood, Crews, & Vandiver, 1995). Sher et al. conducted two studies with 583 and 318 students, respectively, and found moderate support for the TPQ higher-order scales, moderate-to-good internal consistency, and good test-retest reliability. Similarly Bagby, Parker, and Joffe (1992) studied 216 undergraduates and concluded that the three-factor structure of the TPQ had an excellent fit, as did Nixon and Parsons (1989) who studied 225 students.

In contrast, using confirmatory factor analysis Earleywine, Finn, Peterson, and Pihl (1992) did not find support for the factor structure of the TPQ. However, their methodology has been criticised by other researchers for its use of just one goodness-of-fit indicator (Parker, Bagby, & Joffe, 1996; Sher et al., 1995). More recently, a study of British students (Stewart, Ebmeier, & Deary, 2004) has cast doubt on the factor structure of the TPQ. Stewart et al. administered the TPQ to 897 students and found that at the scale level Cloninger's model was well replicated, but at the item level the three-factor model



was not supported. Although the HA scale was supported, the NS and RD scales were only weakly supported. The study did, however, replicate the gender differences on the TPQ scales found in previous research with students (e.g., Earleywine et al., 1992; Nixon & Parsons, 1989; Sher et al., 1995): female students scored higher on RD and HA than did males.

### Motivational Structure

Cox and Klinger (2002, 2004b) described *motivational structure* as the properties of an individual's pursuit of goals. They showed that people's substance use is related to their motivational structure (see Chapter 3). To assess motivational structure, Klinger, Cox, and Blount (1995, 2003) developed the Motivational Structure Questionnaire (MSQ), and Cox and Klinger (1999) developed a shorter and more user-friendly version of the MSQ called the Personal Concerns Inventory (PCI). These two assessment tools can categorise respondents with *adaptive* and *maladaptive* motivational structures.

In general, people with adaptive motivation are emotionally engaged in their goal pursuits. That is, they expect strong joy if they succeed in obtaining their goals and strong sorrow if they do not. They feel a strong commitment to obtaining their goals; they have strong expectations of success; and they expect to obtain their goals in the relatively near future. In contrast, people with maladaptive motivation are not emotionally involved in their goal pursuits. Although they can identify attractive goals that they believe they can obtain, they expect little joy if they succeed and little sorrow if they fail. They also do not feel strongly committed to achieving their goals (Cox & Klinger, 2004b).

The relationship between motivational structure and a variety of substance-use outcome variables has been assessed with both clinical and student samples. With a clinical sample, Cox, Blount, Bair, and Hosier (2000) studied the relationship between people's readiness to change and their motivational structure. From 77 inpatients admitted

to a detoxification and rehabilitation program for substance abuse or dependence, Cox et al. found that an adaptive motivational structure was a positive predictor of determination to change. Using an early version of the MSQ, Klinger and Cox (1986) showed that the motivational structure of 53 inpatients at a treatment centre moderately predicted their response to treatment. Finally, in a sample of 202 alcoholic veterans, followed at 12-months after undergoing a 30-day treatment program, adaptive motivational structure again predicted more positive drinking outcomes (Glasner, Cox, Klinger, & Parish, 2001).

Several studies with student samples have assessed the relationship between motivational structure, alcohol consumption, and alcohol-related problems. Cox et al. (2002) tested 370 university students in four countries: the Czech Republic, Norway, the Netherlands, and the United States. These authors hypothesised that adaptive motivational structure would be associated with lower alcohol consumption. Although adaptive motivation was not related to alcohol consumption for the sample as a whole, there was an interaction between adaptive motivation and alcohol-related problems. The source of the interaction was that as students' alcohol-related problems increased, the strength of the negative relationship between adaptive motivation and alcohol consumption also increased. This implies that for students who experienced more alcohol-related problems, as their alcohol consumption increased their level of adaptive motivation decreased.

Other studies with students using the PCI have found direct relationships between motivational structure and measures of alcohol use. Fadardi (2004) showed that maladaptive motivation and alcohol consumption were positively related. Hosier (2002) demonstrated that maladaptive motivation predicted the number of alcohol-related problems experienced by college students.

## Drinking Motives

Drinking motives are the self-reported reasons people give for their drinking. They are designed to identify the psychological function that drinking alcohol serves and are the most proximal determinant of alcohol use (Cooper, 1994). Amongst college students, drinking motives are potent predictors of both heavy drinking and alcohol-related problems (Carey & Correia, 1997; Stewart, Loughlin, & Rhyno, 2001).

As described in detail in Chapter 2, Cox and Klinger (1988, 1990, 2004a) asserted that people's motivation for drinking is determined through their expectations of affective change from drinking. Cooper (1994) expanded the prior work by proposing a model of drinking motives based on the valence (positive or negative) and source (internal and external) of the outcomes the individual expects to achieve by drinking. Crossing these two dimensions, Cooper described four drinking motives. That is, individuals may drink for (a) internally generated positive reinforcement motives (drinking to enhance positive mood), (b) externally generated positive reinforcement motives (drinking to obtain social rewards), (c) internally generated negative reinforcement motives (drinking to regulate negative emotions), and (d) externally generated negative reinforcement motives (drinking to avoid social rejection). Cooper refers to these motives as enhancement, social, coping, and conformity motives, respectively.

It should be noted, however, that although these motives roughly correspond to Cox and Klinger's (1988, 1990, 2004a) model, they are a slight misinterpretation of it. In Cox and Klinger's model drinking motives are determined by crossing the valence (positive and negative) of the affective change and the source of the affective change either directly (pharmacologically) or indirectly (instrumentally). Thus, according to Cox and Klinger, enhancing positive affect instrumentally is broader than what Cooper describes as social motives.

Drinking motives predict unique aspects of drinking behaviour. For instance, drinking for negative-reinforcement reasons (i.e., coping and conformity) predicts alcohol-related problems, whereas drinking for positive reinforcement reasons (i.e., enhancement and social motives) predicts heavy alcohol consumption (Stewart et al., 2001). Drinking motives, especially internally driven ones (i.e., coping and enhancement), have also been linked to personality factors. Novelty seeking has been significantly correlated with drinking for enhancement motives, but not with coping motives (Cooper, Frone, Russell & Mudar, 1995). However, levels of trait anxiety are significant predictors of coping motives, but unrelated to enhancement or social motives (Stewart & Zeitlin, 1995).

The present study aimed to identify the predictors of alcohol consumption and alcohol-related problems in excessive drinking students. As described above, drinking motives, motivational structure, and personality factors are all related to excessive drinking. According to Cox and Klinger (1988, 1990, 2004a) and Cooper (1994) the more proximal factor, and arguably, that with the greatest influence on alcohol consumption and related problems are drinking motives. Cox and Klinger (2004a) further suggested that motivational structure is more proximal than personality factors. The present analyses describes the unique contribution that each of these factors has on university students alcohol consumption and alcohol-related problems.

It was first hypothesised that enhancement motives for drinking and high scores on novelty seeking would be positively associated with alcohol consumption. Second, it was hypothesised that high scores coping motives for drinking and on novelty seeking and harm avoidance would predict alcohol-related problems. It was expected that the predicted relationships among the variables would occur both at the baseline and the follow-up assessment. Additionally, at the follow-up it was expected that high

maladaptive motivation and low adaptive motivation would be predictive of higher levels of alcohol consumption and alcohol-related problems.

## Method

### **Participants**

A total of 88 excessive drinking students volunteered to participate (as was described in Chapter 4<sup>1</sup>). Of those recruited, 75 participants completed the follow-up assessment. Because two participants' data files were corrupted, 73 participants were included in the final sample, 30 of whom were male (41%), and 43 were female (58%). The average age of the final sample was 21.30 years ( $SD = 4.75$ ).

### **Instruments**

*Drinking Motives Questionnaire (DMQ)*. (Appendix D, p. 308). The Drinking Motives Questionnaire (Cooper, 1994) is a 20-item questionnaire designed to assess motives for drinking. The questionnaire measures four kinds of motives for drinking: *social* motives, *coping* motives, *enhancement* motives, and *conformity* motives (see Chapter 4 for a fuller description).

*A Quantity/Frequency Alcohol Consumption Questionnaire (QF)* (Appendix E, p. 309). The QF Questionnaire retrospectively records the respondent's alcohol consumption over a prior 12-week period. With the aid of a calendar, the interviewer records the respondent's (a) the *usual* amount of alcohol consumed in the week, (b) the number of *days* this usual amount was consumed, (c) the *greatest* amount of alcohol consumed in a week, and (d) the number of *days* this greatest amount was consumed (see Chapter 4 for a fuller description).

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<sup>1</sup> Note: the data analysed in this chapter was derived from the participants described in Chapter 4.

*Drinker's Inventory of Consequences (DrInC-2R)* (Appendix F, p. 310). The DrInC-2R (Miller, Tonigan, & Longabaugh, 1995) is a 50-item questionnaire designed to measure a variety of problems frequently experienced by those who drink excessively. The questionnaire assesses negative consequences occurring specifically during the previous three months (see Chapter 4 for a fuller description).

*Short Tridimensional Personality Questionnaire (Short-TPQ)* (Appendix G, p. 311). The Short-TPQ is a 44-item questionnaire (Sher, Wood, Crews, & Vandiver, 1995) designed to measure three basic personality dimensions: Novelty Seeking, Harm Avoidance, and Reward Dependence (see Chapter 4 for a fuller description).

*Personal Concerns Inventory (PCI)*. The PCI was used to measure motivational structure (Cox & Klinger, 2004). A computerized version of the PCI used in the current study (see Chapter 3). It includes a list nine life areas: Home and Household Matters; Employment and Finances; Relationships; Love, Intimacy, and Sexual Matters; Self Changes; Education and Training; Health and Medical Matters; Leisure and Recreation; and Other Substance Use. Respondents are required to choose the life areas in which they have concerns; they are then asked to describe their concerns and how they would like to resolve them. The respondents then use 10 scales to rate each goal: *commitment, importance, how likely, control, what to do, joy, unhappiness, when will it happen? will alcohol be helpful?, and will alcohol be unhelpful?*

### **Procedure**

Students were scheduled for two interviews, both of which took place in a quiet room in the School of Psychology. During the first interview, the participant was asked to complete a battery of questionnaires that comprised the instruments described above. Only participants who were allocated to the CBI-E Group (see Chapter 3) completed the PCI at

baseline. During the second interview, approximately 12 weeks after the first interview, participants in all three groups completed the PCI, QF, and DrInC. For a fuller description of the procedure, see Chapter 4.

### ***Plan of Analysis***

Statistical analysis occurred in two phases. In the first phase the Short-TPQ and PCI were factor analysed. The analysis was performed on the Short-TPQ because the reliability of its original factor structure has been questioned. As expected, the analysis of the PCI yielded two factors, which depict adaptive and maladaptive motivational structures. In the second phase of the analysis multiple regression was used to identify the predictors of alcohol consumption and alcohol-related problems at baseline and follow-up.

The factor analyses were performed on medium sample sizes (Short-TPQ;  $n = 88$  & PCI;  $n = 73$ ). Kline (1994) suggested that large sample sizes ( $n > 100$ ) are desirable for factor analysis and that the ratio of the number of participants to the number variables should be at least 2:1. Other researchers (e.g., Arrindel & van der Ende, 1985) have advocated that the ratio of number of participants to number of factors be at least 20:1<sup>2</sup>; Thurstone (1947) suggested that the variable-to-factor ratio should be at least 3:1. Thus, although there is disagreement about the appropriate ratio, the present analyses (which yielded a three-factor solution to the 44-item Short-TPQ, and a two-factor solution to the ten-variable PCI) met Kline's participant-to variable-ratio requirement (a minimum of 20 participants), Arrindel and van der Ende's participant-to-factors ratio (a minimum of 40 participants), and Thurstone's variable-to-factor ratio (a minimum of 6 variables). Kline suggested that for sample sizes with fewer than 100 participants, an exploratory factor

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<sup>2</sup> A two-factor solution in the present analyses would require a minimum sample of  $n = 40$ , whereas a three-factor solution would require a minimum sample of  $n = 60$ .

analysis is a statistically reliable approach. This is the approach used in the present analyses.

Two methods of exploratory factor analysis were considered: principal-components analysis and principal-axis factoring. Principal-components analysis is the appropriate method of analysis when the observed items are considered to cause the latent variable, whereas principal-axis factoring is appropriate when the latent variable is considered to cause the observed items. The latter method of analysis—principal-axis factoring—was more appropriate analysis, because personality variables and motivational structure are seen as *causing* the observed item responses, rather than vice versa.

Next, relationships between the PCI and alcohol-related variables were assessed. Specifically, the PCI factor scores obtained from the factor analysis, along with other predictor variables, were entered into separate multiple regression analyses in which alcohol consumption and alcohol-related problems were the respective dependent variables.

To predict alcohol consumption and alcohol-related problems, at Time 1, hierarchical multiple regression analyses were conducted with the four drinking motives (social, coping, enhancement, and conformity) and the three personality variables (novelty seeking, harm avoidance, and reward dependence) as the predictor variables. In the analysis predicting alcohol consumption, gender was entered in the first step so that it could be controlled before the other predictor variables were entered. In the analysis predicting alcohol-related problems, both gender and alcohol consumption was entered in the first step.

To predict alcohol consumption and alcohol-related problems at Time 2, hierarchical multiple regression analyses were conducted in which the four drinking motives, motivational structure (adaptive and maladaptive factors), and the three



personality variables were the predictor variables. In the analysis predicting alcohol consumption at Time 2, gender and dummy variables to designate group allocation was entered in the first step—again, to control for their influence. Similarly, in the analysis predicting alcohol-related problems at Time 2, gender, alcohol consumption, and the group dummy variables was entered in the first step.

In each analyses after entering specific variables to control for their effects (e.g., gender), the theoretically more proximal variables were entered first. The order of entry of the predictor variables was considered on the basis that the more proximal variables would have the greatest influence on the dependent variables; therefore, motives were entered in the first block in order to predict the unique variance of these items. The next block contained items that were more distal to motives (e.g., motivational structure or personality factors). These remaining items were entered in order to establish the amount of unique variance these additional items could explain over and above drinking motives. The effect of the predictor variables in each step was measured by testing the significance of the change in  $R^2$ . The  $R^2$  statistic represents the total amount of variance accounted for in the dependent variable by the independent variable(s). The  $R^2$  change in the analysis represents the unique contribution of a predictor variable to the final model<sup>3</sup>.

## Results

Table 5.1 presents the means and standard deviations of drinking motives, personality variables separately for male and female students. A frequency distribution indicated that the most frequently cited reason for drinking was for social motives; for males, the mean score on social motives was 3.60 ( $sd = .76$ ), and for females, it was 3.47 ( $sd = .86$ ). Gender differences in drinking motives were tested. There was one significant

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<sup>3</sup> Note. Presented throughout the regression analyses are changes in  $R^2$  rather than the more conservative estimates of changes in Adjusted  $R^2$ .

difference. Females ( $M = 2.56, sd = .89$ ) scored significantly higher than males ( $M = 1.97, sd = .47$ ) on coping motives,  $t(66.8) = -3.64, p = .001$ . Gender differences in the personality variables were also tested. There was one difference. Females ( $M = 11.37, sd = 5.94$ ) were significantly higher than males ( $M = 5.70, sd = 3.30$ ) on harm avoidance,  $t(68) = 5.22, p < .001$ .

Table 5.1

*Means and Standard Deviations of the Four Subscales of the Drinking Motives Questionnaire and the Three Subscales of the Tridimensional Personality Questionnaire (TPQ), Separately for Males and Females*

Variable	Males		Females	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
<b>Drinking Motives</b>				
Social	3.60	.76	3.47	.86
Enhancement	2.93	.73	2.94	.90
Coping	1.97	.47	2.56	.89
Conforming	1.48	.46	1.54	.61
<b>TPQ</b>				
Novelty Seeking	7.07	2.89	6.05	3.14
Harm Avoidance	5.70	3.30	11.37	5.94
Reward Dependence	5.97	2.25	6.88	2.06

### **Factor Analyses**

In order to identify the factor structure of the Short-TPQ on the present sample, (see Sher, et al., 1995), the 44-items were factor analysed. This analysis was conducted because previous research with British students (Stewart et al., 2004) failed to confirm the item reliability of the 100-item TPQ (Cloninger, 1987).

A correlation matrix of the TPQ items was first inspected to ensure that there were adequate inter-variable relationships on which to base a factor analysis. These relationships were adequate: 25 percent of the coefficients were greater than 0.2.

Bartlett's test of sphericity was significant (1925.1,  $p < .001$ ) and Kaiser-Meyer-Olkin's

measure of sampling adequacy was .63—thus confirming that the analysis could be carried out with confidence.

The factors were extracted with principal-axis factoring, and a varimax rotation constrained the number of factors to three, in line with Cloninger's (1987) model. This same procedure was used in the original development of the Short-TPQ (Sher, et al., 1995) and in Stewart et al's. (2004) subsequent British study using the full TPQ. Items with loadings lower than .30 were considered *not to load* on a given factor. Table 5.2 shows the rotated factor matrix of the three-factor solution.

Table 5.2

*Factor Loadings (.30 and greater) of the Three-Factor Varimax Rotated Solution of the TPQ*

Factor one			Factor two			Factor three		
No.	Item	Loading	No.	Item	Loading	No.	Item	Loading
1	HA	.76	38	RD	.85	20	NS	.62
37	HA	.72	39	RD	.77	10	NS	.53
11	HA	.70	2	RD	.71	21	NS	.51
9	HA	.66	6	RD	.64	18	NS	.51
40	HA	.66	27	NS	.34	44	NS	.49
8	HA	.63	14	RD	.32	12	NS	.46
3	HA	.61				25	NS	.40
15	HA	.55				22	HA	.34
34	HA	.55				19	HA	.34
33	HA	.55				16	NS	.33
31	HA	.52						
5	HA	.49						
43	HA	.48						
7	HA	.48						
42	HA	.45						
4	HA	.44						
28	HA	.43						
19	HA	.39						
36	HA	.38						
17	HA	.35						
24	HA	.33						
22	HA	.31						

The first factor in the three-factor solution can clearly be called Harm Avoidance (HA): all of the original HA items loaded on this factor, with loadings ranging from .31 to .76. No items from the other scales loaded on this factor. Only two of the 22 original HA items loaded on another factor (Factor 3), and only one of these had a higher loading on the other factor (Item No. 22; .034 on Factor 3, compared to .031 on Factor 1) than on Factor 1. The second factor was labelled Reward Dependence (RD): five of the nine original RD items loaded on this factor, with loadings ranging from .32 to .85. One item from the original Novelty Seeking (NS) scale also loaded on Factor 2 (with a factor loading of .34). Eight of the 13 original NS items loaded on Factor 3. The factor scores of these items ranged from .33 to .62. As stated above, two HA items also loaded on this factor. The variance explained by each factor and the corresponding eigenvalues were as follows: 17% and 7.45 for Factor 1 (Harm Avoidance), 8% and 3.63 for Factor 2 (Reward Dependence), and 8% and 3.49 for Factor 3 (Novelty Seeking). Cronbach's Alpha for the three factors was .89, .72, and .73, respectively. The factor solutions provide a good fit to Cloninger's (1987) model.

Participants' concerns were evaluated from the PCI. The number of concerns ranged from two to seven ( $M = 3.68$ ,  $sd = 1.09$ ), and the focus of their concerns were in the following areas: Education ( $n = 47$ ), Finances ( $n = 44$ ), Relationships ( $n = 37$ ), Housing ( $n = 26$ ), Employment ( $n = 26$ ), Exercise ( $n = 22$ ), Health ( $n = 17$ ), Leisure ( $n = 8$ ), and Self-changes ( $n = 4$ ).

Factor analysis was also performed on the indices derived from the PCI. The purpose of this analysis was to define respondents' motivational structure. The ten indices from the PCI were first inspected to identify any deviations from normality. None of the ten indices had any degree of skewness that would threaten the validity of the factor analysis. A correlation matrix of the PCI indices was next inspected to ensure that there

were adequate inter-variable relationships on which to base a factor analysis. The relationships were adequate: 38 percent of the coefficients were greater than .20.

Bartlett's test of sphericity was significant (237.7,  $p < .001$ ), and Kaiser-Meyer-Olkin's measure of sampling adequacy was .60— again confirming that the analysis could be conducted with confidence.

The extraction of factors using principal-axis factoring generated three factors with eigenvalues greater than 1.0, but analysis of the scree plot suggested a two-factor solution would better fit the data. Rotation of the factors was conducted with Direct Oblimin procedures, which allows factors to be correlated with each other.

Table 5.3 displays the two-factor solution, with factor solutions greater than .30. Commitment, Importance, Happiness, and Likelihood loaded positively on Factor 1, and Unhappiness and Goal Distance loaded negatively. Factor 2, by contrast, is loading positively on Control, what to do, Likelihood, and Commitment. Two of the ten indices— *alcohol will help* and *alcohol will interfere* with goal pursuits—did not load on either factor. Together, the two factors accounted for 50.1% of the total variance, with Factor 1 explaining 30.1% of the variance and Factor 2 explaining 20%.

Table 5.3

*Factor Loadings (.30 and Greater) of the Indices From the Personal Concerns Inventory (PCI)*

PCI Indices	Factor 1	Factor 2
Commitment	.789	.337
Importance	.661	
Happiness	.639	
Unhappiness	-.590	
Goal Distance	-.331	
Control		.895
What To Do		.775
Likelihood	.508	.660

Factor 1 was labelled Adaptive Motivation for the following reasons. Respondents who scored high on this factor were emotionally involved in their goal pursuits, expecting much happiness and little unhappiness from goal attainments. They were strongly committed to their goals, which they identified as being important. They had relatively high expectations of success in obtaining their goals, which they expected to achieve in the near future. In contrast, Factor 2 was labelled Maladaptive Motivation. Respondents scoring high on this factor were not emotionally involved in their goal pursuits; they did not have strong expectations of either happiness or unhappiness from goal achievements, nor did they view their goals as important. Even though they felt strong control over obtaining their goals and that they knew what to do in order to achieve them and believed that their chances of success were high, they were only moderately committed to pursuing their goals.

## Multiple Regression Analyses

Hierarchical multiple regression was used to establish which of the baseline factors predicted the dependent variables of interest—namely, alcohol consumption and alcohol-related problems—at Time 1 and at Time 2. As a first step in the multiple regression, relationships among the motivational, personality, and dependent variables were examined in a correlation matrix. The results, shown in Table 5.4, indicate substantial multicollinearity among the variables.

Table 5.4

*Intercorrelations Among Alcohol Consumption, Alcohol-Related Problems, Drinking Motives, TPQ Indices and PCI Factor Scores*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Alc. t1	-											
2. DrInC t1	.43***	-										
3. Alc. t2	.39***	Ns	-									
4. DrInC t2	.40***	.55***	.37**	-								
5. Social	ns	.25*	ns	.24*	-							
6. Coping	ns	.48***	ns	.25*	.59***	-						
7. Enhance	ns	.29**	ns	ns	.28**	ns	-					
8. Conform	.29**	Ns	.31**	ns	.31**	.34**	.29**	-				
9. NS	ns	.44***	-.25*	.48***	ns	.23*	.25*	ns	-			
10. HA	ns	Ns	ns	ns	ns	.61***	ns	.21*	ns	-		
11. RD	-.43**	Ns	ns	ns	ns	ns	ns	ns	ns	ns	-	
12. PCIF1	ns	Ns	ns	-.24*	ns	ns	ns	ns	ns	ns	ns	-
13. PCIF2	ns	Ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

Note: Alc. t1 = average weekly alcohol consumption at Time 1; DrInC t1 = average alcohol-related problems at Time 1; Alc. t2 = average weekly alcohol consumption at Time 2; DrInC t2 = average alcohol-related problems at Time 2; Social = social motives; Coping = coping motives; Enhance = enhancement motives; Conform = conformity motives; NS = novelty seeking; HA = harm avoidance; RD = reward dependence; PCI F1 = adaptive motivation; PCI F2 = maladaptive motivation.

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

Before proceeding with the multiple regression analysis, the data were examined to ensure that they did not violate the assumptions of the test. None of the dependent variables—average weekly alcohol consumption at Time 1, at Time 2, alcohol-related

problems at Time 1, and at Time 2—were normally distributed: there was a high degree of skew and kurtosis in all cases. A logarithmic transformation<sup>4</sup> of the alcohol consumption variables corrected the deviations from normality in the distributions (see Chapter 4 p. 133 for a fuller explanation). Square-root transformations<sup>5</sup> of the alcohol-related problems variables corrected the lack of normality in these distributions (see Chapter 4 p. 140 for a fuller explanation). Scatterplots revealed no problems with lack of linearity or outliers in the data. The data were further tested for homoscedasticity: the standardised residuals were plotted against the standardised predicted values. The spread of the residuals at every set of values in the independent variables was equal, thus confirming the homoscedasticity of the distributions.

Tables 5.5 displays the results of a hierarchical multiple regression analysis, in which the dependent variable was the logarithmic transformation of average weekly alcohol consumption at Time 1. To evaluate the effect of drinking motives (coping, enhancement, social, and conformity) and personality variables (novelty seeking, harm avoidance, and reward dependence) beyond that accounted for by gender, gender was entered as Step 1, and the four drinking motives were entered as the next block, using forward selection. In forward-selection, the variables are entered one at a time starting with the highest value of the standardised beta (at the  $p < .05$  level). This process continues until no additional variables are significant. The personality variables were entered in the next block, again using forward selection. The order in which the variables was entered was based on the premise that order of entry should represent the proximity of the variables' relationship to alcohol consumption—in this instance, gender, motives, and then personality.

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<sup>4</sup> Howell (1997) recommends logarithmic transformations whenever the standard deviation is proportional to the mean or the data are positively skewed.

<sup>5</sup> Howell (1997) recommends square root transformations for data that is *count data* (e.g., that which is based on Likert scales such as the DrInC).



Table 5.5

*Results of a Hierarchical Multiple Regression Analysis of the Ability of Drinking Motives and Personality variables to Predict Average Weekly Alcohol Consumption at Time 1 Beyond That Accounted for by Gender*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.08	.08	7.43 (1,86)	.008
Gender	-.15	.05	-.28**				
Step 2				.16	.08	8.22 (1,85)	.005
Coping Motives	.02	.01	.30**				
Step 3				.21	.05	5.18 (1,84)	.025
Enhancement Motives	.01	.01	.22*				
Step 4				.31	.10	11.95 (1,83)	.001
Reward Dependence	.03	.01	.33**				

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

As expected, gender significantly predicted alcohol consumption, accounting for 8% of the variance. Males drank more than females. Coping motives uniquely predicted alcohol consumption, accounting for a further 8% of the variance, and enhancement motives uniquely predicted 5% of the variance. Finally, reward dependence predicted 10% of the variance. The final model explained a total of 31% of the variance in alcohol consumption,  $F = 9.28 (4, 87), p < .001$ .

Table 5.6 displays the results of a hierarchical multiple regression analysis, in which the dependent variable was the square root transformation of alcohol-related problems at Time 1. To evaluate the effect of drinking motives (coping, enhancement, social, and conformity) and personality variables (novelty seeking, harm avoidance, and reward dependence) beyond that accounted for by alcohol consumption and by gender, alcohol consumption and gender were entered as Step 1. Drinking motives were entered as the next block. The predictor variables were selected using forward selection. In the next block, the personality variables were entered, and again, the forward selection technique was selected. The order in which the independent variables were entered was again

determined theoretically on the basis of the degree of proximity between each independent variable and the dependent variable.

Table 5.6

*Results of a Hierarchical Multiple Regression Analysis of the Ability of Drinking Motives and Personality Variables to Predict Alcohol-Related Problems at Time 1 Beyond That Accounted for by Alcohol Consumption and Gender*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.25	.25	13.85 (2,85)	.000
Alcohol Consumption	2.88	.55	.51 <sup>***</sup>				
Gender	.69	.29	.23 <sup>*</sup>				
Step 2				.37	.12	16.37 (1,84)	.000
Coping Motives	.15	.04	.39 <sup>***</sup>				
Step 3				.40	.03	4.62 (1,83)	.034
Enhancement Motives	.06	.03	.19 <sup>*</sup>				
Step 4				.46	.06	9.50 (1,82)	.003
Novelty Seeking	.03	.01	.33 <sup>**</sup>				

Note. <sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$ . <sup>\*\*\*</sup> $p < .001$ .

Alcohol consumption and gender accounted for 25% of the variance in alcohol-related problems. Drinking to cope was a significant predictor of drinking problems, accounting for a further 12% of the variance. Enhancement motives also uniquely predicted problems, accounting for 3% of the variance. Of the personality variables, only novelty seeking was a significant predictor of alcohol problems, accounting for 6% of the variance. The full model accounted for a total of 46% of the variance in alcohol-related problems,  $F = 14.21 (5, 87), p < .001$ .

Tables 5.7 displays the results of a hierarchical multiple regression analysis in which the dependent variable was the logarithmic transformation of average weekly alcohol consumption at Time 2. To evaluate the effect of drinking motives (coping, enhancement, social, and conformity), motivational structure (adaptive and maladaptive) and personality variables (novelty seeking, harm avoidance, and reward dependence) beyond that accounted for by gender and group allocation, gender and dummy variables

defining group membership were entered as Step 1. The forward selection technique was selected for each of the next three blocks. The four drinking motives were entered in the second block. The PCI factor scores were entered in third block. The personality variables were entered in the final block. The order in which the independent variables were entered was again determined theoretically on the basis of the degree of proximity between each independent variable and the dependent variable.

Table 5.7

*A Hierarchical Multiple Regression Analysis of the Ability of Drinking Motives, Motivational Structure, and Personality Variables to Predict Average Weekly Alcohol Consumption at Time 2 Beyond That Accounted for by Gender and Group*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.13	.13	3.40 (3,69)	.023
Gender	-.20	.08	-.30*				
Group_1	-.10	.09	-.14				
Group_2	-.13	.09	-.19				
Step 2				.18	.05	4.04 (1,68)	.049
Social Motives	.02	.01	.22*				
Step 3				.24	.07	5.84 (1,67)	.018
Novelty Seeking	.03	.01	.28*				

Note. \*  $p < .05$ .

Gender and group membership accounted for a total of 13% of the variance. Males had higher weekly alcohol consumption than females, but group membership did not significantly add to the model. In Step 2, drinking for social motives uniquely predicted 5% of the variance in alcohol consumption. Finally, Novelty Seeking predicted 7% of the variance. The PCI factor scores were not a significant predictor of alcohol consumption. The final model accounted explained a total of 24% of the variance in alcohol consumption at Time 2,  $F = 4.31 (5, 67), p = .002$ .

Table 5.8 displays a hierarchical multiple regression analysis in which the dependent variable was the square root transformation of alcohol-related problems at Time

2. To evaluate the effect of drinking motives (coping, enhancement, social, and conformity), motivational structure (adaptive and maladaptive), and personality variables (novelty seeking, harm avoidance, and reward dependence) beyond that accounted for by alcohol consumption, group membership, and gender, the latter variables were entered as Step 1. In the next three blocks, drinking motives the motivational structure variables, and the personality variables were entered, and the forward selection technique was selected in each case. The order in which the independent variables were entered was again determined theoretically on the basis of the degree of proximity between each independent variable and the dependent variable.

Table 5.8

*A Hierarchical Multiple Regression Analysis of the Ability of Drinking Motives, Motivational Structure, and Personality Variables to Predict Alcohol-Related Problems at Time 2 Beyond That Accounted for by Alcohol Consumption, Gender, and Group*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.24	.24	5.38 (4,68)	.001
Alcohol Consumption	2.23	.51	.50*				
Gender	.11	.33	.04				
Group_1	.51	.40	.16				
Group_2	.17	.38	.06				
Step 2				.32	.08	7.90 (1,67)	.006
Coping Motives	.12	.04	.32**				
Step 3				.38	.06	6.13 (1,66)	.016
Novelty Seeking	.13	.05	.27*				

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

Alcohol consumption, gender, and group memberships together accounted for 24% of the variance in alcohol-related problems. Drinking to cope independently predicted drinking problems, accounting for a further 8% of the variance. Neither adaptive nor maladaptive structure contributed significantly to the model. Of the personality variables, only novelty seeking was a significant predictor accounting for 6% of the variance. The

full model accounted for a total of 38% of the variance in alcohol-related problems,  $F = 6.69 (6, 66), p < .001$ .

## Discussion

The results of the exploratory factor analysis of the Short-TPQ supported Cloninger's (1987) three-factor model. Unlike Stewart et al's. (2004) study, the present data supported the model at the item level. The three-factors in the solution clearly represent harm avoidance, reward dependence, and novelty seeking. In relation to gender, the present findings only partly replicate those of Earleywine et al. (1992), Nixon and Parsons (1989), and Sher et al. (1995): females were significantly higher on harm avoidance than males, but not higher on reward dependence.

The relationship between the TPQ scales and drinking motives were as expected. The correlation between harm avoidance and coping motives was significant and high. As with harm avoidance, females scored higher than males on coping motives. Novelty seeking was most strongly correlated with social motives, and to a lesser degree with enhancement, and coping motives. Reward dependence was not related to any of the drinking motives.

Stewart and Devine (2000) found that internal drinking motives (coping and enhancement), but not external motives (conformity and social) were related to participants' personality characteristics. They showed that coping-motivated drinkers were anxious, depressed, and vulnerable, whereas enhancement-motivated drinkers were excitement seekers. The former, but not the latter, relationship was replicated by Stewart, Loughlin, and Rhyno (2001). The present study only partly supports the findings of Stewart and Devine, but fully supports those of Stewart, et al. Furthermore, the relationship between social motives (an external motive) and novelty seeking found in this

study is plausible. That is, students who were novelty seekers drank alcohol to better enjoy parties and other social gatherings.

There were several noteworthy correlations between drinking motives and personality variables and weekly alcohol consumption and alcohol-related problems. First, coping motives had a significant and high correlation with drinking problems at Time 1; the correlation with drinking problems at Time 2 remained significant but was weaker. The present findings cannot establish the causation of this relationship. However, it is more reasonable to expect that drinking to cope will result in many alcohol-related problems than vice versa (e.g., experiencing drinking problems leads one to drink to cope), although the relationship is probably reciprocal—that is, as drinking problems increase a person might become more motivated to drink to cope.

Second, harm avoidance was not related to either alcohol consumption or alcohol-related problems at Time 1, but was negatively correlated with drinking problems at Time 2. These relationships might be a consequence of participants' taking part in the study. Participants high on harm avoidance who received specific information that their drinking was risky (or who simply became aware of their risk status by being in the study) may have deliberately tried to avoid experiencing alcohol-related problems.

Third, social motives and enhancement motives were positively correlated with drinking problems but not with consumption; furthermore, social motives, but not enhancement motives, continued to be positively correlated with drinking problems at Time 2. The sole relationship between these motives and drinking problems but not alcohol consumption implies that drinking problems—for excessive drinking students—are caused more by situational factors (e.g., socialising) than the amount of consumption per se.

Finally, novelty seeking was positively correlated with both alcohol consumption and alcohol-related problems at Time 1 and Time 2. These findings are consistent with previous research (see Bagby, et al., 1992; Cloninger, 1987; Nixon & Parsons, 1989; Sher, et a., 1995).

As expected, the factor analysis of the PCI yielded two factors that were interpreted as adaptive and maladaptive motivation. Respondents with an adaptive motivational structure were emotionally involved in their goal pursuits. They expected great joy and little unhappiness from their goal attainments; they were strongly committed to their goal, which they viewed as important; they also expected to successfully reach their goals in the near future. Respondents with a maladaptive motivational structure, in contrast, were not emotionally involved in their goal pursuits. They did not view their goals as important, and they were only moderately committed to them. They expected neither strong happiness nor strong unhappiness from their goal attainments, even though they had a high sense of control over obtaining them, knew what to do to achieve them, and believed that they would succeed. These two factors clearly replicate those found in earlier research (e.g., Cox & Klinger, 2004b).

The PCI was administered to the full cohort of participants only at the follow-up, and it was this follow-up PCI data that were factor analysed. The PCI was not administered to all participants at baseline because it formed part of the intervention for participants in the CBI-E group. Therefore, the validity of exploring the relationship between drinking at baseline and motivational structure at follow-up is questionable. Nevertheless, alcohol consumption at the baseline was moderately negatively correlated with adaptive motivation. Adaptive motivation was also negatively correlated with drinking problems at the follow-up. However, unlike Hosier's (2002) and Fadardi's

(2004) results, maladaptive motivation was related neither to alcohol consumption nor alcohol-related problems.

The significant but weak relationship between adaptive motivational structure and both average weekly alcohol consumption and alcohol-related problems could be due to an artefact of the study design. As discussed, the PCI was administered at the follow-up when many of the students had reduced their drinking and their alcohol-related problems. It will be recalled that Cox et al. (2002) found a negative relationship between students' adaptive motivational structure and alcohol consumption only among students' who had experienced drinking-related problems.

The hypothesis that high scores on enhancement motives and novelty seeking would predict higher levels of alcohol consumption was partially supported. However, when baseline drinking motives were regressed onto alcohol consumption, after the effects of gender had been controlled, both coping motives and enhancement motives uniquely predicted alcohol consumption. Furthermore, coping motives explained more of the variance (8%) than enhancement motives (5%). Cooper, et al. (1995) also showed that both coping motives and enhancement motives predicted alcohol consumption, but that enhancement motives explained more of the variance.

After controlling for gender and drinking motives, reward dependence and not novelty seeking, predicted alcohol consumption. This finding was unexpected. The relationship between reward dependence as measured by the full TPQ and alcohol use has not been previously found (i.e., Bagby, et al., 1992; Cloninger, 1987; Nixon & Parsons, 1989; Sher, et al., 1995). Likewise, using the short TPQ, Sher et al. did not find a relationship between reward dependence and alcohol use. The amount of variance explained by reward dependence was also high (e.g., 10%), and greater than the unique variance explained by coping motives and enhancement motives. Therefore, reward



dependence, a theoretically more distal influence on drinking than motives explained more of the variance in alcohol consumption. Again this was an unexpected result.

Reward dependence is characterised by sensitivity to cues signalling reward, particularly social approval. Therefore, the finding that reward dependence had a greater influence on alcohol consumption might suggest that those students who are predisposed to seek social approval sought to do so by consuming excess amounts of alcohol. This outcome is consistent with the finding that students, in general, cite social motives as the most common reason for drinking.

The second hypothesis was partially supported. It was expected that high scores on coping motives, novelty seeking, and harm avoidance would all predict higher levels of alcohol-related problems. When drinking motives were regressed onto alcohol-related problems, after controlling for gender and alcohol consumption, it was coping motives that predicted the most variance, although enhancement motives was also a unique predictor. Cooper et al's. (1995) model suggested that enhancement motives have only an indirect effect on alcohol problems through alcohol consumption. However, in the present study enhancement motives was a significant predictor of problems after alcohol consumption had been controlled. This finding is consistent with that of Stewart et al. (2001).

After controlling for gender, alcohol consumption, and drinking motives, novelty seeking predicted problems. Sher et al. (1995) demonstrated that novelty seeking and harm avoidance were independent significant predictors of alcohol-related problems. However, the present findings are more consistent with those of Hosier (2001), who reported that novelty seeking was the only TPQ dimension that significantly predicted problems in a sample of university students.

The third hypothesis was partially supported. It was expected that at the follow-up high scores on enhancement motives, high scores on maladaptive motivation, low scores

on adaptive motivation, and high scores on novelty seeking would predict greater alcohol consumption. However, when drinking motives were regressed onto alcohol consumption at the follow-up, after controlling for the effects of both gender and group membership, it was social motives that uniquely predicted alcohol consumption. That is, those students who cited social motives as the most important reason for drinking at baseline were those who continued to drink excessively at the follow-up. Although it is generally accepted that internal motives (coping and enhancement) are stronger predictors of excessive drinking than external motives, the present results demonstrate the importance of social motives in students' drinking.

Motivational structure did not uniquely explain variance in alcohol consumption. This finding is possibly due to the limitation in the study design described above (i.e., participants' motivational structure was assessed only at the follow-up). Cox et al.'s (2002) study of students might provide a possible explanation for this lack of a relationship. Cox et al. reported a relationship between adaptive motivation and alcohol consumption only among students who had experienced alcohol-related problems. In the present study, drinking problems tended to decrease for the whole sample at the follow-up.

At baseline, novelty seeking was a significant predictor of alcohol consumption at the follow-up. That is, students who were high on novelty seeking (e.g., impulsive, excitable, disorderly) continued to drink excessively. Unexpectedly, novelty seeking explained the more of the unique variance in the model than did any of the drinking motives. This suggests that the enduring effects of personality are critically important to the on the effectiveness of the interventions used in this study. That is to say, the interventions were less effective in reducing the alcohol consumption of students high on novelty seeking than they were for other students.

The fourth hypothesis was also partially supported. It was expected that students with high scores on coping motives, high scores on maladaptive motivation, low scores on adaptive motivation, and high scores on novelty seeking would have more alcohol-related problems than other students. When drinking motives were regressed onto alcohol problems at Time 2, after controlling for the effects of gender, alcohol consumption, and group allocation, coping motives uniquely predicted alcohol-related problems, as they had at Time 1. Therefore, the relationship between drinking to cope and drinking problems remained stable across time.

Motivational structure was not a significant predictor of drinking problems. This lack of relationship could be attributed to the limitations in the study design (i.e., taking part in the study may have affected participants' motivational structure). Nevertheless, there was a significant negative correlation between drinking problems at Time 2 and adaptive motivation. Similarly, Cox et al. (2002) found relationships among adaptive motivational structure, alcohol consumption, and alcohol-related problems. As alcohol problems increased, the negative relationship between adaptive motivation and alcohol consumption became stronger. In the present study, the statistical control of alcohol consumption might have negated the effects of motivational structure on alcohol problems.

Novelty seeking uniquely predicted alcohol-related problems at the follow-up, as it did at the baseline. That is, the impulsive, excitable, and disorderly behaviour that predicted problems at baseline continued to do so at the follow-up.

## Conclusions

This study supported the three-factor model of the TPQ suggested by Cloninger (1987). It confirmed the relationships between personality factors and drinking motives described by previous research (Stewart, et al., 2001). For instance, people who were high on harm avoidance—described as cautious or inhibited—drank for coping motives (i.e., to

regulate negative emotions). Unlike previous research, this study found that people who were high on novelty seeking—described as excitable or impulsive—drank for social motives (i.e., to obtain social rewards).

The study also replicated adaptive and maladaptive motivational factors found in earlier research by Cox and Klinger (2004b). Respondents with adaptive motivation were emotionally involved in their goal pursuits, whereas those with maladaptive motivation were not. In order to properly test the interventions, the motivational structure of all respondents was measured only at the follow-up. Moreover, the reductions in alcohol consumption and alcohol-related problems in the CBI-E Group might have weakened relationships between these variables and motivational structure that otherwise would have been found. Nevertheless, at the follow-up adaptive motivation was negatively correlated with drinking problems, consistent with expectations.

It was expected that at baseline enhancement motives and novelty seeking would predict alcohol consumption. Although enhancement motives were a unique predictor of consumption after gender had been controlled, coping motives explained more of the variance. Unexpectedly, reward dependence was also a unique predictor of alcohol consumption and this factor explained more unique variance than the more proximal factors of drinking motives. In short, alcohol consumption was predicted by students' coping motives (drinking to reduce negative emotions), enhancement motives (drinking to enhance mood), and reward dependence (those who sought social approval).

It was expected that enhancement motives, motivational structure, and novelty seeking would also predict alcohol consumption at the follow-up. After gender and group allocation at the baseline had been controlled, social motives and novelty seeking predicted consumption. That is, after taking part in the study, participants who drank to gain social rewards (social motives) and those who were impulsive and excitable (novelty seeking)

drank more than other participants. Again, the enduring influence of personality was critical in determining those who would continue to drink excessively.

The predictors of alcohol consumption, both at baseline and at the follow-up, highlight the importance of social aspects of student drinking. At the baseline, the main personality factor that predicted drinking was a need to seek social approval. At the follow-up, those who drank for social rewards drank more than others.

It was expected that coping motives, novelty seeking, and harm avoidance would all independently predict alcohol-related problems. After controlling for gender and alcohol consumption, it was coping motives, enhancement motives, and novelty seeking that were unique predictors of problems. That is, students who drank to reduce negative emotions (e.g., drinking to cope), to enhance positive mood (e.g., drinking for enhancement), or who were impulsive (e.g., those high on novelty seeking) experienced more alcohol problems than others.

It was expected that coping motives, motivational structure, and novelty seeking would predict alcohol-related problems. After controlling for gender, group allocation, and alcohol consumption at the baseline, it was coping motives and novelty seeking that were unique predictors of problems. Therefore, after taking part in the study, alcohol-related problems were predicted by those drinking to reduce negative emotions (e.g., drinking to cope) and those who were impulsive and excitable (e.g., those high on novelty seeking).

The predictors of alcohol-related problems, both at the baseline and the follow-up, highlight the enduring effects of drinking to cope and novelty seeking. Both of these factors predicted drinking problems at the baseline and they continued to do so at the follow-up.

## CHAPTER 6

### **Study 2: Evaluating Brief Interventions for Excessive Drinking With a Hospital Sample**

Excessive drinking contributes to a variety of health-related problems (see Chapter 1). Accordingly, it has a detrimental impact on the National Health Service (NHS) in the United Kingdom. There are an estimated 28,000 hospital admissions each year due to alcohol dependence or its toxic effects (Alcohol Concern, 2002). The Royal College of Physicians (2001) estimated that alcohol is a contributory factor to between 7 and 40% of all hospital admissions. Accident and emergency departments are inundated with alcohol-related admissions at peak times (e.g., weekends and evenings) (Pirmohamed et al., 2000). Indeed, alcohol misuse accounts for as much as 12% of all NHS expenditures on hospitals, or an estimated £3 billion annually (Royal College of Physicians, 2001).

A report commissioned by the Royal College of Physicians (2001) provided recommendations to tackle the problem of alcohol misuse in British hospitals. Amongst their recommendations were (a) the implementation of a screening strategy as part of the routine admission procedures—this would be for the early detection of hazardous and harmful drinkers; (b) the provision of brief alcohol interventions for hazardous drinkers; and (c) detoxification and ongoing support for harmful drinkers generally and patients with alcohol-dependence syndrome in particular.

The early detection of alcohol misuse in hospital settings is vital to the appropriate management of hazardous and harmful drinking and also to the prevention of future alcohol-related admissions. The recording of patients' drinking history during general admission procedures has proved inadequate: Barrison, Viola, and Murray-Lyon (1980) showed that doctors recorded patients' alcohol history in just 37% of case notes. A study

by Canning, Kennell-Webb, Marshall, Wessely, and Peters (1999) also found that doctors could correctly identify only 46% of the cases of hazardous or harmful drinking that were identified by the Alcohol Use Disorder Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1989) screening tool.

Several screening tools have been specifically developed for use in hospitals and primary health care. The AUDIT was developed in a World Health Organisation (WHO) collaborative project across six countries specifically for the use in primary health care (Babor et al., 1989). The 10-item questionnaire has good sensitivity and specificity and can identify hazardous and harmful alcohol use, as well as possible alcohol dependence. However, in busy hospital settings, the AUDIT is considered too long to administer routinely. Consequently, a number of briefer screening tools have been used in hospital settings.

Hodgson et al. (2003) compared three brief screening tools with the AUDIT, for use in four accident and emergency departments in the U.K. They were the CAGE questionnaire (Mayfield, McLeod, & Hall, 1974), which comprises 4 items; the Paddington Alcohol Test (PAT; Smith, Touquet, Wright, & Das Gupta, 1996), which comprises 3 items; and the Fast Alcohol Screening Test (FAST; Hodgson, Alwyn, John, Thom, & Smith, 2002), which comprises 4 items—the FAST items are derived from the AUDIT questionnaire. The FAST provided the best alternative to the AUDIT: it had a high sensitivity (92.8%) and high specificity (87.6%) in comparison to the AUDIT. Furthermore, the FAST could identify 50% of patients who abused alcohol with just the first question.

Relatively few studies have examined the effectiveness of brief alcohol interventions in general hospital settings. Emmen, Schippers, Bleijenberg, and Wollersheim's (2004) recent review of such studies, from their initial search of 481

studies, found that just eight met their inclusion criteria. They specified that studies should be opportunistic brief alcohol interventions in a medical setting, have a control group, and use alcohol consumption as an outcome measure. Of the studies that they reviewed, just one showed a significant reduction in alcohol consumption.

However, two studies that do not meet Emmen et al.'s (2004) inclusion criteria support the effectiveness of opportunistic brief alcohol interventions in medical settings, even for participants who are harmful drinkers. For instance, an opportunistic brief alcohol intervention in a British accident and emergency department, which did not include a control group, reported a significant reduction in alcohol consumption (Wright, Moran, Meyrick, O'Connor, & Touquet, 1998). A total of 58 dependent ( $n = 29$ ) and hazardous ( $n = 29$ ) drinkers who received a brief alcohol intervention were followed-up after six-months. Both dependent drinkers and hazardous drinkers significantly reduced their alcohol consumption by 52% and 72%, respectively.

A more recent study of a brief alcohol intervention for harmful drinkers on medical wards also supports the efficacy of this approach (Mcmanus et al., 2003). This study used a *before and after* design. In the initial phase of the study, patients were screened for their alcohol use but were not offered a brief alcohol intervention. However, in a second phase and third phase of the study, after patients had been screened for their alcohol use, those who met the inclusion criteria were offered a brief alcohol intervention. Inclusion into the study was contingent on males consuming 50 units or more per week and females 35 units or more per week; therefore, participants were considered harmful drinkers. Participants in each phase of the study were followed up after six months.

In Phase 1 of the study, 895 patients were screened for their alcohol consumption, 113 met the inclusion criteria, and 80 were followed up. This group did not receive an intervention. In Phase 2 of the study, 465 patients were screened for their alcohol



consumption, 64 met the inclusion criteria, and 45 received a brief alcohol intervention and were followed up. In Phase 3, 45 participants were identified as excessive drinkers and received a two-session brief alcohol intervention and were later followed up. The first session took place at the hospital and the second, one month later, at participants' homes.

The results showed that participants who did not receive a brief intervention did not significantly reduce their consumption: their average weekly consumption was 68.5 units at baseline and 64 units at the follow-up. Participants who received a one-session brief intervention significantly reduced their alcohol consumption by 62.8% from an average weekly consumption of 78 units at baseline to 29 units at the follow-up. Likewise, participants who received a two-session brief intervention significantly reduced their alcohol consumption by 68.6% from an average weekly consumption of 70 units at baseline to 22 units at the follow-up. The authors concluded that there was no difference between the one-session and the two-session interventions in reducing alcohol consumption.

The Mcmanus et al. (2003) and the Wright et al. (1998) studies support the use of brief alcohol interventions in medical settings. Furthermore, these two studies support the use of brief alcohol interventions with harmful and dependent drinkers. This is contrary to the recommendations proposed by the Royal College of Physicians (2001): namely, that brief alcohol interventions should target hazardous drinkers rather than harmful drinkers.

The present study examined two brief alcohol interventions in a medical setting (a standard version and an enhanced version—see Chapter 3). Participants were drinkers who consumed more alcohol than the government specified safe limits (i.e., they were hazardous or harmful drinkers). The study conformed to Emmen et al's. (2004) criteria: it had a control group, and it used alcohol consumption as an outcome measure. The following hypotheses were tested: participants who receive a brief alcohol intervention,

unlike control participants, will reduce the number of drinking days per week; the number of binge episodes per week; their overall alcohol consumption, and the number of alcohol-related negative consequences. Finally, participants who receive the enhanced brief alcohol intervention will have greater reductions in consumption than those who receive the standard brief alcohol intervention.

## **Method**

### ***Participants***

Forty-five hospital patients volunteered to participate. Inclusion criteria stipulated that men drink more than 21 units per week or 8 or more units on one occasion at least weekly, and women drink more than 14 units per week or 6 or more units on one occasion at least weekly. The participant information sheet and study leaflets described the study as consisting of two sessions: Session 1 would last approximately 90 minutes; Session 2 (three months after the first session) would last about 45 minutes. It also indicated that participants would be paid £10 for completing the second session.

Three different recruitment techniques were used to recruit three sub-samples of participants. Initially, inpatients on five medical wards and one surgical ward, who met the inclusion criteria, were informed of the study. One of the medical wards was for acute medical emergencies, and the surgical ward was for acute orthopaedic emergencies. After a four-month period of testing with disappointing results, two other recruitment procedures were initiated. The first was aimed at outpatients who had pre-operative assessment appointments two weeks prior to their planned orthopaedic surgery. The second recruitment procedure was aimed at outpatients attending a gastroenterology clinic. The latter two recruitment procedures were implemented during the final two months of the six-month recruitment period.

Table 6.1 shows the number of participants who were recruited into the study at each point of contact (i.e., the particular hospital ward or clinic where recruitment took place) and the type of presenting health-related problem (i.e., alcohol-related or not). The majority of patients (77.8%) had an alcohol-related health problem. That is, they had a medical diagnosis that was exacerbated by excessive drinking. The sample consisted of 38 inpatients and 7 patients attending outpatient gastroenterology clinics. No patient was recruited from the pre-operative outpatient assessment appointments.

Table 6.1

*The Number of Participants Entering the Study From Each Ward or Clinic and the Nature of the Health-Related Problem*

Referral ward	Non-specific illness	Alcohol-related Illness	Alcohol-related Injury
Orthopaedic wards			
Beuno (acute admission)			6
Prysor	1		1
Glaslyn			
Emergency admission ward			
Tryfan	1		2
Gastroenterology ward			
Gogarth	1	23	
Outlying medical wards			
Tegid		1	
Hebog		1	
Aran		1	
Gastroenterology clinic	7		

Participants were randomly assigned to one of three groups: Computerised Brief Intervention (CBI), Computerised Brief Intervention-Enhanced (CBI-E), or Control Group. To ensure that the two groups were balanced for gender, male and female participants were assigned to the two groups in equal proportions.

Of the total sample of 45 participants, 15 (33.3%) were female, five of whom were assigned to each of the three groups. The sample had a mean age of 45.7 years ( $sd = 10.2$ ) and an average of 11.6 years of education ( $sd = 2.8$ ). Fifty-eight percent of the sample was

unemployed, and 20% were on permanent leave from work because of illness. Thirty-six percent of the sample was married or cohabiting; the remainder were single (38%), divorced (24%), widowed (7%), or separated (4%). Twenty-six participants (58%) had had a previous treatment for alcohol-use problems.

Twenty-six participants (58%) completed the follow-up session; of these, 39% were female. In the CBI-E group ( $n = 8$ ), three (38%) were female; in the CBI group ( $n = 9$ ), three (33%) were female; in the control group ( $n = 9$ ), four (44%) were female. The mean age of participants who completed the follow-up session was 46.4 years ( $sd = 9.42$ ). Fourteen (54%) of the participants who completed the follow-up session had had a previous treatment for alcohol-use problems.

## ***Instruments***

*Short Alcohol Dependency Data Questionnaire (SADD)*. The SADD (Davidson & Raistrick, 1986) is a 15-item questionnaire designed to identify a person's level of alcohol dependency from his or her current drinking habits. Respondents with a total score of 1–9, 10–19, or 20–45 are classified as low, medium, or high on dependency, respectively (see Chapter 4 for a fuller description).

*The Readiness to Change Questionnaire (RTCQ)* (Appendix C, p. 307). The RTC (Heather, Gold, & Rollnick, 1991) is a 12-item questionnaire designed to assess the respondent's level of commitment to change his or her drinking. The respondent is assigned to one of three stages of change—*precontemplation*, *contemplation*, or *action*. A summary score can also be obtained by adding the respondent's answers to the 12 items, after the answers to the precontemplation items have been reverse-scored. The higher the score, the greater is the commitment to change (see Chapter 4 for a fuller description).

*Drinking Motives Questionnaire (DMQ)*. (Appendix D, p. 308). The Drinking Motives Questionnaire (Cooper, 1994) is a 20-item questionnaire designed to assess motives for drinking. The questionnaire measures four kinds of motives for drinking: *social, coping, enhancement, and conformity* (see Chapter 4 for a fuller description).

*Alcohol Timeline Followback (TLFB)*. The TLFB (Sobell & Sobell, 1992) is a method of retrospectively estimating daily alcohol consumption over a given period of time. The TLFB method uses a calendar to help the respondent recall the amounts of alcohol consumed on each day during the period. The TLFB technique was modified for this study. Along with the type and amount of alcoholic beverage consumed on each day, the respondent was asked to estimate the duration of each drinking episode. From this additional information, a blood-alcohol concentration could be estimated for each drinking episode (see Chapter 4 for a fuller description).

*Drinker's Inventory of Consequences (DrInC-2R)* (Appendix F, p. 310). The DrInC-2R (Miller, Tonigan, & Longabaugh, 1995) is a 50-item questionnaire designed to measure a variety of problems frequently experienced by excessive drinkers. The questionnaire assesses negative consequences occurring specifically during the previous three months (see Chapter 4 for a fuller description).

*Short Tridimensional Personality Questionnaire (Short-TPQ)* (Appendix G, p. 311). The Short-TPQ is a 44-item questionnaire (Sher, Wood, Crews, & Vandiver, 1995) designed to measure three personality dimensions: Novelty Seeking, Harm Avoidance, and Reward Dependence (see Chapter 4, for a fuller description).

*Personal Concerns Inventory (PCI)*. The PCI was used to measure motivational structure (Cox & Klinger, 2004b). A computerized version of the PCI was adapted for use in the current study (see Chapter 3). The PCI includes a list nine life areas: Home and Household Matters; Employment and Finances; Relationships; Love, Intimacy, and Sexual

Matters; Self Changes; Education and Training; Health and Medical Matters; Leisure and Recreation; and Other Substance Use. Respondents are asked to choose the life areas in which they have concerns; they are then asked to describe their concerns and how they would like to resolve them. The respondents then use 10 scales to rate each goal for the resolution of the concern: *commitment, importance, how likely, control, what to do, joy, unhappiness, when will it happen? will alcohol be helpful?, and will alcohol be unhelpful?*

### **Procedure**

Each participant was scheduled for two interviews. There were two recruitment procedures used in the study: one for inpatients and one for outpatients. The recruitment procedure for inpatients was as follows: the patients who were admitted to the wards were routinely screened for their alcohol use as part of the admission procedure. The admitting nurse informed those meeting the inclusion criteria of the study. Each patient who expressed an interest in participating was given an information sheet. If the patient was too ill during the admission procedure, the information sheet was given at a later time. The admitting nurse recorded the patient's name in a referral book. The investigator checked the referral book each day. He then approached each patient who had expressed an interest in participating to give him or her additional details about the study, as required. The investigator and the patient then arranged a suitable time for the interview.

All inpatient interviews were conducted in a quiet room on the hospital ward. Participants were scheduled for the interview as near to their discharge date as possible. This was done for two reasons: (a) newly admitted patients were often too ill to participate or would be too preoccupied with their immediate health concerns, and (b) it seemed more appropriate to motivate patients to change their drinking habits close to the time when they could act on their intention to change.

The recruitment of outpatients attending the gastroenterology clinic was as follows. On admission to the clinic, the clinic nurse informed the patient of the study. Each patient was given a leaflet describing the aims of the study and the inclusion criteria. The patient was then asked to read the leaflet while in the waiting area, and to tick a box on the leaflet to either decline to participate or to express an interest in doing so. Each patient was asked to return the leaflet to the nurse regardless of whether or not he or she intended to participate in the study, thus avoiding embarrassment to those who were interested in taking part. Patients who expressed an interest in the study met with the investigator who was waiting in a quiet room in the clinic.

The following procedure was undertaken with both inpatient and outpatient participants. On arrival at the designated room, the participant read and signed a consent form and was asked to name a *collateral*—a friend or family member—who could answer questions about his or her drinking. The participant was informed that 10% of the nominated collaterals would be contacted.

Each participant was then individually administered the baseline assessments in the following order: Demographic, SADD, RTC, and Drinking Motives questionnaires; the TLFB interview; and the DrInC-2R and Short-TPQ questionnaires. Participants in the control group were then dismissed. Participants in the CBI or CBI-E groups completed the computerised intervention (as described in Chapter 3). Experimental participants received a printed summary of the results of the intervention.

Approximately 13.5 weeks later (*median* = 95 days, *sd* = 27.7), each participant was contacted by post or telephone to arrange the second interview at a convenient location. These locations included participants' homes ( $n = 13$ ), the university ( $n = 4$ ), the hospital where the recruitment had taken place ( $n = 3$ ), or a detoxification centre ( $n = 1$ ). If recruitment was at the original hospital, it was because the patient had been re-admitted

for a different health-related problem than the original one. The participants were re-administered the RTC and DrInC-2R. They were re-interviewed about their drinking during the prior 12-weeks in an Alcohol Timeline-Follow-back interview, and they were asked to fill out a follow-up questionnaire. All participants also completed the computerised PCI. Participants in the control group were now offered the opportunity to complete the CBI intervention. At the conclusion of the assessment, participants were thanked, debriefed, paid, and dismissed.

Two participants were followed up on the telephone and three by post. These participants were assessed only for alcohol use. Of those who could not be contacted at the follow-up ( $n = 19$ ), two had moved to new addresses, and two had died.

## Results

### *Baseline Analyses*

At baseline, males consumed a mean of 154.6 units ( $sd = 165.3$ ) per week and females 59.9 ( $sd = 70.0$ ); as expected, males drank significantly more than females,  $t(43) = 2.11, p < .05$ . Males drank on more days per week than females, 5.6 days ( $sd = 2.16$ ) compared to 4.1 days ( $sd = 2.38$ ),  $t(43) = 2.14, p < .05$ . Males also had more binge episodes<sup>1</sup> ( $M = 59.90, sd = 31.26$ ) during the previous 12-weeks than did females ( $M = 36.27, sd = 30.32$ ),  $t(43) = 2.41, p < .05$ .

The mean number of total negative consequences from the DrInC was 42.4 ( $sd = 26.4$ ) for males and 39.2 ( $sd = 35.0$ ) for females; the two sexes did not differ,  $t(43) = .34, p = .73$ . The DrInC scores, for both males and females, were in the medium to low range in comparison to the normative scores for dependent drinkers in the Project MATCH DrInC

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<sup>1</sup> Binge episodes were defined as eight or more units for males and six or more units for females on one occasion.



test booklet (Miller, et al., 1995). Participants' highest mean scores were on the negative physical consequences sub-scale, followed by intrapersonal, interpersonal, impulse control, and social responsibility consequences, respectively. Table 6.2 displays the ten most frequently reported negative consequences. Participants gave their highest endorsement to spending too much money on alcohol—more than 46% indicated that this had happened “very much” during the past three months; more than 75% of the sample indicated that they had not eaten properly, had suffered physical damage, had friends or family who worried or complained, or had felt unhappy, as a result of their drinking.

Table 6.2

*The Percentage and Number of Participant's Ten Most Frequently Endorsed DrInC Items in the Last Three Months*

Ten most frequently endorsed DrInC items	Lowest Endorsement		Middle Endorsement		Highest Endorsement	
	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>
I have spent too much or lost a lot of money because of my drinking <sup>†</sup>	15.6	7	11.1	5	46.7	21
I have smoked tobacco more when I am drinking <sup>‡</sup>	8.9	4	13.3	6	44.4	20
Because of my drinking I have not eaten properly <sup>†</sup>	22.2	10	15.6	7	40.0	18
My physical health has been harmed by my drinking <sup>‡</sup>	20.0	9	15.6	7	40.0	18
I have lost interest in activities and hobbies because of my drinking <sup>†</sup>	13.3	6	20.0	9	37.8	17
My physical appearance has been harmed by my drinking <sup>‡</sup>	15.6	7	15.6	7	37.8	17
Because of my drinking, I have not had the kind of life that I want <sup>†</sup>	8.9	4	20.0	9	31.1	14
My family has been hurt by my drinking <sup>‡</sup>	17.8	8	13.3	6	31.1	14
My family or friends have worried or complained about my drinking <sup>†</sup>	35.6	16	20.0	9	22.2	10
I have been unhappy because of my drinking <sup>†</sup>	40.0	18	17.8	8	20.0	9

Lowest Endorsement = <sup>†</sup>has happened once or a few times; <sup>‡</sup>has happened a little.

Middle Endorsement = <sup>†</sup>has happened once or twice a week; <sup>‡</sup>has happened somewhat.

Highest Endorsement = <sup>†</sup>has happened daily or almost daily; <sup>‡</sup>has happened very much.

Both male ( $M = 18.5$ ,  $sd = 11.3$ ) and female ( $M = 13.8$ ,  $sd = 12.2$ ) participants had moderate levels of alcohol dependency, that is, scores between 10 and 19. Males and

females did not differ in their SADD scores,  $t(43) = 1.26, p > .05$ . Table 6.3 displays the number of participants who had low, medium, or high levels of alcohol dependency for the total sample and for males and females separately. The distributions for males and females were not significantly different  $\chi^2(2, n = 45) = 2.73, p > .05$ . The majority of participants (42.2%) had high levels of alcohol dependency. The level of dependency was significantly greater for those participants who could not be contacted at the follow-up ( $M = 21.6, sd = 11.9$ ) than for those who were re-contacted ( $M = 13.5, sd = 10.4$ ),  $t(43) = 2.45, p < .05$ .

Table 6.3

*Distributions of Three Levels of Alcohol Dependency (Derived From the SADD Questionnaire) Separately for Males, Females, and the Total Sample*

Alcohol Dependency Level	Males ( $N = 30$ )		Females ( $N = 15$ )		Total ( $N = 45$ )	
	$N$	%	$N$	%	$N$	%
Low	9	30.0	8	53.3	17	37.8
Medium	6	20.0	3	20.0	9	20.0
High	15	50.0	4	26.7	19	42.2

Participants' reason for drinking was assessed with the drinking motives questionnaire (Cooper, 1994). Table 6.4 displays male and female participants' mean scores for drinking motives. Both males' and females' highest mean score was on coping motives, followed by enhancement, social, and conformity motives. There was one gender difference in drinking motives: males ( $M = 2.18, sd = .97$ ) scored significantly higher than females ( $M = 1.53, sd = .54$ ) on conformity motives,  $t(42.3) = 2.89, p < .01$ .

Table 6.4.

*Means and Standard Deviations on the Four Subscales of the Drinking Motives Questionnaire for Males and Females*

Drinking Motives	Males		Females		<i>df</i>	<i>T</i>
	<i>M</i>	<i>Sd</i>	<i>M</i>	<i>sd</i>		
Coping	4.09	1.44	3.30	1.48	43	1.13
Enhancement	3.65	1.47	2.95	1.28	43	1.74
Social	3.38	1.44	2.77	1.54	43	1.57
Conforming	2.18	.97	1.53	.54	42.3	2.89**

\*\*  $p < .01$ .

Personality dimensions were assessed with the Short-TPQ. The means and standard deviations for males and females on the Short-TPQ are shown in Table 6.5.

Males and females showed comparable results: the highest score was on Harm Avoidance (HA), followed by Novelty Seeking (NS), and Reward Dependence (RD). There was one gender difference, females ( $M=5.93$ ,  $sd = 2.22$ ) scored significantly higher than males ( $M=4.33$ ,  $sd = 1.99$ ) on Reward Dependence.

Table 6.5

*Means and Standard Deviations on the Three Subscales of the Short-TPQ for Males and Females*

TPQ Sub-scales	Males		Females	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
Harm Avoidance	11.93	5.95	11.07	5.64
Novelty Seeking	7.50	2.73	7.00	3.16
Reward Dependence	4.33	1.99	5.93	2.22

The distribution of participants' stage of change identified with the RTC questionnaire is displayed in Table 6.6. The distributions for the stage-of-change for males and females were not significantly different  $\chi^2(2, n = 45) = .96, p > .05$ . The majority of participants were in the contemplation stage of change ( $n = 21$ ). Just 13.3% ( $n = 6$ ) of the participants were pre-contemplative. Thus, the majority of the participants had at least recognised that their drinking was a problem.

Table 6.6

*Distributions of Three Stages of Change (Derived from the RTC Questionnaire) Separately for Males, Females, and the Total Sample*

Stage of Change	Males ( <i>N</i> = 30)		Females ( <i>N</i> = 15)		Total ( <i>N</i> = 45)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Pre-contemplation	3	10.0	3	20.0	6	13.3
Contemplation	15	50.0	6	40.0	21	46.7
Action	12	40.0	6	40.0	18	40.0

### **Main Analyses**

The main analyses tested changes, from baseline to follow-up, in alcohol consumption and number of drinking days, binge episodes, and alcohol-related problems. Before proceeding with the main analyses, the data were examined for group (CBI, CBI-E, Control) differences at baseline for participants who completed both the baseline and follow-up sessions. There were no group differences on readiness to change, level of dependency, drinking motives, personality variables, number of alcohol-related problems, number of days drinking per week, and average weekly alcohol consumption. However, there was a significant group difference in the number of binge episodes at baseline,  $F(2,23) = 5.89, p < .009$ . Post hoc Bonferroni tests showed that the participants in the CBI-E group ( $M = 67.13, sd = 24.23$ ) binged more often than participants in the control group ( $M = 22.11, sd = 26.49$ ),  $p = .007$ .

Table 6.7 shows the baseline mean weekly alcohol consumption (in units), total number of binge episodes, number of negative consequences, and the level of dependency of participants in the control, CBI, and CBI-E groups. The average weekly alcohol consumption ranged from 23.3 to 644.0 units for the CBI-E group, 16.3 to 287.0 for the CBI group, and 14.0 to 168.0 for the control group. Although there were variations among

the groups in weekly consumption, mean level of dependency was in the medium range in all three groups.

Table 6.7

*Means and Standard Deviations of Alcohol Consumption Measures, Alcohol-Related Problems, and Level of Dependency, Separately for Participants in the CBI-E, CBI, and Control Groups*

	CBI-E ( <i>N</i> = 8)		CBI ( <i>N</i> = 9)		Control ( <i>N</i> = 9)	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
Weekly Alcohol Consumption	162.73	206.84	104.98	107.63	41.33	49.03
Days Drinking per Week	5.79	1.82	4.05	2.60	3.25	2.58
Amount per drinking day	24.91	28.48	23.53	11.06	16.35	9.61
Number of Binge Episodes	67.13	24.23	46.44	29.88	22.11	26.49
Alcohol-Related Problems	39.88	34.31	42.44	18.57	27.44	23.78
Level of Dependency	14.88	11.78	13.22	5.85	12.44	13.33

The data presented above in Table 6.7, are clearly skewed because, in the majority of cases, one standard deviation exceeds or is proportional to the mean. For each of the analyses below (i.e., those concerning changes in average weekly alcohol consumption, days drinking per week, number of binge episodes, and number of alcohol-related problems) the data were analysed with non-parametric tests. In each case the analyses were conducted with Wilcoxon Signed Ranks Tests for related-samples separately for each group. The Wilcoxon Signed Rank Test is the non-parametric alternative for data that does not meet the assumptions of normality.

Figure 6.1 displays the median and interquartile ranges of weekly alcohol consumption for participants in the CBI-E, CBI, and Control groups at baseline (Time 1) and at follow-up (Time 2). There is a clear trend in the expected direction: respondents in both of the experimental groups reduced alcohol consumption, whereas those in the control group increased consumption. Participants in the CBI-E group reduced their average weekly consumption by 28%, from a median of 89.2 units per week at Time 1

(*interquartile range* = 175.7) to a median of 64.3 units per week at Time 2 (*interquartile range* = 131.9). Participants in the CBI group reduced their average weekly consumption by 75%, from a median of 66.8 units per week at Time 1 (*interquartile range* = 183.4) to a median of 17.0 units per week at Time 2 (*interquartile range* = 89.4). Participants in the Control group increased their average weekly consumption by 6%, from a median of 21.8 units per week at Time 1 (*interquartile range* = 29.2) to a median of 23.0 units per week at Time 2 (*interquartile range* = 64.9).

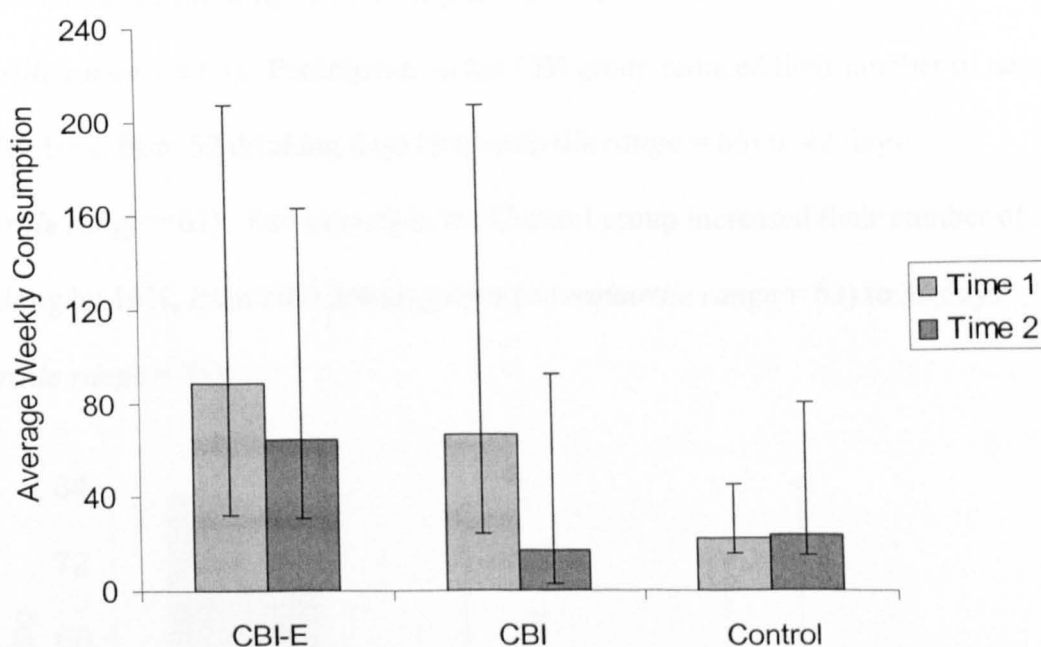


Figure 6.1. Median weekly consumption (in units) and interquartile ranges at Time 1 and Time 2 for participants in the CBI-E, CBI, and Control groups.

Participants' alcohol consumption was assessed for changes from Time 1 to Time 2. Wilcoxon Signed Ranks Tests for related-samples were conducted separately for each group. There were no significant differences in consumption for each of the three groups across time: for the CBI-E group,  $Z = -1.82$ ,  $p = .07$ ; for the CBI group,  $Z = -1.60$ ,  $p = .11$ ; and for the Control group,  $Z = -.06$ ,  $p = .95$ . As there were no group differences the combined effect of an intervention versus no intervention was tested: the CBI-E and CBI

groups were collapsed into one group. The combined group had a significant reduction in average weekly consumption,  $Z = -2.39, p = .016$ .

Figure 6.2 displays the median and interquartile ranges of the number of days drinking for participants in the CBI-E, CBI, and Control groups at baseline (Time 1) and at follow-up (Time 2) for the previous 84 days. There was a trend for participants in the CBI-E and CBI groups to reduce their number of drinking days, but for those in the Control group to increase. Participants in the CBI-E group reduced the number of drinking days by 18%, from 82 drinking days (*interquartile range* = 30.8) to 67.5 days (*interquartile range* = 47.3). Participants in the CBI group reduced their number of days drinking by 19%, from 52 drinking days (*interquartile range* = 66) to 42 days (*interquartile range* = 61). Participants in the Control group increased their number of days drinking by 16%, from 30.0 drinking days (*interquartile range* = 63) to 35 days (*interquartile range* = 71).

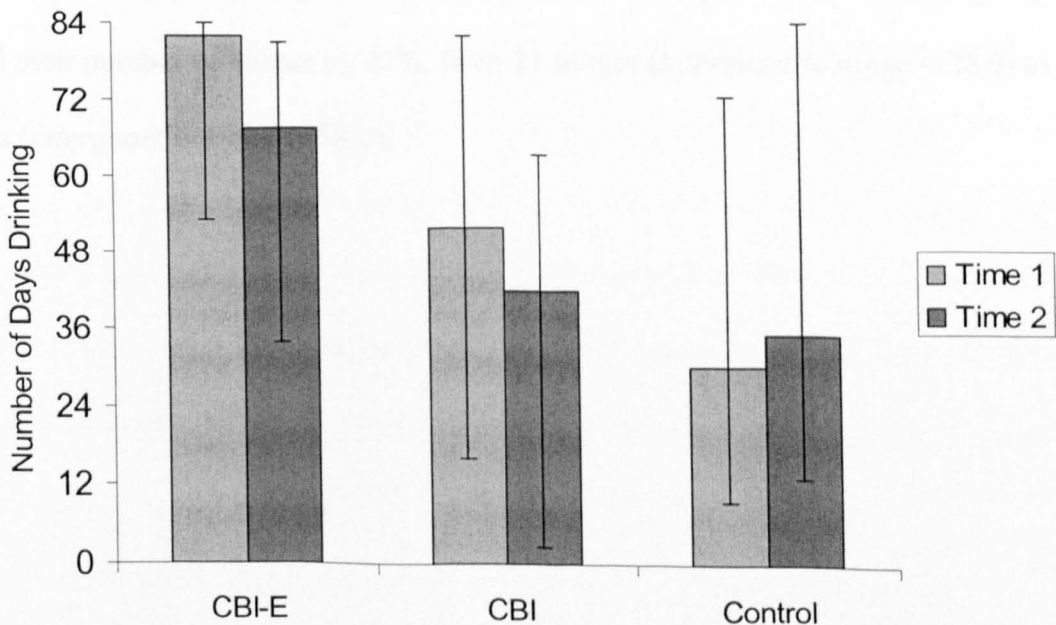


Figure 6.2. Median number of drinking days and interquartile ranges at Time 1 and Time 2 for participants in the CBI-E, CBI, and Control groups.

Participants' number of drinking days was assessed for changes from Time 1 to Time 2. Wilcoxon Signed Ranks Tests for related-samples were conducted separately for each group. Participants in the CBI-E group significantly reduced their number of drinking days,  $Z = -2.00, p < .05$ . Participants in both the CBI group,  $Z = -.98, p = .33$ , and the Control group,  $Z = -.17, p = .87$ , did not significantly reduce their number of days drinking.

Figure 6.3 displays the median number of binge episodes and interquartile ranges of participants in the CBI-E, CBI, and Control groups at baseline (Time 1) and at follow-up (Time 2). There was a trend for participants in the CBI-E and CBI groups to reduce their number of binge episodes, but for those in the Control group to increase them. Participants in the CBI-E group reduced their binge episodes by 44%, from 80 binges (*interquartile range* = 40.5) to 45 binges (*interquartile range* = 44.8). Participants in the CBI group reduced their number of binge episodes by 90%, from 52 binges (*interquartile range* = 60.5) to 5 binges (*interquartile range* = 46.5). Participants in the Control group increased their number of binges by 27%, from 11 binges (*interquartile range* = 28.0) to 14 binges (*interquartile range* = 58.0).



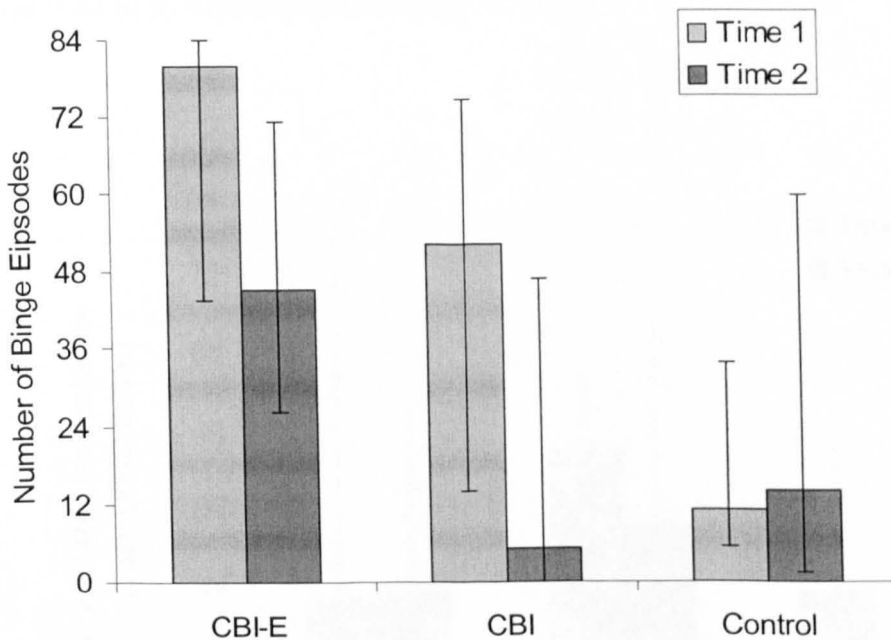
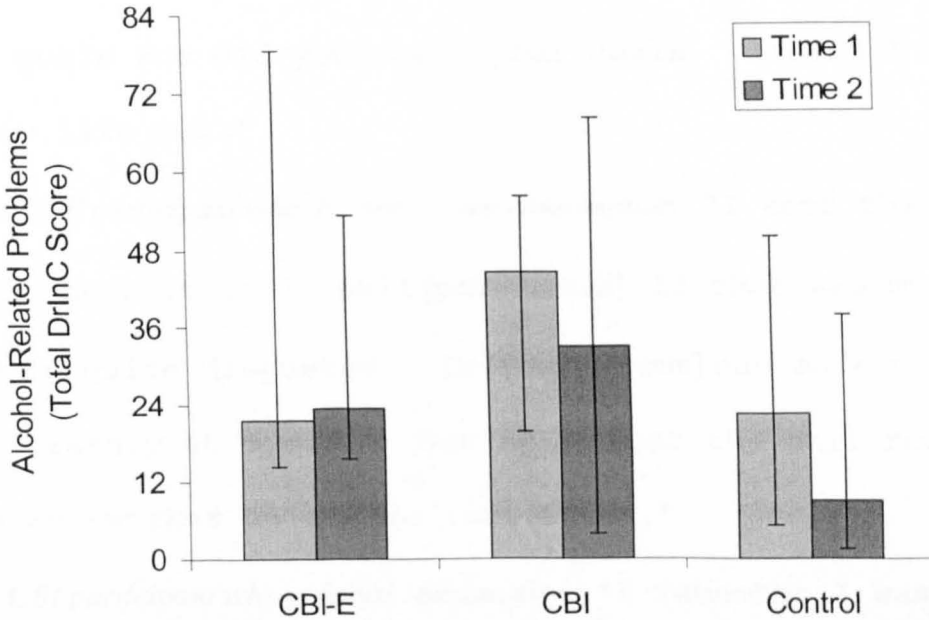


Figure 6.3. The median and interquartile ranges of number of binge episodes at Time 1 and Time 2 for participants in the CBI-E, CBI, and Control groups.

Participants' median number of binge episodes was assessed for changes from Time 1 to Time 2. Wilcoxon Signed Ranks Tests for related-samples were conducted separately for each group. Participants in the CBI-E group significantly reduced their binge episodes,  $Z = -2.20, p < .05$ . Participants in both the CBI group,  $Z = -1.48, p = .14$ , and the Control group,  $Z = .0, p = 1$ , did not significantly reduce their number of binges.

Figure 6.4 displays the median level of drinking problems and interquartile ranges for participants in the CBI-E, CBI, and Control groups at baseline (Time 1) and at follow-up (Time 2). Participants in the CBI-E group had a 9% increase in alcohol-related problems from a median DrInC score of 21.5 (*interquartile range* = 64.3) to 23.5 (*interquartile range* = 37.8). Participants in the CBI group reported a 26% reduction in alcohol-related problems, from a median DrInC score of 44.5 (*interquartile range* = 36.3) to 33 (*interquartile range* = 64.3). Participants in the Control group reported a 60%

reduction in alcohol-related problems, from a median DrInC score of 22.5 (*interquartile range* = 44.8) to 9 (*interquartile range* = 36.5).



*Figure 6.4.* The median and interquartile ranges of alcohol-related problems at Time 1 and Time 2 for participants in the CBI-E, CBI, and Control groups.

Participants' number of alcohol-related problems was assessed for changes from Time 1 to Time 2. Wilcoxon Signed Ranks Tests for related-samples were conducted separately for each group. Participants in each of the three groups did not significantly change their number alcohol-related problems: CBI-E,  $Z = -.34$ ,  $p = .74$ , CBI group,  $Z = -.52$ ,  $p = .60$ , and Control group,  $Z = -1.36$ ,  $p = .17$ .

### **Participant Feedback**

After taking part in the experiment, participants were asked to report their experiences with it and any effects that it had on their drinking behaviour. A selection of

responses of participants in each of the three groups is shown below<sup>2</sup>. An example is included from participants who successfully reduced their consumption and for those who did not.

*CBI-E participant who reduced consumption.* "I remember you asked me about goals and did you reach your goals. I said I had to sort my life out."

*CBI-E participant who did not reduce consumption.* "I kept the print-out and have it on my wall [points to wall]. If that was my friend I would be quite disgusted. It [the experiment] has made me look more inwardly at myself. Seeing you got the ball rolling. I saw a key-worker to get me into Detox."

*CBI participant who reduced consumption.* "I remember I was a really heavy drinker in the number of units I was drinking in a week. Taking part in the experiment was a motivator for me. It was a way for me to look at my lifestyle. It was like signing a contract or something."

*CBI participant who did not reduce consumption.* "I still have the print-out of what we did last time. [On why he didn't reduce] I have been drinking a lot more since I haven't been working."

*Control participant who stopped drinking completely.* "I just stopped. I realised that things were getting out of hand (being in hospital). The support of a close friend has helped me greatly."

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<sup>2</sup> These comments are not exhaustive, but they are intended to be representative of participant feedback. A full list of participants' comments is included in Appendix J.

*Control participant who did not reduce consumption.* "I want to stop. I've got to stop. [On why he didn't reduce:] I experimented with drinking in moderation, but it didn't work. I just can't do that. The health effects on me have been terrible"

## Discussion

The majority of participants in this study were identified as excessive drinkers. The typical respondent was being treated in hospital for an alcohol-related illness or injury; scored in the medium range of alcohol dependency; drank between four and seven times more alcohol than the government recommended weekly guidelines; had suffered significant alcohol-related problems as a consequence of his or her excessive drinking; and recognised the need for change.

The participants were harmful drinkers rather than early stage problem drinkers. Consequently, many participants could not be contacted at the follow-up. For instance, two had moved to new (unknown) addresses, and two had died. Those who could not be followed up had significantly higher levels of alcohol dependency than those who were followed up.

The present study aimed to establish whether participants who received either of the two brief alcohol interventions would show improvements on several outcome measures in comparison to a control group. The outcome variables of interest were as follows: average weekly alcohol consumption, number of days drinking per week, number of binge episodes, and number of alcohol-related negative consequences. It was also expected that those who received the enhanced version of the intervention would have better outcomes than those who received the standard intervention. The results provided mixed support for these hypotheses. The following sections will consider each of the outcome variables in turn.

### ***Average Weekly Alcohol Consumption***

At baseline, participants' average weekly alcohol consumption ranged from 14 units to 644 units. Such diverse levels of drinking, and a small sample size resulted in wide variations between the three groups. For instance, the average consumption of participants in the CBI-E group was more than three times that of participants in the control group. Nevertheless, participants in the three groups had an equivalent (medium) level of alcohol dependency.

None of the three groups showed a significant change in average weekly alcohol consumption between the baseline and follow-up assessments. However, the trend was in the expected direction. Participants in the CBI-E group and the CBI group reduced their average weekly alcohol consumption by 28 percent and 75 percent, respectively. Previous hospital-based brief intervention studies have shown reductions at a six-month follow-up similar to the reductions found in the present study: Wright et al. (1998) reported a 52 percent reduction for dependent drinkers, and Mcmanus et al. (2003) reported a 43 percent reduction. Unlike these studies, the present study included a control group, the participants in which increased their consumption by 6 percent, although the increase was not significant.

The present study did not support the hypothesis that the more intensive intervention would lead to a greater reduction in average weekly consumption than the less intensive intervention. Instead, the standard intervention group reduced their consumption by a greater number of units (e.g., the CBI-E group reduced by 24.9 units and the standard group by 49.8 units per week). Combining the CBI-E and CBI groups showed that participants who received a brief intervention significantly reduced their average weekly alcohol consumption.

The present study, therefore, supports the view that brief interventions in a hospital setting can significantly reduce alcohol consumption. Furthermore, unlike Wright et al., (1998) and Mcmanus (2003), this study established that excessive drinking hospital patients who did *not* receive a brief intervention did not significantly decrease their drinking. In fact, there was a trend for control participants to increase their consumption. This trend suggests that drinkers who have already been admitted to hospital for an alcohol-related illness or injury will need further treatment. This has obvious implications for NHS expenditures related to excessive drinking.

### ***Number of Days Drinking***

At baseline participants drank an average of more than four days per week. Although there were no significant differences among the three groups, there was considerable variation. The CBI-E group drank on more than six and one half days per week, the CBI group on four days, and the control group on two and one half days.

Only the participants CBI-E group significantly reduced the number of days that they drank per week. This group reduced their drinking days by more than one day per week (an 18% reduction). Although participants in the CBI group did not significantly reduce the number of days that they drank per week, there was a trend for this group to reduce. The CBI group reduced by less than one day per week; this was a 19 percent reduction. There was a trend for control participants to increase their days drinking per week by almost one half of a day (a 16% increase). Therefore, as hypothesised, participants who received the more intensive intervention significantly reduced their drinking days.

Reducing the number of drinking days per week was an objective of the interventions used in the present study. Unlike the control participants, participants in both

intervention groups were asked to consider two strategies for reducing their drinking. One strategy highlighted techniques for slowing down drinking. The other strategy asks participants to consider reducing the number of days that they drank per week.

Considering that the average consumption of participants was more than 21 units per drinking day, aiming to cut down the number of days drinking per week was a particularly suitable strategy.

### ***Binge Drinking***

At baseline, participants in the CBI-E group binge drank significantly more than those in the control group. The CBI-E group binge drank on more than six and one half days per week, which is almost the same as to the average number of days per week that this group drank. In fact, 96 percent of this group's drinking days included a binge session. The CBI group binge drank on more than four days per week, which again was almost as many as this group's average number of drinking days: 95 percent of their drinking days included a binge session. The control group binge drank less than one day per week, which was only 57 percent of the days on which they drank.

Epstein, Kahler, McCrady, Lewis, and Lewis (1995) argued that the sole use of *binge drinking* to classify drinking patterns is problematic, especially for dependent drinkers. In the United States, binge drinking is usually defined as a man's consumption of five drinks (8 units) or a woman's consumption of four drinks (6 units) in a row at least once in a two-week period (Wechsler et al., 2000). Although this pattern of consumption can be useful for identifying high-risk groups, such as early stage problem drinkers (Bradley, Bush, Davis, Dobie, Burman, Rutter, & Kivlahan, 2001), it does not adequately describe other kinds of drinkers, such as those tested in the present study. Epstein, Labouvie, McCrady, Swingle, and Wern (2001) categorised drinking patterns as follows:

Binge, Episodic, Sporadic, and Heavy Steady. They defined *Heavy Steady* as drinking on a minimum of 67.5 percent of valid days. Thus, the majority of participants in this study met the *Heavy Steady* drinking criterion.

Nevertheless, using the traditional definition of binge drinking, the participants in the CBI-E group did significantly reduce their binge drinking at the follow-up. This group reduced their average number of binge drinking sessions by almost three episodes per week to just under four sessions per week. Participants in the CBI group had the greatest reduction in binge drinking of any group, although not significantly so. This group reduced its consumption by more than three and one half sessions per week to just under one-half binge sessions per week. Participants in the control group did not significantly change their number of binge sessions; the control session remained binge drinking approximately once per week.

### ***Alcohol-Related Problems***

At baseline, participants reported a significant number of alcohol-related problems. The level of problems was in the medium-to-low range for dependent drinkers in treatment (Miller, et al., 1995), which is consistent with the medium level of alcohol dependency of this sample. Participants most frequently cited physical problems (e.g., that they were not eating properly or had suffered physical damage as a result of their drinking). This is not surprising, considering that the majority of these participants were being treated at the hospital for an alcohol-related problem.

At the follow-up, none of the groups showed a significant reduction in the number of alcohol-related problems. Surprisingly participants in the control group reported the largest reductions—they reported 60 percent fewer problems—even though they had increased their consumption at the follow-up. These reductions in drinking problems



reported by participants might be explained by the timing of the assessments. The first assessment of drinking problems occurred after the participants were admitted to hospital, and for majority this was because of an alcohol-related problem. Therefore, these acute problems were probably reflected in the high level of problems reported at the baseline.

### ***General Discussion***

This study demonstrated that heavy drinking hospital patients who received a brief intervention reduced their drinking. Those in the CBI-E group also significantly reduced the number of days that they drank, and their number of binge episodes. The drinking pattern of the respondents is best typified as a one of heavy, steady drinking, rather than a binge pattern. Participants in the CBI group showed a substantial, albeit non-significant, trend to reduce the days that they drank, their binge drinking episodes, and the alcohol-related problems that they experienced.

Unlike previous studies, this study measured changes in drinking of hospital patients who did not receive a brief intervention. Control participants showed no significant changes on any of the outcome measures. However, the trend for these participants was to increase their alcohol consumption, number of days drinking, and the number of binge sessions. Nevertheless, these participants reported fewer alcohol-related problems at the follow-up than at baseline. However, it is almost certain that the questionnaire used to assess alcohol-related problems reported higher scores at the baseline than at the follow-up because the baseline assessment coincided with a recent alcohol-related hospital admission.

The participants were asked to describe their experience of taking part in this study and how it caused them to change. It is clear that participants who reduced their drinking perceived that changes in their lifestyle were important. One respondent stated that he had

had to “sort my life out”; another indicated that the intervention was, “...a way for me to look at my lifestyle.” One participant who received the CBI-E intervention said that it had motivated him to “...get the ball rolling...to get me into Detox.” Another participant in the CBI group who did not to reduce his drinking attributed his failure to the fact he had not been working.

A participant in the control group described what had influenced his decision to stop drinking completely. He stated that being in hospital had made him realise that his drinking was “...getting out of hand.” Such outcomes for untreated drinkers have been reported elsewhere. Orford, Dalton, Hartney, Ferrins-Brown, Kerr, and Maslin (2002), who studied a sample of 500 untreated heavy drinkers at a two-year follow-up, found that three factors were associated with reducing drinking: (a) contemplating change at the baseline assessment, (b) accurate feedback about alcohol-consumption levels, and (c) having a serious health event leading to an inpatient stay in hospital.

Implementing brief interventions in a hospital can capitalise on a naturally occurring shift in a person’s motivation to change. The majority of participants—more than 85 percent—in this study were contemplating changing their drinking. People who are admitted to hospital because of a health problem resulting from their drinking might be more inclined than others to consider changing their behaviour. Indeed, the period of time after a person has been admitted to hospital for an alcohol-related problem has been referred to as the *teachable moment* (Williams, Brown, Patton, Crawford, & Touquet, 2005).

The brief interventions that were used in this study achieved several important goals. First, they gave respondents accurate feedback about their drinking. Second, they encouraged respondents to weigh the pros and cons of their use. Doing so at a time when the negative consequences of drinking are more prominent might be particularly

appropriate for increasing motivation to change. Third, they gave respondents practical strategies to help them make these changes.

The enhanced brief intervention included additional elements that helped participants to initiate change. This intervention gave respondents an opportunity to describe their concerns and goals in life while also considering the effect that their alcohol use would have on achieving their goals. Many participants' alcohol use was interfering with achieving their goals. This intervention focused respondents on their goals at a time when their motivation to make important changes was high; furthermore, it gave respondents the opportunity to devise a plan to make these changes.

## CHAPTER 7

### **Study 3: The Assessment of Alcohol Consumption and Alcohol-Related Problems Among University Students**

There can be little doubt that the accurate assessment of a person's alcohol consumption is essential to both clinicians and researchers. Both the provision and evaluation of treatment often depend critically on the accuracy of the alcohol assessment. The level of information required about alcohol consumption will depend on the professional's intended purpose (e.g., research or treatment). Often the decision of how detailed the assessment should be must be balanced against the time available for the assessment. Today, there are multiple measures available from which clinicians and researchers can choose. However, improving techniques to assess alcohol consumption is still ongoing.

This chapter first describes the current methods available to measure alcohol consumption. Next, it reviews the methods used to assess binge drinking patterns. Finally, it presents a study that (a) evaluated a new alcohol consumption questionnaire, and (b) assessed the relationship between students' drinking patterns and their alcohol-related problems.

### **Measuring Alcohol Consumption**

There are two main methods of measuring alcohol consumption. One is biochemical measurement; the other is based on self-reports. Biochemical markers of alcohol consumption are derived from analysis of a person's bodily fluids (e.g., a sample of blood, saliva, sweat, or urine). Self-reports, on the other hand, rely on respondents to provide honest and accurate reports of their own drinking. Both of these assessment methods have their benefits and their drawbacks.

Biochemical measures vary greatly in their ability to accurately measure alcohol consumption. For instance, these measures can vary as a function of the respondent's age, gender, ethnicity, and health status (Allen & Litten, 2003). Some measures can accurately estimate how much alcohol has been consumed within a few hours, but no one marker can accurately estimate an individual's level alcohol consumption following a few hours of abstinence. Biochemical measures are further restricted in their ability to identify drinkers at the early stages of hazardous or harmful use, although they can identify drinkers with a long history of alcohol abuse. Biochemical measures have their greatest value in detecting whether an individual has returned to drinking after a prolonged period of abstinence (e.g., investigating the post-treatment status of abstinent drinkers who are at-risk for relapse).

The principle concern about self-reports is that they might not give valid and reliable results. For instance, are respondents willing to give honest reports of their alcohol consumption? And, if they are, how accurately are they able to recall their drinking? If one can assume that self-reports are reliable and valid, they can provide detailed information about the quantity of alcohol consumed and respondents' patterns of drinking. Several comprehensive reviews have assessed the validity and reliability of self-reports (Babor, 1990; Babor, Brown, & Del Boca 1990; Brown, 1992; Maisto, McKay, & Connors, 1990; Sobell & Sobell, 1990). The conclusions of these reviews are that self-reports are indeed reliable and valid providing that the data were gathered under appropriate conditions. That is, respondents should be (a) alcohol-free during the assessment; (b) given written assurances of confidentiality; (c) in a situation that is conducive to honest reporting (e.g., in a research setting rather than being evaluated for probation or employment); (d) asked clear, objective questions; and (e) provided with memory aids to enhance recall.

There are two types of self-report—daily drinking reports of consumption and averaging techniques. Furthermore, self-reports can be either prospective or retrospective. The earliest method used was an averaging technique called the *Quantity Frequency* (QF) method (Strauss & Bacon, 1953). QF methods are retrospective techniques that are the quickest and easiest of the measures to take. They usually ask the respondent to estimate his or her average daily consumption and the average frequency of consumption.

*Retrospective Diary* (RD) methods were introduced to improve the accuracy of QF methods (Millwood & McKay, 1978). These methods require the respondent to provide a detailed account of daily drinking during a designated period of time. *Self-Monitoring* (SM) techniques are prospective daily self reports, which were introduced to improve QF and RD methods. SM techniques typically ask the respondents to record their consumption drink-by-drink as each drink is consumed, thereby removing the potential memory bias associated with retrospective methods. However, these techniques have been strongly criticised because they alter the very behaviour that they aim to record (Midanik, 1988).

Retrospective techniques are the most common approach used in outcome research. These techniques assess alcohol consumption either by an interview or with a questionnaire. Of the two retrospective techniques outlined above, RD methods generate the most detailed account of the respondent's alcohol consumption. The Timeline Follow-Back (TLFB; Sobell & Sobell, 1992; 1995) is a comprehensive RD method. The TLFB is an interview that asks respondents to estimate their alcohol consumption for each day during a given assessment period; this period can vary from 30 days up to 12 months. Respondents are aided in their recall by the use of a calendar; key dates (e.g., birthdays, public holidays) are listed on the calendar to further aid the respondent's memory. The amount of time taken to administer the TLFB can range from 15 to 30 minutes.

The TLFB method provides a number of indices of a person's alcohol consumption. Along with the quantity and frequency of alcohol consumption, the pattern of consumption can also be identified. For instance, the number of abstinent days, heavy drinking days, or binge episodes during a given period of time can be estimated. The TLFB has been evaluated in several studies (Connors, Watson, & Maisto, 1985; Maisto, Sobell, Cooper, & Sobell, 1979; Maisto, Sobell, Sobell, & Cooper, 1982), and it has been shown to have good reliability and validity.

The TLFB has several distinct disadvantages, particularly in comparison to questionnaires. Because the TLFB must be delivered by a trained interviewer, it is more costly to administer than a questionnaire. Furthermore, it cannot be administered by post. It is also time consuming and not suited to time-limited situations (e.g., in survey studies). Finally, it is intensive and places a burden on the respondent.

QF questionnaires, by comparison, offer certain advantages. They can be completed independently by respondents, and, because of their brevity, are less arduous to complete. QF measures require respondents to state their *average* or *typical* consumption during a given period of time. For example, respondents might be asked to state how much they drink *on a typical day* from a list of categories (e.g., *1-2 drinks, 3-4 drinks*), and then to state *how often* they drink this *typical* amount from a list of categories (e.g., *every day, twice a week*). Most QF methods repeat these questions for each beverage type (i.e., *beer, wine, and spirits*). The total consumption for a given period is then calculated as the product of the quantity and frequency for each beverage type.

Early type of QF measures were criticised because they could not capture the variability in drinking patterns (Room, 1990). For instance, two individuals could, on average, both drink the same amount of alcohol per week and on the same number of days per week, but could still have very different drinking patterns: one individual might drink

six units each day, whereas the other might drink two units on two days but 14 units on one day. Such a diverse drinking pattern cannot be detected by the early QF methods. The precision of the QF methods was improved by asking respondents, along with their typical amounts and frequencies, to estimate their *maximum quantity* and the *frequency* of this maximum quantity. Even with such refinements, the QF methods are limited in their ability to assess the variability and pattern of an individual's alcohol consumption (e.g., it is unable to capture the pattern of consumption of an individual if he or she consumes beer and wine on the same day).

*Graduated-Frequency* (GF; Clark & Midinak, 1982) questionnaires were introduced in order to accurately determine a person's pattern of alcohol use when he or she consumes more than one type of beverage on a single drinking occasion. GF questionnaires simply combine the three main beverage types (e.g., beer, wine, spirits) into one category called *drinks*. Respondents are asked to recall the frequency of their drinking (e.g., *once a day, 4-5 times per week*) for each of a series of different amounts (e.g., *1-2 drinks, 3-4 drinks, to the highest ever consumed*). Unfortunately, such questionnaires make it difficult for respondents to characterize their actual alcohol consumption, and this can lead to gross overestimations—for instance double that recorded by QF measures and SM methods (Poikolainen, Podkletnova, & Alho, 2002).

Miller and Marlatt (1987) attempted to combine the benefits of the retrospective daily diary method (i.e., the detailed assessment of drinking patterns) and the QF method (i.e., the brevity of the approach) by using a grid-averaging approach. Their Drinker Profile (DP) is a measure of alcohol consumption that is part of the Comprehensive Drinker Profile (CDP, Miller & Marlatt, 1987). The DP is an interview technique that asks respondents to state their alcohol consumption for a typical week on a grid of 21 cells—



each of the seven days has three time points *morning*, *afternoon*, and *evening*. The amount consumed and the duration of each drinking episode is recorded in each cell.

The DP also enables respondents to record their consumption even if they do not have a typical weekly drinking pattern. If, for instance, the respondent has an episodic drinking pattern, the quantity consumed, duration of the episode and the number of episodes during the given period is recorded on a separate sheet. As many as three different types of episodes can be recorded. If the drinker has a combined episodic and regular drinking pattern, it can be recorded by completing both sheets. The DP can calculate the same measures as can the TLFB (i.e., total consumption, number of days drinking, average number of drinks per day, and average number of binge drinking sessions). In addition, the DP can calculate blood alcohol concentration (BAC) levels for each drinking session.

Measures of BAC are being used with increased frequency in alcohol research (Lo, 1996; Marlatt et al., 1998; Miller, 1978). These measures are useful both as outcome measures and as feedback in an intervention (see Chapter 3). Levels of acute intoxication can be estimated from reports of the quantities consumed, duration of the episode, body weight of the individual, and his or her gender (see Chapters 1 and 3 for more details). Retrospective estimates of BAC have been shown to accurately reflect actual fluid samples (Carey, & Husted, 2002).

A study by Grant, Tonigan, and Miller (1995) compared the validity of three retrospective approaches: the QF, TLFB, and DP. The alcohol consumption during the previous three months of 80 university students was assessed. Respondents were given a self-administered questionnaire packet containing a QF, drinking-problems, and alcohol-dependency questionnaire. Next, the respondents were interviewed about their alcohol consumption with both the TLFB method and the DP. The order of the interviews was

counterbalanced, so that half of the participants were interviewed first with the TLFB and half first with the DP. With each respondent, a different interviewer conducted the TLFB and the DP. The results of the study showed that in comparison to the TLFB, the QF more accurately total alcohol consumption than the DP. The DP overestimated alcohol consumption.

Form 90 (Miller, 1996) is a further adaptation of Miller and Marlatt's (1987) DP method. Form 90 is the test manual for the structured assessment interview for drinking and related behaviours used in Project MATCH (1997). Form 90 measures the last 90 days of drinking and related behaviours. The alcohol consumption section of Form 90 retains the original features of the DP, but in addition it contains a further weekly grid for recording alcohol consumption. The initial stage of the alcohol consumption assessment in Form 90 also differs from the DP: Form 90 uses a calendar in a similar fashion to the TLFB. The test-retest reliability of Form 90's alcohol consumption indices has been found to be excellent (Tonigan, Miller, & Brown, 1997).

The exact relationship between QF measures and RD methods remains uncertain. For instance, many studies have reported that QF methods under-estimated alcohol consumption when compared to RD methods (O'Hare, 1991; Redman et al., 1987; Sobell & Sobell, 1995; Webb et al., 1990). Other studies have reported that QF measures overestimated alcohol consumption when compared to RD methods (Midanik, Klatsky, & Armstrong, 1989; O'Callagan & Callan, 1992; Single & Wortley, 1994; Wyllie et al., 1994). Generally, though, it is agreed that QF methods adequately estimate an individual's total alcohol consumption in comparison to RD methods. Sobell, Agrawal, Sobell, Leo, Young, Cunningham, and Simco (2003) compared the results of a QF measure and a TLFB interview with 825 alcohol abusers. The QF measure gave similar aggregate measures of consumption as the TLFB.

In conclusion, there are several methods for estimating an individual's alcohol consumption. Biochemical measures are particularly limited in their ability to accurately estimate how much alcohol has been consumed. However, these measures accurately indicate whether or not acute consumption has occurred, especially after a prolonged period of abstinence. They cannot, however, accurately measure how much alcohol moderate drinkers have consumed or identify individuals at an early stage of alcohol misuse.

Self-reports are the most suitable option for gaining accurate information about an individual's alcohol consumption. Several reviews of the literature have supported the validity and reliability of self-reports when the data are collected under appropriate conditions. There are several self-report techniques. Each has its own benefits and limitations. For instance, prospective self-reports have been criticised because of the unintended effect that self-monitoring has on drinking behaviour. QF methods, although quick and cost effective, cannot distinguish between different patterns of alcohol consumption. Although RD methods, such as the TLFB, give many details about alcohol consumption, they are limited in their application. This is due to the length of the assessment, and the necessity of a trained interviewer to conduct it.

In summary, alternative methods to the QF (i.e., the GF) or a combination of the QF and TLFB (i.e., the DP) have not improved self-report methods, although the alcohol consumption section of the Form 90 is perhaps a beginning. Currently, the selection of an appropriate measure for estimating an individual's alcohol consumption depends on the level of detail required and the time available for the assessment.

### **Measuring Binge Drinking**

The risk of harm from alcohol consumption can occur in two ways: (a) from heavy sustained use (high weekly consumption) or (b) from heavy occasional use (excessive

single session consumption) (see Chapters 1 and 4). In recent years, particular attention has been paid to excessive, single-session patterns of consumption; this pattern of is often called *binge drinking*, although some researchers refer to it as *heavy episodic binge drinking* (Nezlek, Pilkington, & Bilbro, 1994), *heavy sessional drinking* (Measham, 1996), or *risky single-occasion drinking* (RSOD; Murgraff, Parrott, & Bennett, 1999). Regardless of the name by which it is called, the quantity of consumption necessary to reach the binge drinking criterion can vary greatly (c.f. Anderson & Plant, 1996; Hanson & Engs, 1992; Webb, Ashton, Kelly, & Kamali, 1996).

The convention in the U.S.A. is to use Wechsler, Davenport, Dowdall, Moeykens, and Castillo's (1994) definition of binge drinking. Wechsler et al. suggested a gender specific definition of five or more drinks per episode for a man and four or more drinks per episode for a woman. These amounts approximately equal eight or more standard British units for men and six or more standard British units for women. This definition has been used throughout this thesis.

The relationship between student binge drinking and alcohol problems has been reported extensively (see Wechsler et al., 1994; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler, Lee-Kuo, Seibring, Nelson, & Lee, 2002). Wechsler and colleagues (1994, 1998, & 2002) reported that students who binge drank were at increased risk of negative consequences (e.g., academic impairment, accidents or injuries, unplanned sexual activity) in comparison to non-binge drinkers (see Chapter 4 for a fuller discussion).

Using the binge-drinking criterion (5+/4+) to define risky drinking is debatable. Several researchers have questioned whether these arbitrarily set drinking levels typify drinking sessions that are likely to result in negative consequences (Gose, 1997; Lang & Voas, 2001; Lo, 1996; Thombs, Olds, & Snyder, 2003). For instance, many factors influence a person's level of intoxication. The most notable factors are the person's

gender, weight, the amount of alcohol consumed, and the duration of the episode—factors from which blood alcohol concentration (BAC) can be quantified. The BAC of two individuals who both drink in binges can vary greatly: for example, a 13-stone male who consumes 8 units of alcohol during 4 hours will have a peak BAC level of 48mg%, whereas a 9-stone male who consumes 8 units of alcohol during 2 hour will have a BAC of 123mg%.<sup>1</sup> Reaching a BAC of 20-60mg% is considered social drinking; 80mg% is the British drink-driving limit; and at 100mg% a person would be acutely intoxicated (Miller, Zweben, DiClemente, & Rychtarik, 1992).

Two studies that compared BACs to binge drinking criterion based on a preset number of units confirmed that many binge drinkers do not reach BACs normally associated with impairment. At a border crossing between Mexico and the United States, Lange and Voas (2001) measured the BACs of 1,059 pedestrians returning from a night of drinking in Mexico. More than 50% of those who met the binge drinking criterion based on the number of drinks that they had consumed that night (i.e., 5+/4+ drinks) had a BAC below 60mg%. Thombs, Olds, and Snyder (2003) conducted a study of 947 university students and reported findings similar to those of Lange and Voas (2001). Thombs et al. reported that 66.3% of those who met the 5+/4+ binge criteria had BACs below 100mg% and 48.5% had BACs below 80mg%. Therefore, both the Lange and Voas (2001) and the Thombs et al. (2003) studies support the view that current binge drinking criteria may not correspond to risky drinking.

The present study had three aims. First, a new alcohol consumption questionnaire was devised, which used techniques similar to those in Form 90. The new questionnaire—the Typical and Atypical Drinking Diary (TADD)—assesses the individual's alcohol consumption for a typical week and for an atypical week using two retrospective weekly

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<sup>1</sup> These BACs were computed with the BACCuS software program (Markham, Miller, & Acriniega, 1993)

diaries. The TADD questionnaire was compared to two well established alcohol consumption measures: a QF measure and a retrospective diary measure. The QF measure was the Khavari Alcohol Test (KAT; Khavari & Farber, 1978). The retrospective diary method was the Timeline Follow-Back (TLFB; Sobell & Sobell, 1992). It was hypothesised that the TADD questionnaire would give a more accurate estimate of respondents' alcohol consumption than would the KAT questionnaire when each was compared against the TLFB interview.

Second, the study sought to evaluate the relationship between drinking patterns and alcohol-related problems. It was hypothesised that BAC levels greater than 99mg% would be a better predictor of alcohol-related problems than would traditional binge criteria. It was also hypothesised that average weekly alcohol consumption and binge drinking would predict different kinds of alcohol-related problems.

## Method

### ***Participants***

A total of 170 undergraduate students of psychology volunteered to participate for course credit. The inclusion criteria stipulated that men drink more than 21 units per week or 8 or more units on one occasion at least weekly, and women drink more than 14 units per week or 6 or more units on one occasion at least weekly. Of those participants recruited, 158 met these inclusion criteria; 117 (74.1%) were female. The final sample comprised 68.4% ( $n = 108$ ) first-year students, 24.1% ( $n = 38$ ) second-year students, and 7.6% ( $n = 12$ ) third-year students. The age of participants ranged from 18 to 24 years old ( $M = 19.1$ ,  $sd = 1.3$ ).

## **Instruments**

*Alcohol Timeline Followback (TLFB).* The TLFB (Sobell & Sobell, 1992) is a method of retrospectively estimating daily drinking episodes during a period of time; a 12-week period was used in the present study. The TLFB method uses a calendar to help the respondent recall the amounts of alcohol consumed on each day in the period. The TLFB technique was modified for the purpose of this study. Along with the type(s) and amount of alcoholic beverage consumed each day, the respondent was asked to estimate the duration of each drinking episode. From this additional information, a blood alcohol concentration could be estimated for each drinking episode.

*Khavari Alcohol Test (KAT).* The KAT (Khavari & Farber, 1978) is a 12-item questionnaire that is designed to measure the respondent's habitual consumption of beer, wine, and distilled spirits. For each beverage type (i.e., beer, wine, and spirits), the KAT measures the following aspects of alcohol consumption during the preceding 12 weeks: usual frequency of consumption (FU), quantity of the usual amount consumed (QU) on each occasion, quantity of the most amount consumed (QM) on one occasion, and frequency that the most amount is consumed (FM). The respondent can choose from the following frequency options: *daily (84), 3 or 4 times a week (42), twice a week (24), once a week (12), 3 or 4 times a month (10.5), twice a month (6), once a month or less (4), and I don't drink (0).*

For this study, the amount consumed was quantified according to the following standard drink sizes in the U.K.: a pint (550ml) of beer = 2 units, a glass (125ml) of wine = 1 unit, and a single "shot" (25ml) of spirits = 1 unit. Alcohol consumption during the 12-week period was calculated for each of the beverages using the following formula:

Quantity = (FU – FM)(QU) + (FM)(QM). The total amount consumed was the sum of the quantity of beer, wine, and spirits.

*Typical and Atypical Drinking Dairy (TADD)* (Appendix K, p. 315). The TADD was developed for use in this study. It is a 6-item questionnaire that measures respondents' patterns and amount of alcohol consumption. It also calculates peak blood-alcohol concentration (BAC) for each drinking session.

The respondent records his or her alcohol consumption during the previous 12 weeks in two weekly diaries: one for *typical* weeks and one for *atypical* weeks (i.e., heavier or lighter drinking weeks). Each weekly diary asks the respondent to state the quantity and pattern of alcohol consumption on each day (from Monday through Sunday). The respondent is asked to name the beverages consumed, the percentage of alcohol they contain, the total amount drunk, and when the each drinking session started and ended. Typical beverage sizes and their alcohol content are shown in an accompanying table. Finally, the respondent is asked to estimate how many times the *typical* and *atypical* pattern of consumption occurred during the previous 12 weeks.

*Rutgers Alcohol Problems Index (RAPI)* (Appendix L, p. 316). The RAPI (White & Loubouvie, 1989) is a 23-item questionnaire that is designed to measure a variety of problems frequently experienced by students who drink excessively. Respondents are asked to indicate how many times they have experienced particular problems while drinking alcohol or as a result of their drinking in a specified time period (up to three years). This study specified a 12-week time period. The respondent indicates how often each of the 23 problems occurred from among this choice of response options (the value assigned to each item is shown in parentheses): *never (0)*, *1 – 2 times (1)*, *3 – 5 times (2)*, *6 – 10 times (3)*, or *more than 10 times (4)*. The total score is the sum of the scores for each item.

*Drinker's Inventory of Consequences (DrInC-2R)* (Appendix F, p. 310). The DrInC-2R (Miller, Tonigan, & Longabaugh, 1995) is a 50-item questionnaire designed to



measure a variety of problems frequently experienced by people who drink excessively. The questionnaire assesses negative consequences of drinking occurring specifically during the previous 12 weeks (see Chapter 4 for a fuller description).

### ***Procedure***

Participants were recruited into the study between 40 and 77 days ( $M = 53$  days,  $sd = 9.5$ ) after the start of the autumn academic term. Each participant was interviewed privately in a quiet experimental room. On arrival, the participant read and signed a consent form. Next, the participant completed the TADD and KAT questionnaires. The administration of these two questionnaires was counterbalanced, so that half of the participants completed the TADD first, and the other half the KAT. The participant was then interviewed about his or her drinking with the TLFB. Finally, the participant completed the RAPI and DrInC questionnaires. Participants were thanked, debriefed, and dismissed.

## **Results**

### ***Drinking Patterns***

The mean weekly alcohol consumption for males was 34.0 units ( $sd = 16.3$ ), and for females it was 26.0 ( $sd = 13.7$ ). As expected, males drank significantly more than females,  $t(156) = 3.05, p < .01$ . There was no difference between males and females in the number of drinking days per week: males drank 3.3 days per week ( $sd = 1.2$ ) and females drank 2.9 days per week ( $sd = 1.1$ ),  $t(156) = 1.77, p = .08$ . There was no difference between males and females in the mean number of binge episodes per week as defined by the *traditional* definition (i.e., 8 or more units for males and 6 or more units for females on

one occasion): males had an average of 2.2 ( $sd = 1.0$ ) binge episodes per week, and females had 2.1 ( $sd = 1.0$ ),  $t(156) = .57, p = .57$ .

Figure 7.1 displays males' and females' average weekly alcohol consumption during the 14 weeks that began before the semester started. From Week 1 to Week 4, participants had not arrived at the university, and alcohol consumption was relatively stable for both males and females. Between Week 1 and Week 4, males consumed an average of 23.4 units per week ( $sd = 16.2$ ) and females 20.9 units ( $sd = 18.6$ ). Week 5 was the first-year students' orientation week, during which students are encouraged to socialise with one another before the start of the academic semester. The weekly alcohol consumption for males in Week 5 was 40.6 units ( $sd = 29.2$ ) and for females it was 37.8 units ( $sd = 24.1$ ). During the academic term (Week 6 to Week 14), the average consumption for males was 37.3 units ( $sd = 17.9$ ) per week, and for females it was 26.9 units ( $sd = 14.4$ ).

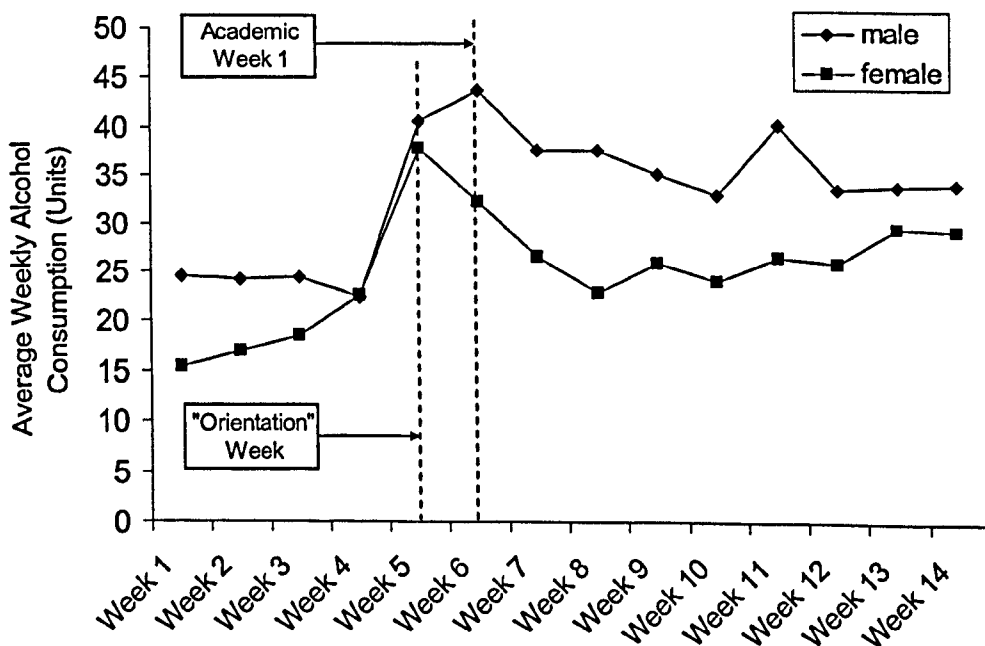


Figure 7.1. Mean weekly alcohol consumption of male and female students before arriving at (Weeks 1 to 4) and after arriving at (Weeks 5 to 14) the university.

Figure 7.2 compare the average weekly alcohol consumption of students before and after they arrived (including the orientation week<sup>2</sup>) at the university. Males drank an average of 23.4 units ( $sd = 16.2$ ) and females 20.9 units ( $sd = 18.6$ ) before they arrived at the university and 38.0 units ( $sd = 18.0$ ) and 28.3 units ( $sd = 14.3$ ), respectively after arriving. Participants drank significantly more alcohol after arriving at university than they had before,  $t(157) = 6.77, p < .001$ . Males and females increased their consumption by 62% and 35.4%, respectively.

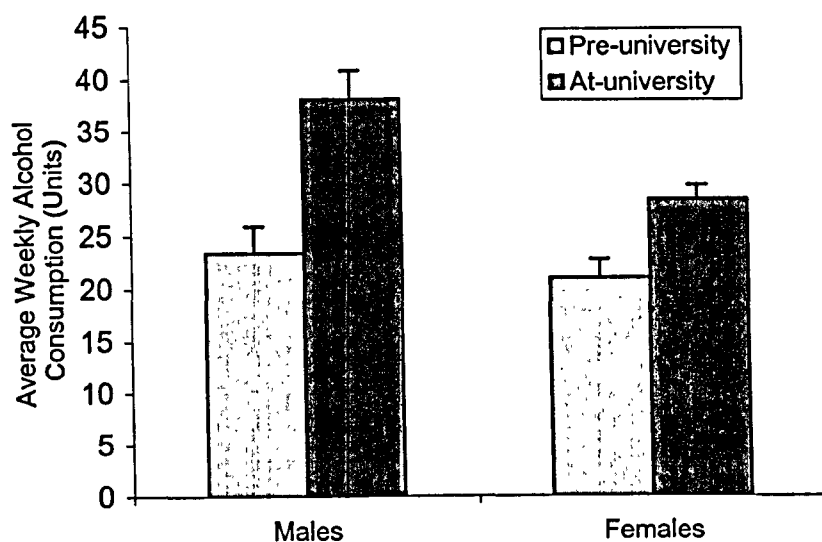


Figure 7.2. Mean weekly alcohol consumption and standard error of male and female students before and after arriving at university.

Figure 7.3 displays the average number of weekly binge episodes of students before and after arriving at the university. Participants binge drank significantly more frequently whilst at university (2.4 times per week) than they had before (1.2 times per week),  $t(157) = 11.79, p < .001$ . Males and females increased their average number of weekly binges by 136% and 85%, respectively.

<sup>2</sup> As noted above students drink considerably more during orientation week. Excluding orientation week, males drank an average of 26.4 units ( $sd = 17.4$ ) and females 26.2 units ( $sd = 14.1$ ) after they arrived at the university; participants drank significantly more alcohol after arriving at university than they had before,  $t(157) = 5.32, p < .001$ ; males and females increased their consumption by 55% and 25%, respectively.

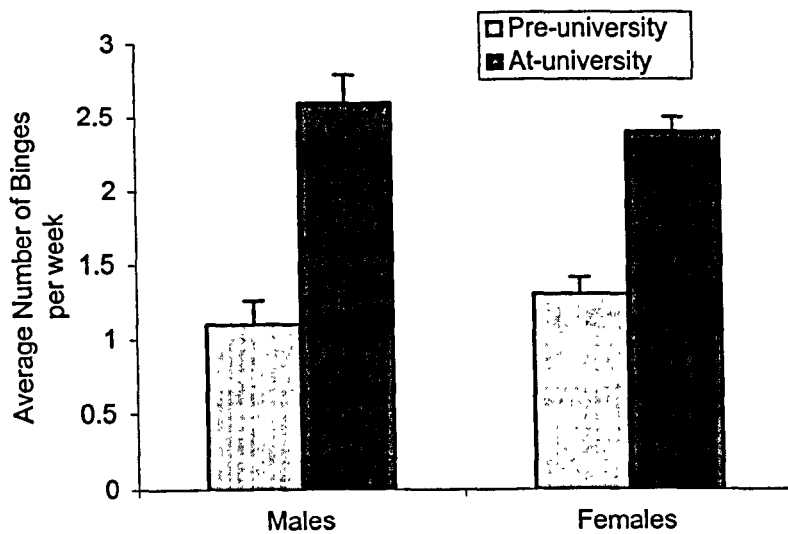


Figure 7.3. Mean number and standard error of binge episodes of male and female students before and after arriving at university.

### Measures of Alcohol Consumption

Whether there was an effect for the order in which the KAT and TADD questionnaires were administered was assessed. There were no differences between participants who were administered the KAT first and those administered the TADD first in terms of average weekly consumption derived from the KAT  $t(156) = .60, p = .55$ , the TADD,  $t(156) = .11, p = .93$ , and the TLFB  $t(156) = .04, p = .96$ .

Table 7.1 displays the average weekly consumption, number of days drinking per week, and the number of binge episodes per week for male and female participants as derived from the TLFB interview, TADD questionnaire, and KAT<sup>3</sup> questionnaire. In comparison to the TLFB, both the TADD and KAT questionnaires overestimated average weekly alcohol consumption. The TADD questionnaire overestimated males' consumption by 24% ( $M = 8.4$  units,  $SD = 12.3$ ) and females' by 23% ( $M = 5.9$  units,  $SD = 8.5$ ). The KAT questionnaire overestimated the males' consumption by 52.5% ( $M = 18.5$

<sup>3</sup> The KAT questionnaire does not estimate the number of drinking days or number of binge episodes.

units,  $SD = 21.8$ ) and females' by 38% ( $M = 9.8$  units,  $SD = 16.5$ ). The mean number of binge episodes per week (see Table 7.1) was defined according to (a) the traditional definition of 8+ and 6+ units for males and females, respectively, and (b) a peak BAC level of more than 99mg%. The BAC level of 100mg% is a level of intoxication that is associated with impaired coordination in normal drinkers: this level is defined as legal intoxication in most states of the U.S.A (Miller et al., 1996). There were fewer incidences of binge drinking using the BAC definition than when using the traditional definition,  $t(157) = 7.79, p < .001$ .

Table 7.1

*Means and Standard Deviations of Males' and Females' Weekly Alcohol Consumption, Drinking Days per Week and Binge Episodes per Week (Defined as Units of Alcohol Consumed and Peak BAC Level) Derived From the TLFB Interview and the TADD and KAT Questionnaires*

	TLFB				TADD				KAT			
	Male		Female		Male		Female		Male		Female	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Weekly Consumption	34.0	16.3	26.0	13.7	42.4	19.4	31.9	15.6	52.5	28.2	35.8	21.2
Days Drinking per Week	3.3	1.2	2.9	1.1	3.9	1.5	3.4	1.2	--	--	--	--
Traditional Binges per Week	2.2	1.0	2.1	1.0	2.6	1.3	2.5	1.1	--	--	--	--
Peak BAC > 99mg% Binges per Week	1.4	1.2	1.8	0.9	1.8	1.1	2.3	1.1	--	--	--	--

In order to confirm that the questionnaire methods did not simply reflect the most recent drinking pattern (i.e., the previous weeks' drinking), the KAT, TADD, and the respondents' previous weeks' drinking (from the TLFB) were compared. Figure 7.4 shows male and female respondents' weekly alcohol consumption derived from the KAT, TADD, and in the previous week from the TLFB. In the previous week the TLFB showed that male respondents drank an average of 37.9 units ( $sd = 17.5$ ) and female respondents 27.6 units ( $sd = 16.9$ ). Paired  $t$  tests showed that average weekly consumption derived

from both the KAT and the TADD questionnaires overestimated drinking compared to the previous weeks' drinking derived from the TLFB: the KAT overestimated by 9.9 units (95% CI, 7.0 to 12.8),  $t(157) = 6.75, p < .001$  and the TADD overestimated by 4.3 units (95% CI, 2.2 to 6.5),  $t(157) = 3.95, p < .001$ . Furthermore the alcohol consumption derived from the KAT questionnaire was significantly higher than that derived from the TADD,  $t(157) = 4.36, p < .001$ .

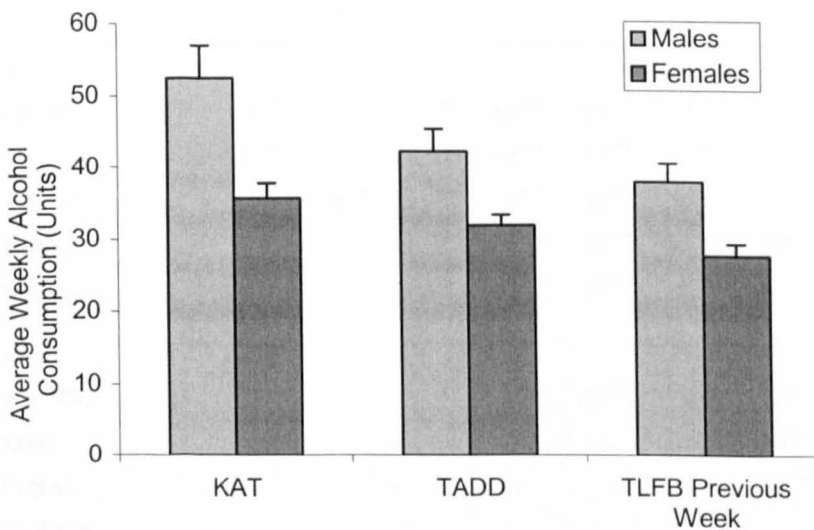


Figure 7.4. Mean weekly consumption and standard error of male and female students derived from the KAT, TADD, and the previous weeks' drinking from the TLFB.

Table 7.2 shows correlations between the alcohol consumption measures derived from the TLFB interview, TADD questionnaire, and KAT questionnaire and drinking problems derived from the RAPI and DrInC questionnaires. Of the drinking measures obtained from the TLFB interview, average weekly consumption had the highest correlation with drinking problems ( $r = .26, n = 158, p < .01$ , with the DrInC and  $r = .33, n = 158, p < .001$ , with the RAPI) rather than with the binge drinking measures. Recall that the TLFB interview is considered the most detailed and most accurate measure of alcohol consumption. Of the binge drinking measures, the one defined according to the traditional

criteria had the highest correlation with drinking problems ( $r = .20, n = 158, p < .05$  with the DrInC and  $r = .24, n = 158, p < .01$  with the RAPI). When defined according to a peak BAC of 100mg% or greater, the correlations were:  $r = .15, n = 158, p > .05$  with the DrInC and  $r = .20, n = 158, p < .05$  with the RAPI.

Table 7.2

*Intercorrelations Among the TLFB, TADD, and KAT Alcohol Consumption Measures and DrInC and RAPI Alcohol-related Problems*

	2	3	4	5	6	7	8	9	10	11	12	13
<b>TLFB</b>												
1. AV. WK	.73***	.90***	.85***	.72***	.83***	.53***	.72***	.57***	.53***	.66***	.26**	.33***
2. Days	--	.70***	.72***	.52***	.64***	.77***	.61***	.57***	.48***	.51***	.13	.24**
3. P. BAC		--	.84***	.85***	.70***	.49***	.81***	.55***	.67***	.54***	.19*	.24**
4. T. Binge			--	.82***	.70***	.52***	.68***	.70***	.64***	.49***	.20*	.24**
5. B. Binge				--	.56***	.39***	.69***	.57***	.70***	.39***	.15	.20*
<b>TADD</b>												
6. AV. WK					--	.67***	.77***	.87***	.66***	.75***	.24**	.38***
7. Days						--	.65***	.63***	.50***	.55***	.11	.26**
8. P. BAC							--	.76***	.83***	.65***	.19*	.30***
9. T. Binge								--	.78***	.52***	.20*	.33***
10. B. Binge									--	.46***	.18*	.24**
<b>KAT</b>												
11. AV WK										--	.29***	.40***
<b>Problems</b>												
12. DrInC											--	.74***
13. RAPI												--

Note. AV.WK = mean weekly alcohol consumption. Days = number of drinking days. P. BAC = total peak blood alcohol concentration. T. Binge = traditional binge episodes (defined as 8 or more units on one occasion for males and 6 or more units for females). B. Binge = binge episodes defined by a peak BAC greater than 99mg/ml%.

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

Average weekly alcohol consumption derived from the TLFB was significantly correlated with alcohol consumption derived from the TADD questionnaire ( $r = .83, n = 158, p < .001$ , two-tailed) and the KAT questionnaire ( $r = .66, n = 158, p < .001$ , two-tailed). Using Meng, Rosenthal, and Rubin's (1992) formula for comparing two correlations, the TADD—TLFB correlation was significantly higher than the KAT—

TLFB one ( $Z = 5.10, p < .001$ ). The average number of weekly binge episodes derived from the TLFB was significantly correlated with the number derived from the TADD questionnaire ( $r = .70, n = 158, p < .001$ , two tails). There was also a significant correlation between the mean number of drinking days per week derived from TLFB and from the TADD ( $r = .77, n = 158, p < .001$ , two tails).

To examine the amount of variance in the TLFB consumption index explained by the KAT and TADD indices, two hierarchical multiple regression analyses were conducted with the KAT and TADD indices as independent variables and the TLFB index as the dependent variable. Before proceeding with the multiple regression analyses, the data were examined to ensure that they did not violate the assumptions of the test. Both the independent variables and the dependent variable had a high degree of kurtosis. A logarithmic transformation of the predictor and dependent variables corrected the deviations from normality. Scatterplots revealed no problems with lack of linearity and no outliers in the data. The data were further tested for homoscedasticity: the standardised residuals were plotted against the standardised predicted values. The removal of one outlier allowed the spread of the residuals at every set of values in the independent variables to be equal, thus confirming the homoscedasticity of the distributions.

In the first hierarchal regression analysis (see Table 7.3), the log transformed TLFB scores were entered as the dependent variable and the log transformed KAT scores were entered in Step 1. The KAT scores predicted 44.5% of the variance in the TLFB,  $F = 124.20 (1, 155), p < .001$ . The log transformed TADD scores were entered in Step 2 and yielded a significant  $R^2$  change ( $p < .001$ ). The TADD index accounted for 28.6% of the unique variance. The final model explained a total of 73% of the variance in the TLFB,  $F = 208.58 (2, 154), p < .001$ .



Table 7.3

*Results of a Hierarchical Multiple Regression Analysis of the Ability of KAT indices (Independently) and the KAT and TADD (Combined) to Predict TLFB Average Weekly Alcohol Consumption*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.45	.45	124.20 (1,155)	.000
KAT	.59	.05	.67***				
Step 2				.73	.28	163.01 (1,154)	.000
KAT	.10	.05	.11				
TADD	.77	.06	.77***				

Note. \*\*\*  $p < .001$ .

In the second hierarchal regression analysis (see Table 7.4), the TLFB log transformed scores were again entered as the dependent variable but this time the log transformed TADD scores were entered in Step 1. The TADD index predicted 72% of the variance in the TLFB,  $F = 406.95 (1, 155)$ ,  $p < .001$ . The log transformed KAT index was entered in Step 2 but did not yield a significant  $R^2$  change ( $p > .05$ ). The KAT scores accounted for just 1% of the unique variance.

Table 7.4

*Results of a Hierarchical Multiple Regression Analysis of the Ability of TADD indices (Independently) and the TADD and KAT (Combined) to Predict TLFB Average Weekly Alcohol Consumption*

Variable	<i>B</i>	<i>SEB</i>	$\beta$	$R^2$	$\Delta R^2$	$\Delta F(df)$	$\Delta p$
Step 1				.72	.72	406.95 (1,155)	.000
TADD	.85	.04	.85***				
Step 2				.73	.01	3.54 (1,154)	.062
TADD	.77	.06	.77***				
KAT	.10	.05	.11				

Note. \*\*\*  $p < .001$ .

From the TLFB interview, it was possible to examine the relationship between the respondents' BAC levels and the number of units that they consumed. Table 7.5 shows the mean number of units consumed by males and females during each drinking episode that resulted in corresponding BAC levels. The table also shows the number of

participants who drank at each of the levels and the total number of binge episodes. To meet the 100-149mg% BAC, males consumed a mean of 11.7 units ( $sd = 3.4$ ); females consumed 7.8 units ( $sd = 1.8$ ). When defined according to the traditional criterion for binge drinking (8 units), males had an average BAC of 60-79mg%, which is lower than the legal driving limit. According to the traditional criterion (6 units), females' average BAC was between 80-99mg%, which corresponds to minor impairment.

Table 7.5

*Peak BAC Levels and Corresponding Effects and the Mean Number (and Standard Deviation) of Units of Alcohol Consumed per Drinking Episode, and the Number of Reported Episodes and Participants, Separately for Males and Females*

BAC level	Common Effects	Males				Females			
		<i>M</i>	<i>SD</i>	<i>Cases</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Cases</i>	<i>N</i>
20-59 mg%	Social drinking	5.9	2.3	387	36	3.6	1.6	674	93
60-79mg%	Below Drink drive limit	8.3	2.4	130	29	5.7	2.6	334	67
80-99mg%	Memory, judgement, and perception impaired	10.4	3.0	169	28	6.0	1.4	322	67
100-149mg%	Co-ordination impaired	11.7	3.4	280	36	7.8	1.8	782	97
150-199mg%	Vomiting may occur	14.7	4.0	246	30	9.6	2.0	658	93
200-299mg%	Blackout may occur	17.8	5.4	157	24	12.9	2.8	723	95
300-399mg%	Unconsciousness may occur	27.2	5.9	50	12	16.7	3.5	272	50
> 400mg%	Potentially fatal dose	30.9	2.5	12	5	22.3	5.7	140	33

### **Alcohol-Related Problems**

The mean total negative consequences score from the DrInC was 19.6 ( $sd = 8.9$ ) for males and 17.7 ( $sd = 9.1$ ) for females; the two sexes did not differ,  $t(155) = 1.15, p = .25$ . Participants' highest mean scores were on the negative impulse control consequences sub-scale, followed by physical, social responsibility, intrapersonal, and interpersonal consequences, respectively. The DrInC manual describes the impulse control consequences sub-scale as a collection of items that do not readily fit into the other categories. This sub-scale measures impulsive action, risk taking, physical fights, and

accidents (Miller, et al., 1995). Table 7.6 shows participants' ten most frequently reported negative consequences. Experiencing a hangover was highest of all. More than 94% of the participants indicated this happening "at least once or a few times" during the past three months; more than 93% indicated saying or doing embarrassing things while drinking.

Table 7.6

*The Percentage and Number of Participants' Ten Most Frequently Endorsed DrInC Items in the Last Three Months*

Ten most frequently endorsed DrInC items	Lowest Endorsement		Middle Endorsement		Highest Endorsement		Total <i>N</i> reported
	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	<i>N</i>
I have had a hangover after drinking <sup>†</sup>	60.1	95	34.8	55	--	--	150
While drinking, I have said or done embarrassing things <sup>†</sup>	62	98	27.2	43	4.4	7	148
I have been sick and vomited after drinking <sup>†</sup>	69.6	110	3.2	5	--	--	115
I have spent too much or lost a lot of money because of my drinking <sup>‡</sup>	47.5	75	17.7	28	5.7	9	112
When drinking, I have done impulsive things that I regretted later <sup>†</sup>	62.0	98	8.2	13	--	--	111
I have felt bad about myself because of my drinking <sup>†</sup>	55.1	87	6.3	10	--	--	97
I have broken things or damaged property while drinking or intoxicated <sup>*</sup>	15.2	24	32.3	51	12.0	19	94
Because of my drinking, I have not eaten properly <sup>†</sup>	48.7	77	7.6	12	--	--	89
I have smoked tobacco more when I am drinking <sup>‡</sup>	23.4	37	10.8	17	20.9	33	87
While drinking or intoxicated, I have been physically hurt, injured, or burned <sup>*</sup>	13.9	22	25.9	41	8.2	13	76

*Note.* Lowest Endorsement = <sup>†</sup>has happened once or a few times; <sup>‡</sup>has happened a little; <sup>\*</sup>has almost happened.

Middle Endorsement = <sup>†</sup>has happened once or twice a week; <sup>‡</sup>has happened somewhat; <sup>\*</sup>has happened once. Highest Endorsement = <sup>†</sup>has happened daily or almost daily; <sup>‡</sup>has happened very much; <sup>\*</sup>has happened more than once.

Male students ( $M = 13.97$ ,  $sd = 7.89$ ) scored significantly higher on the RAPI questionnaire than female students ( $M = 10.47$ ,  $sd = 7.26$ ),  $t(153) = 2.55$ ,  $p < .05$ . There were also differences in the frequency with which males and females endorsed problems occurring during the prior three months (see Table 7.7). For instance, 66% of the male students reported that they had tried to reduce their alcohol consumption and that they were developing a tolerance for alcohol. In contrast, the female students most frequently cited problems related to fulfilling academic roles (e.g., missing a day from school or work and not studying for a test).

Table 7.7

*The Number and Percentage of Males' and Females' Five Most Frequently Endorsed RAPI Items in the Last Three Months*

Rank		Total reported		1-2 times		3-5 times		6-10 times		More than 10 times	
		<i>N</i>	%	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%	<i>n</i>	%
Male participants											
1	Tried to cut down on drinking	27	66	14	34	5	13	5	13	3	7
2	Felt that you needed more alcohol than you used to use in order to get the same effect	27	66	16	39	6	15	4	10	1	2
3	Had a bad time	26	63	15	37	8	20	3	7	--	--
4	Missed out on other things because you spent too much money on alcohol	25	61	20	49	4	10	1	2	--	--
5	Missed a day (or part of a day) of school or work	23	56	7	17	13	32	2	5	1	2
Female Participants											
1	Missed a day (or part of a day) of school or work	73	62	48	41	18	15	6	5	1	1
2	Had a bad time	69	59	49	42	18	15	2	2	--	--
3	Not able to do your homework or study for a test	64	55	53	45	10	9	1	1	--	--
4	Felt that you needed more alcohol than you used to use in order to get the same effect	63	54	28	24	23	20	9	8	3	3
5	Suddenly found yourself in a place that you could not remember getting to	63	54	32	27	24	21	7	6	--	--

The DrInC questionnaire was factor analysed in an attempt to identify the factor structure of it. The subscales reported in DrInC questionnaire by Miller, et al. (1995) were derived through inter-rater agreement rather than by a factor analysis of the items. In factor analysing the items, the relationship between the factor scores derived from the

DrInC and student's alcohol consumption measures was assessed. Three of the DrInC items<sup>4</sup> were not endorsed by any of the respondents and were not included in the analysis. A correlation matrix of the DrInC items showed that 41% of the coefficients were significant, thus confirming that there were adequate relationships among the items on which to base a factor analysis. Bartlett's test of sphericity was significant (2406.0,  $p < .001$ ) and Kaiser-Meyer-Olkin's measure of sampling adequacy was .70, thus confirming that the analysis could be carried out with confidence.

The extraction of factors was completed with principal-axis factoring and a varimax rotation. The model was constrained to six factors, in line with the model proposed by Miller, et al. (1995); a scree plot also supported the six-factor solution. Items with loadings lower than .30 were considered *not to load* on a factor. Table 7.8 shows the rotated factor matrix of the six-factor solution. The factor solution included 43 of the 47 original DrInC items. Although the resulting factors did not coincide with the sub-scales described in the DrInC manual (Miller et al., 1995), they did provide an interpretable solution.

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<sup>4</sup> Item 7 = My ability to be a good parent has been harmed by my drinking. Item 41 = I have been arrested for driving while under the influence of alcohol. Item 44 = I have been suspended/fired from or left a job or school because of my drinking.

Table 7.8

*Factor Loadings (.30 and greater) of the Principle Axis-Factoring Six-Factor Varimax Rotated Solution of the DrInC*

Sub-scale	Item	Factor					
		1	2	3	4	5	6
Intra-	I have been unhappy because of my drinking	.57					
Intra-	When drinking my personality has changed for the worse	.54					
Intra-	I have felt bad about myself because of my drinking	.54	.32				
Inter-	A friendship or close relationship has been harmed by drinking	.52					
Inter-	My marriage or love relationship has been harmed by my drinking	.49					
Intra-	I have felt guilty or ashamed because of my drinking	.46	.38				
Inter-	While drinking I have said harsh or cruel things to someone	.45		.34			
Inter-	I have lost a marriage or close love relationship because of my drinking	.45					
Inter-	My family or friends have worried or complained about my drinking	.36					
Impulse	When drinking, I have done impulsive things that I regretted later	.34			.33		
Intra-	My drinking has got in the way of my growth as a person		.74				
Intra-	Because of my drinking, I have not had the life that I want		.65				
Intra-	My spiritual or moral life has been harmed by my drinking		.56				
Intra-	I have lost interest in activities and hobbies because of my drinking		.51				
Physical	My physical health has been harmed by my drinking		.41				
Impulse	I have had an accident while drinking or intoxicated			.55			
Impulse	While drinking or intoxicated, I have injured someone else			.52			
Impulse	I have taken foolish risks when I have been drinking or intoxicated			.49			
Impulse	I have broken things or damaged property while drinking or intoxicated			.43			
Impulse	I have had trouble with the law (other than driving while intoxicated) because of my drinking			.40			
Social	I have gotten in trouble because of my drinking	.39		.39			
Inter-	While drinking, I have said or done embarrassing things			.38			
Physical	While drinking or intoxicated, I have been physically hurt, injured, or burned			.38			
Impulse	I have gotten into a physical fight while drinking			.36			
Social	I have failed to do what is expected of me because of my drinking				.60		
Social	I have missed days of work or school because of my drinking				.50		
Social	The quality of my work has suffered because of my drinking		.37		.49		
Impulse	My drinking has caused me to use other drugs more				.47		
Physical	Because of my drinking, I have not eaten properly				.39		
Physical	I have had a hangover because of my drinking				.38		
Physical	My sex life has suffered because of my drinking				.36		
Physical	After drinking, I have had trouble with sleeping, staying asleep, or nightmares				.34		
Impulse	I have smoked more when I am drinking				.31		
Control	Drinking has helped me have a more positive outlook on life					.57	
Control	Drinking has helped me relax					.52	
Control	When drinking, my social life has been more enjoyable					.51	
Control	I have enjoyed the taste of beer, wine, or liquor					.45	
Social	I have had money problems because of my drinking				.32	.36	.33

Social	I have lost a friend because of my drinking	.30	
Inter-	My drinking has damaged my social life, popularity, or reputation		.53
Social	I have spent too much or lost a lot of money because of my drinking	.35	.44
Impulse	I have been overweight because of my drinking		.40
Inter-	My family has been hurt by my drinking		.37
Physical	My physical appearance has been harmed by my drinking	.34	.36

The first factor in the six-factor solution comprised eleven items. Four of these items are on the intrapersonal subscale of the DrInC, five are on the interpersonal subscale, one is on the impulse scale, and one is on the social responsibility scale. The intrapersonal items focus on feeling unhappy, guilty or ashamed, bad about oneself, and having adverse change in personality because of drinking. The interpersonal items are related to relationships (e.g., friends, loved ones, and family) that have been harmed by drinking. These interpersonal and intrapersonal items are related to one another (e.g., relationship conflicts because of drinking would understandably make a person feel bad, unhappy, or ashamed). Thus, Factor 1 was concerned primarily with difficult relationships because of drinking and was named *Relationship Difficulties*.

The second factor comprised eight items. Five items are from the intrapersonal subscale of the DrInC; one is from the social responsibility subscale; one is from the physical subscale; and one is from the interpersonal subscale. These items focus on alcohol interfering with personal growth, spiritual life, interests and activities, and having the kind of life one wants. Factor 2 was called *Harm to Personal Growth*.

The third factor comprised eleven items. Six of the items are from the impulse subscale of the DrInC; one is from the social responsibility subscale; and two each are from the interpersonal and physical subscales. All of these items were concerned with having accidents, injuries to oneself or others, taking risks, damaging property and getting in trouble. Factor 3 was termed *Inappropriate Behaviour*.

The fourth factor comprised eleven items. Four of the items are from the social responsibility subscale of the DrInC; four are from the physical subscale; and three are from the impulse subscale. Five items focused on role fulfilment (e.g., missing work or school, poor work quality, not doing what is expected, a sex life that has suffered, and not eating properly). The remaining items were related to difficulties in role fulfilment (e.g., the use of other drugs, experiencing hangovers, doing impulsive things, and not sleeping properly). Factor 4 was termed *Lack of Role Fulfilment*.

The fifth factor comprised seven items. Four of these items are from the control subscale of the DrInC; two are from the social responsibility subscale; and one is from the interpersonal subscale. The items with the highest loadings were from the control scale; thus Factor 5 was termed *Control*.

The sixth factor comprised six items. Two of the items are from the interpersonal subscale of the DrInC; two are from the social responsibility subscale; one is from the physical subscale; and one is from the impulse subscale. Four of the items focused on harm to one's reputation, physical appearance, and family. Two of the items were concerned with spending too much money on alcohol. Factor 6 was termed *Harm to Appearance*.

The variance explained by each factor and the corresponding eigenvalues are as follows: 15.0% and 7.06 for Factor 1 (Relationship Difficulties), 5.5% and 2.57 for Factor 2 (Harm to Personal Growth), 5.3% and 2.49 for Factor 3 (Inappropriate Behaviour), 4.9% and 2.28 for Factor 4 (Lack of Role Fulfilment), 4.3% and 2.02 for Factor 5 (Control), and 4.2% and 1.98 for Factor 6 (Harm to Appearance). Cronbach's Alpha was calculated, and the results are as follows: Factor 1 ( $\alpha = .79$ ), Factor 2 ( $\alpha = .75$ ), Factor 3 ( $\alpha = .74$ ), Factor 4 ( $\alpha = .69$ ), Factor 5 ( $\alpha = .65$ ), and Factor 6 ( $\alpha = .58$ ).



Table 7.9 shows the mean and standard deviations of each of the DrInC factor subscales. Males students reported most negative consequences in the Inappropriate Behaviour subscale and this was significantly higher than the females,  $t(156) = 2.43, p < .05$ . Female students most frequently reported Lack of Role Fulfilment problems. Male students reported fewest problems for Relationship Difficulties, whilst for female students it was Harm to Personal Growth.

Table 7.9

*Rank Orders, Means, and Standard Deviations of the DrInC Factor Scales for Males and Females Separately*

Factor No.	Factor Name	Male			Female		
		Rank	<i>M</i>	<i>SD</i>	Rank	<i>M</i>	<i>SD</i>
1	Relationship Difficulties	5	.40	.27	4	.35	.29
2	Harm to Personal Growth	4	.41	.37	5	.30	.28
3	Inappropriate Behaviour	1	.67	.41	2	.50	.35
4	Lack of Role Fulfilment	2	.56	.35	1	.60	.31
6	Harm to Appearance	3	.42	.34	3	.41	.34

Bivariate correlations among the DrInC factor scores and alcohol consumption measures are shown in Table 7.10, separately for male and female participants. The intercorrelations among the consumption variables are high for both males and females. There is only one notable intercorrelation among the factor scores and this only for the males: harm to personal growth and relationship difficulties was positively correlated.

Table 7.10

*Correlation Matrix of Males' and Females' DrInC Factors Scores, Average Weekly Alcohol Consumption, and Binge Drinking (Defined by Traditional and BAC Criteria)*

	1	2	3	4	5	6	7	8
1. Av. Weekly Consumption	---	.85 <sup>***</sup>	.74 <sup>***</sup>	ns	ns	.53 <sup>***</sup>	ns	ns
2. Traditional Binge	.87 <sup>***</sup>	---	.82 <sup>***</sup>	ns	ns	.38 <sup>°</sup>	ns	ns
3. Peak BAC > 99mg% Binge	.80 <sup>***</sup>	.86 <sup>***</sup>	---	ns	ns	.38 <sup>°</sup>	ns	ns
4. Lack of Role Fulfilment	ns	.21 <sup>°</sup>	.19 <sup>°</sup>	---	ns	ns	ns	ns
5. Inappropriate Behaviour	.27 <sup>**</sup>	.22 <sup>°</sup>	ns	ns	---	ns	ns	ns
6. Harm to Appearance	.32 <sup>**</sup>	.25 <sup>**</sup>	ns	ns	ns	---	ns	ns
7. Relationship Difficulties	ns	ns	ns	ns	ns	ns	---	.54 <sup>***</sup>
8. Harm to Personal Growth	ns	-.19 <sup>°</sup>	ns	ns	ns	ns	ns	---

Note. Male participants ( $n = 41$ ) are shown above the diagonal, and female participants ( $n = 117$ ) are shown below the diagonal. <sup>°</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$ . <sup>\*\*\*</sup> $p < .001$ .

Hierarchical multiple regressions were conducted to determine the relative contributions of average weekly alcohol consumption, binge drinking (traditional measure), and binge drinking (BAC measure) over and above gender in predicting alcohol-related problems. Each of the factor scores were entered as the dependent variable in separate analyses. In each analysis gender was entered as Step 1 and average weekly alcohol consumption, binge drinking (traditional measure), and binge drinking (BAC measure) were entered as Step 2. The predictor variables in Step 2 were selected using forward selection. In forward-selection, the variables are entered one at a time starting with the highest value of the standardised beta (at the  $p < .05$  level). This process continues until no additional variables are significant.

Before proceeding with the multiple regression analyses, the data were examined to ensure that they did not violate the assumptions of the tests. The following adjustments were made to ensure that there were no problems with lack of linearity or no outliers in the data: Regression Number 1 the removal of 3 outliers; Regression Number 2 the removal of 6 outliers; Regression Number 3 the removal of 2 outliers; Regression Number 4 the

removal of 2 outliers; and Regression Number 5 the removal of 4 outliers. The data were further tested for homoscedasticity: the standardised residuals were plotted against the standardised predicted values. The spread of the residuals at every set of values in the independent variables was equal, thus confirming the homoscedasticity of the distributions. The results are shown in Table 7.11.

Table 7.11

*Results of a Hierarchical Multiple Regression Analyses of the Ability of Average Weekly Alcohol Consumption and Binge Drinking (Defined by Traditional and BAC Criteria) From the TLFB to Predict Alcohol-Related Problems*

Regression Number	Dependent Variable	Independent variables in order of entry	$\Delta R^2$	$\beta$ in final equation
1	Relationship Difficulties	1. Gender	.00	-.02
2	Harm to Personal Growth	1. Gender	.00	-.07
		2. Binge Drinking (BAC criterion)	.05	-.22**
3	Inappropriate Behaviour	1. Gender	.04	-.16*
		2. Average Weekly Alcohol Consumption	.04	.20*
4	Lack of Role Fulfilment	1. Gender	.02	.15
		2. Binge Drinking (traditional criterion)	.03	.18*
5	Harm to Appearance	1. Gender	.00	.15
		2. Average Weekly Alcohol Consumption	.23	.49***

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

In the first analysis, neither gender nor any of the alcohol consumption variables could predict relationship difficulties.

In the second analysis, gender did not predict Harm to Personal Growth. After controlling for gender, binge drinking (using the BAC criterion) significantly predicted 5%

of the variance. This relationship was negative: therefore, participants who binged more frequently were less likely to report Harm to Personal Growth.

In the third analysis, gender predicted Inappropriate Behaviour accounting for 4% of the variance: it was male drinkers who engaged in more inappropriate behaviour. After controlling for gender, average weekly alcohol consumption significantly predicted inappropriate behaviour accounting for a further 4% of the variance.

In the fourth analysis, gender did not predict Lack of Role Fulfilment. After controlling for gender, binge drinking (using the traditional criterion) significantly predicted Lack of Role Fulfilment accounting for 3% of the variance.

In the final analysis, gender did not predict Harm to Appearance. After controlling for gender, average weekly alcohol consumption significantly predicted Harm to Appearance accounting for a further 23% of the variance.

## Discussion

### *Alcohol Consumption*

The students who took part in this study were drinking at hazardous levels. Their average weekly alcohol consumption in the 12 weeks prior to taking part in the study was 34 units for males and 26 units for females. The students drank on approximately three days per week, and binge drank—using the gender specific binge drinking criteria—on two of those days.

It was possible to assess the students' drinking patterns in the weeks before and after they attended the university. They drank significantly more alcohol after the start of the university term than before it started. Male participants increased their consumption by an average of 62 percent, and females, by more than 35 percent. Weekly plots of their average weekly drinking showed a dramatic increase in students' drinking after the term

started. For instance, in the first week of the term, male students increased their consumption by more than 73 percent and females by more than 80 percent. Similarly, students more than doubled their frequency of binge drinking after the term started. In short, attending university appears to have had a dramatic effect on the drinking behaviour of these participants.

Each drinking episode was examined from information collected during the TLFB interview. Respondents were asked to estimate, along with the quantity consumed, the duration of the drinking episode. From this information, and the participant's gender and weight, an algorithm was used to estimate the BAC for each drinking episode. To meet a standard level of impairment (i.e., a BAC level of between 100-149mg%, or an *average* level of being drunk), males needed to drink 11.7 units and females 7.8 units<sup>5</sup>. These levels are considerably higher than the traditional criteria for binge drinking (i.e., 8 units for males and 6 units for females).

The data were inspected to determine the BAC that a student reached when he or she drank as defined by the traditional binge drinking criteria. Male students who consumed eight units on one occasion had a BAC level below that of the drink drive limit (e.g., a BAC of 60-79mg%), which is just above the level defined as social drinking. Female students who consumed six units on one occasion had a BAC that corresponded to minor impairment (e.g., a BAC of 80-99mg%). Therefore, the traditional definition of binge drinking does not identify, for males especially, a drinking session that would result in significant impairment.

This study validated two retrospective alcohol consumption measures against the TLFB interview, which is regarded as the most detailed and most accurate retrospective

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<sup>5</sup> Note. There were significantly more incidences of binge drinking using the traditional binge drinking criterion than the BAC criterion of 100mg% or more.

measure of drinking (Sobell & Sobell, 1992; 1995). Both of the questionnaires overestimated alcohol consumption compared to the interview. In terms of average weekly alcohol consumption, the TADD overestimated drinking by 23 percent (e.g., 6.5 units) while the KAT overestimated by 43 percent (e.g., 12.1 units). Previous research has shown that QF methods have both over-estimated (Midanik, et al., 1987) and underestimated (Sobell, Cellucci, Nirenberg, & Sobell, 1982) drinking in comparison to retrospective diary methods.

Students might have over-estimated their consumption with the QF methods because, rather than estimating their aggregate consumption during the previous three months, they reported their most recent drinking habits. It will be recalled that the students had significantly increased their consumption after the start of term. Therefore, the student's average weekly alcohol consumption for the week prior to taking part in the study—as estimated from the TLFB—was compared to the three-month estimates taken from the TADD and KAT. The TADD overestimated consumption by 4.3 units per week, and the KAT by 9.9 units. Although the KAT and TADD questionnaires more closely estimated the previous weeks' drinking than the overall estimate, the KAT continued to overestimate drinking in comparison to the TADD.

Although both of the questionnaires overestimated average weekly alcohol consumption, the correlations between both of the questionnaires and the TLFB were high. Importantly, the correlation between the TADD and the TLFB was significantly higher than was correlation between the KAT and the TLFB. Two hierarchical regression analyses showed that (a) the TADD explained significantly more variance in the TLFB than the KAT, and (b) the KAT did not explain any unique variance in the TLFB that the TADD did not.

The TADD questionnaire also compared favourably to the TLFB interview in terms of estimating the number of days drinking and the number of binge episodes that the participants reported. The TADD overestimated the number of days drinking by less than 17 percent; likewise, it overestimated binge drinking—using both the traditional measure and the BAC measure of 99mg% or greater—by no more than 20 percent in each case. The number of days drinking and binge drinking episodes measured by the TADD were significantly correlated with the corresponding variables measured by the TLFB. It will be recalled that the KAT is impractical for estimating drinking days or binge episodes.

The results of the study confirmed that the TADD gave a significantly more accurate estimate of respondents' average weekly alcohol consumption than did the KAT when each was compared against the TLFB interview. Given these findings, it is clear that there are benefits of the TADD over standard QF measures. However, the advantage that the TADD has over the QF method is not without cost. The TADD is a more detailed instrument than are most QF methods. It takes approximately ten minutes to complete compared to three minutes for many QF measures. However, given the importance of obtaining valid and reliable measures of alcohol consumption, this cost is minimal.

It was also confirmed that the TADD provided a good alternative to the TLFB interview. The difference obtained with these two measures was minimal. It remains for future research to establish whether the minimal differences between these measures would invalidate the results of outcome trials, and whether the time, cost, and effort of the TLFB warrant using it.

### ***Alcohol-Related Problems***

The students reported a range of negative consequences of their drinking. There were no differences on the number or types of problems (defined by the DrInC subscales)

reported by males and females on the DrInC questionnaire. The most frequently cited negative consequence was experiencing a hangover, followed closely by doing embarrassing things: more than 90 percent of students experienced either of these consequences during the previous three months. The student's most frequently cited problems were on the Impulse Control sub-scale of the DrInC the items making up this sub-scale were described by Miller et al. (1995) as those that do not, "...fit into one of the above categories [physical, social, interpersonal, or intrapersonal sub-scales]" (p. 10).

The RAPI, in contrast, did reveal two differences between males and females. First, male participants scored significantly higher on the RAPI than did females. Second, the problems reported by males were different from those reported by females: males most frequently reported that they had tried to cut down their drinking and that they felt that they were developing a tolerance for alcohol; females most frequently reported that they had missed work, had had a bad time, or had not studied for a test. The RAPI is a short questionnaire that covers a wide range of negative consequences, and unlike the DrInC it does not readily divide into sub-categories.

Although the DrInC does have sub-categories of various alcohol-related problems, it was developed primarily for treatment-seeking individuals, rather than for student drinkers, as was the RAPI. Nevertheless, the extensive range of problems identified from the DrInC suggests that this questionnaire is useful for this population. However, the factor structure of the questionnaire might be quite different for students than for dependent drinkers. Furthermore, an attempt to factor analyse the DrInC by Miller et al. (1995) did not provide clinically useful groupings of the items. In the present study, the DrInC was factor analysed to identify a suitable factor structure for student drinkers.

The present findings did not replicate the factor structure proposed by Miller et al. (1995). However, the findings did provide an interpretable, albeit weak, solution of the



factor items. As Miller et al. suggested, the data were best represented by six factors. Although the eigenvalues guiding the factor selection were greater than one, the variance explained by each factor was relatively weak, particularly the control and harm to appearance factors. In contrast to Miller et al., only one factor—Control—contained more than 50 percent of the DrInC sub-scale items. Furthermore, only two of the factors (i.e., Control and Inappropriate Behaviour) had 50 percent or more of the items from one of the DrInC sub-scales.

The student's problems were best represented on five sub-scales. Relationship Difficulties comprised problems related to harm to relationships and feelings of unhappiness (possibly as a result of harmed relationships) as a result of drinking. Harm to Personal Growth comprised items that represented harm to a person's interests, activities, life (spiritual and other harm), and growth as a person. Inappropriate Behaviour comprised items that related to accidents, injuries (to self and others), risk-taking, fights, damaging property, and getting in trouble. Lack of Role Fulfilment represented either not fulfilling roles (e.g., missing school, not doing what is expected) or activities that would directly interfere with doing so (e.g., having a hangover, using other drugs). Harm to Appearance comprised items that represented both physical harm (e.g., being overweight) and harm to a person's reputation.

Unlike female students, male students reported experiencing most problems that were represented by the Inappropriate Behaviour subscale. Furthermore, male students scored significantly higher on Inappropriate Behaviour than did females. Thus, confirming that there was a gender difference for type of drinking problems, as suggested by the RAPI.

## ***Relationships Between Alcohol Consumption and Alcohol-Related Problems***

The study assessed relationships between excessive drinkers' alcohol consumption and their drinking problems. Of the alcohol consumption measures (i.e., average weekly consumption, days drinking, binge drinking traditional criterion, and binge drinking BAC criterion), average weekly consumption that had the highest correlation with both the DrInC and RAPI questionnaires. Borsari, Neal, Collins, and Carey (2001) found that average weekly consumption explained more of the variance in drinking problems from the RAPI than did either binge drinking using traditional criterion or using peak BAC levels.

Although the RAPI and DrInC had their highest correlation with average weekly consumption, the strength of these correlations was only modest. It will be remembered that the inclusion criteria stipulated that all participants had to be excessive drinkers and as such the majority of participants were experiencing problems (e.g., more than 90% experiencing hangovers and doing embarrassing things when intoxicated). Therefore, the strength of the relationships between alcohol consumption and problems was weakened by a *ceiling / floor effect*.

This study aimed to establish whether specific drinking patterns predicted specific drinking problems. The measures expected to be predictive of problems were (a) gender, (b) average weekly alcohol consumption, (c) binge drinking (using the traditional measure), and (d) binge drinking (using a BAC of 100mg% or more).

Drinking measures did differentially predict the subscales of alcohol-related problems, although in one case, there was no relationship at all—neither gender nor any of the drinking variables predicted relationship difficulties. However, the items that made up this sub-scale were the least likely to be reported by males and only Harm to Personal

Growth items were reported less by females. When drinking measures did predict drinking problems, the relationships were at best modest.

Harm to Personal Growth was negatively predicted by binge drinking defined by BAC levels of 100mg% or more. BAC levels that reach 100mg% or more are considered to represent levels of drinking that would result in impairment. Therefore, students who drank to levels of impairment were less likely to report that alcohol had harmed their personal growth. In contrast, excessive drinking students who binged less frequently did report harm to their personal growth.

Inappropriate behaviour was predicted by both gender and average weekly alcohol consumption. As consumption increased so did inappropriate behaviour. The items that represented inappropriate behaviour are more commonly associated with binge drinking (see, for example, Wechsler et al., 1994, 1998, 2002). The lack of relationship between binge drinking and inappropriate behaviour found in this study can be explained in two ways. First, the inclusion criteria used in this study (see above) might have weakened the relationship: the majority of students were binge drinking and this would have weakened the ability of binge drinking to predict problems. Second, binge drinking is viewed dichotomously using a pre-set criterion, and the measure does not account for how much a person drinks above this criterion. Nevertheless, the current findings are reasonable: the more alcohol a person consumes the more he or she will engage in inappropriate behaviour.

It was binge drinking (using the traditional criterion) that predicted lack of role fulfilment. Those students who experienced more hangovers, missed work or lectures, and did not do what is expected of them binge drank more frequently. Interestingly, average weekly alcohol consumption was not a predictor of lack of role fulfilment. Therefore, the

low level binge drinking (e.g., using the traditional criteria) was sufficient to produce negative consequences resulting in lack of role fulfilment.

Students who reported heavier drinking also reported more harm to their appearance or to their reputation as a result of their drinking. The variance explained in harm to appearance by average weekly consumption was substantial (e.g., 23 percent). In this instance, limiting the study to hazardous drinkers might have strengthened the relationship between harm to appearance and average weekly alcohol consumption: one might expect harm to appearance to occur only after drinking reaches a certain level.

This study has confirmed that drinking problems can be predicted by a variety of drinking measures. For instance, inappropriate behaviour and harm to appearance were predicted by heavy weekly alcohol consumption rather than by binge drinking. Harm to personal growth was protective against binge drinking and was unrelated to average weekly consumption. Lack of role fulfilment was predicted by binge drinking, but not by average weekly alcohol consumption.

This study did not fully confirm that binge drinking defined by BAC would be a better predictor of problems than traditional measures. It was assumed that drinking to impairment (defined through BAC estimates) would be a more sensitive measure of problems than using pre-set drinking levels. It was argued above that drinking at the traditional binge drinking limits could result in very minor levels of impairment (e.g., when an individual has a large body mass and drinks over a protracted period). As such, it was considered that when resulting BAC levels were low then alcohol-related negative consequences would be less likely to occur. However, this study did not consider the situational factors of drinking that could increase the likelihood of experiencing problems. For instance, drinking in bars or at parties with heavy drinking peers might have a greater influence on negative consequences than might the amount of alcohol consumed.

There are three limitations of this study that deserve comment. First, the study showed that after students attended university there were substantial increases in alcohol consumption and binge drinking. However, without a control group of non-student peers, it is impossible to confirm if it was attending university that *caused* drinking to increase rather than other factors (e.g., maturation factors). Second, although the DrInC questionnaire provides a variety of alcohol-related problems it is not entirely suitable for students. The factor analysis of the DrInC, although providing an interpretable solution for students, was relatively weak and as such limits the relationships found between alcohol consumption and related problems. A representative measure of an alcohol-related problem questionnaire for students awaits future research. Third, this study focused exclusively on heavy drinking students rather than all students irrespective of their drinking status. As such the predictors of the subcategories of drinking problems were mostly weak. The one situation where a drinking measure was a substantial predictor of problems was quite possibly due to the selected sample. Future research would benefit from a widespread survey of student drinking. A further recommendation would be to evaluate situational factors such as where drinking took place (i.e., in bars or at home) and with whom (i.e., with a group of friends, with a partner, or in isolation) along with consumption measures.

## CHAPTER 8

### General Discussion

Three studies are described in this thesis. The first two studies evaluated two computerised opportunistic brief alcohol interventions for excessive drinkers. Study One was conducted with university students. Study Two recruited a sample of general hospital patients. Study Three evaluated a new alcohol-consumption questionnaire and examined the relationship between patterns of alcohol consumption and alcohol-related problems. This chapter discusses the findings of all three studies and the relationships among them, and it makes recommendations for future research.

Studies One and Two evaluated two computerised brief alcohol interventions. The first of the two interventions, the Computerised Brief Intervention (CBI), was designed to motivate participants to reduce their alcohol consumption by directly addressing their excessive consumption. The intervention achieved this aim by combining aspects from several treatment approaches (e.g., motivational interviewing, stages of change, alcohol expectancies). The second of the two interventions, the Computerised Brief Intervention-Enhanced (CBI-E) was designed to motivate participants to reduce their alcohol consumption both directly, by addressing their excessive consumption, and indirectly, by addressing their general motivational patterns with the Personal Concerns Inventory.

The CBI adheres to the principles of motivational interviewing (Miller & Rollnick, 2002). The intervention is delivered in an empathic manner, uses reflective listening, and seeks to understand the participant's perspective without judging or blaming. The intervention seeks to develop a discrepancy between the participants' positive expectancies from drinking (i.e., the perceived good things from drinking) and the actual outcome (e.g.,

the “not so good” things). The ambivalence that people experience when their behaviour includes both positive and negative aspects is viewed as a normal process.

The CBI also adheres to the stages-of-change model (Prochaska & DiClemente, 1983). The intervention is appropriate for people who are in different stages of change. For instance, the screens at the beginning of the intervention are designed to give people the feedback that their drinking is excessive and they might be risking harm. Information that highlights the risk of harm is particularly appropriate for people who are in precontemplative or contemplative stages of change. Later in the program, the participant is asked to select a drinking goal that would be most appropriate for him or her (i.e., to cut down, stop drinking, or not change). People who are in the preparation or action stages-of-change are directed to strategies that would help them to make their desired behaviour change.

Finally, the CBI complies with negative alcohol-expectancy theory (Jones, 2004). The intervention seeks to highlight participants’ negative expectancies from drinking. It achieves this aim by asking the participants to list some of the not-so-good things about drinking for them. Participants typically answer this question in terms of short-term effects (e.g., having a hangover, spending too much money, having fights/arguments). It also asks participants to consider the longer-term negative expectancies (i.e., to consider the future outcome if their drinking were to continue unchanged).

The CBI-E, in addition to the elements of the CBI, includes a method of assessing participants’ motivational patterns for reaching their goals. Participants receive feedback about these motivational patterns in order to assist them to overcome any motivational difficulties in their goal pursuits. As described by the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a), if people are unable to gain positive affective changes from their non-drinking goals, they are more likely to use alcohol as a means of

doing so. The CBI-E used a computerised version of the Personal Concerns Inventory (PCI; Cox & Klinger, 1999), to assess participants' motivational patterns. The PCI asks participants to describe their concerns in various areas of life and the goals that they have to resolve them. The interviewer next discusses the motivational profile for each goal pursuit and outlines to the participant the potential motivational difficulties surrounding each goal, using the techniques of Systematic Motivational Counselling (SMC; Cox, Klinger, Blount, 1999; Cox & Klinger, 2004b).

Study One evaluated the effectiveness of these two interventions with excessive drinking university students. A total of 88 students participated in the study—70% for cash payments and the remainder as a requirement for their degree in psychology. Although all of these students were excessive drinkers, many of them were in the precontemplative stage (37%) or contemplative stage (41%) rather than the action stage (22%) according to the Readiness To Change Questionnaire (RTC; Heather, Gold, & Rollnick, 1991). Hence, the financial reward or course requirement was perhaps the main incentive for students to take part in the study rather than a genuine concern about their excessive alcohol consumption. The average weekly alcohol consumption of students in this first study was heavy. Males consumed on average 35 units per week and females, 26 units. Engs et al. (1996) defined heavy drinking as consumption that exceeded 30.8 units per week for males and 20.5 units per week for females. The students, on average, binge drank twice per week; thus they met the Wechsler et al. (1994) criteria for frequent binge drinking. Although they met these heavy drinking criteria, many students did not consider themselves to be heavy drinkers. In fact, the recruitment of participants was hampered when advertisements were directed at “Heavy social drinkers.” Recruitment was improved—from an average of 1.2 participants per week to an average of 10.4 per week—by changing the advertisement to “Drinkers needed for research.”



Consistent with their heavy drinking status, the students in this study reported a range of negative consequences of their drinking. They reported problems that were related to a *lack of role fulfilment* (e.g., experiencing hangovers, missing classes) and *inappropriate behaviour* (e.g., saying or doing embarrassing things, breaking things, injuring oneself). These problems are consistent with the findings with heavy-drinking and binge-drinking students in the United States (e.g., Engs et al., 1996, Wechsler et al., 1993, 1997, 1999, 2001).

The first study found that male students who received a brief intervention significantly reduced their average weekly alcohol consumption, unlike those in the control group. Female students reduced their average weekly consumption irrespective of their group allocation. Previous brief intervention studies have reported similar gender effects (e.g., the WHO brief-intervention study, Babor & Grant, 1992). It seems that females are particularly receptive to the implicit message that taking part in a study for excessive drinkers conveys (i.e., that their drinking should be a target for change). The differences between males and females might be explained by differences in their desire to avoid harm. Females tend to score higher than males on harm avoidance (i.e., they are inclined more than males to avoid punishment and threatening situations). The female students in this study, as in previous research (e.g., Nixon & Parsons, 1989; Sher et al., 1995), scored significantly higher on harm avoidance than the males.

Importantly, only the students (both males and females) who received a brief intervention significantly reduced their *binge* drinking. Unlike the control participants, they received specific information about drinking to intoxication and strategies for reducing it. Even though females in the control group reduced their overall consumption, they did not reduce their binge drinking. This was probably because they were unaware that drinking in binges might be harmful.

There were no significant differences between the effectiveness of the CBI and CBI-E. However, there was a trend for participants to fare better with the CBI-E. For instance, the average weekly consumption of all of the male participants in the CBI-E group was below the Department of Health's (DoH, 1996) safe limits for each of the twelve weeks of the follow-up. A significantly greater proportion of participants in both of the intervention groups than in the control group drank within the DoH's safe limits at the follow-up; however, there was a trend for the CBI-E group to have a greater improvement than the CBI group.

Study Two evaluated the same two interventions as Study One, but with general-hospital patients. A total of 45 general-hospital patients were assigned to one of the two interventions or a control group. Initially, recruitment was based on the results of a routine screening that was carried out by the admitting nurse on five general-medical wards and one surgical ward. However, many of the nursing staff failed to implement the screening. Because of this failure to implement the screening, many nurses tended to inform only those patients with a clearly identifiable alcohol problem (i.e., alcohol was the cause of their illness or injury) about the study. Consequently, many early-stage problem drinkers were overlooked.

After four months of disappointing referral rates, two additional screening procedures were implemented. Recruitment leaflets—that simply stated the inclusion criteria and study aims—were given to hospital outpatients who attended pre-operative assessment clinics and to those who attended day-case gastroenterology clinics. Because of these varied recruitment procedures, participants had a wide range of drinking levels. For instance, the majority of the inpatients, who were clearly identified as excessive drinkers, had very high levels of alcohol consumption, whereas those who were recruited from the clinics drank less. The average weekly consumption of participants ranged from

14 to 644 units of alcohol per week. The mean weekly alcohol consumption was 155 units for males and 60 units for females. Males consumed the equivalent of five bottles of whiskey per week, and females consumed the equivalent of two bottles.

In addition to their consumption levels, there were several notable differences between the participants in Study One and Study Two. Unlike the majority of the student sample who had low levels of dependency, the majority of the hospital sample had high levels of dependency. Accordingly, the number and type of problems reported by the samples differed. The hospital sample, for example, reported almost twice as many problems as the student sample. Furthermore, unlike the student sample the hospital sample reported problems related to their *appearance, their personal growth, a lack of role fulfilment, and relationship difficulties*. Also a greater proportion of the hospital sample was ready to change their alcohol use. In the hospital sample, 13 percent were in the pre-contemplative stage and 40 percent in the action stage of change, compared to 37 percent and 22 percent, respectively, in the student sample.

In Study Two, none of the three groups showed a significant change in average weekly alcohol consumption. However, there were trends in the expected direction; the lack of significant changes was probably due to the small sample sizes. When the participants in the two intervention groups were collapsed into one group (e.g., a brief-intervention group), there was a significant reduction in alcohol consumption. Furthermore, this reduction in consumption was meaningful in practical terms: participants who received a brief intervention reduced their consumption by an average of 35 units per week (i.e., a 52% reduction). On the other hand, the control participants did not change their consumption.

Significance tests showed that participants who were in the CBI-E group had better outcomes than those in the CBI group and control group. These participants significantly

reduced their drinking days and binge drinking. Again these reductions were practically meaningful: participants reduced their drinking days by more than one day per week and their binge drinking by almost three episodes per week. Participants in the CBI group had a reduction equivalent to that in the CBI-E group, although the change was non-significant. There was also a trend for the control participants to increase their days drinking by one-half a day per week and their binge drinking remained stable at one binge episode per week.

The results of Studies One and Two confirm that people who receive a computerised brief intervention can significantly reduce their alcohol consumption. This is somewhat surprising considering that the two samples differed significantly in their alcohol consumption and level of dependency. In contrast to the present findings, Heather (2001) suggested that opportunistic brief interventions are better suitable for early-stage problem drinkers (e.g., those in Study One) and that brief treatment is more suitable for dependent drinkers (e.g., those in Study Two).

The flexibility of the intervention and timing of the study were major factors determining the success of the intervention with dependent drinkers. The majority of the participants in Study Two had been admitted to hospital because of an alcohol-related illness or injury and were already contemplating changing their drinking before they received an intervention. These two factors (i.e., being admitted to hospital for an alcohol-related illness or injury and contemplating change) are important factors in naturally occurring change without a formal intervention (Orford, et al., 2002). Furthermore, the interventions amplified participants' negative expectancies from drinking by asking them to consider the future consequences of their drinking if they did not change. Doing this at a time when the negative consequences of the drinking are already salient can be particularly effective.

The interventions evaluated in this study capitalised on participants' naturally occurring shift in their motivation for change. Participants often stated that completing the intervention was like signing a contract for change. Importantly, very few participants who did not receive an intervention (i.e., those in the control group) were motivated enough to reduce or discontinue their drinking. It was more common for participants in the control group to resume drinking and at an even higher level than at baseline.

Taking the findings from Study One and Study Two together suggests that the CBI-E was more effective than the CBI. Recall that the CBI was enhanced—to the CBI-E—with a computerised version of the Personal Concerns Inventory (PCI; Cox & Klinger, 2004). The enhanced component of the CBI-E was very brief: it took approximately 15 minutes to complete. The PCI is not usually administered in such a short period of time, and the feedback from it is incorporated into longer-term work with a client (i.e., as Systematic Motivational Counselling; SMC, Cox & Klinger, 2004b). For students, and males in particular, just completing the PCI was beneficial. For instance, participants often commented on their difficulties in their goal pursuits whilst giving low ratings on certain scales of the PCI. Participants thereby made the connections between the assessment and the feedback that they later received. Typically, the participants in the hospital study did not make these spontaneous connections.

There are several reasons to believe that the hospital patients would have benefited from more time or additional sessions based on the PCI after leaving the hospital. First, many of the hospital patients were preoccupied with their physical health and found it difficult to identify concerns in other life areas. Second, the intensity of the CBI-E might have been too great for patients who were physically ill. Finally, a longer version of the PCI might be more appropriate for dependent drinkers who often commented that they would require many lifestyle changes in order to change the way in which they drink.

In summary, the computerised brief interventions successfully reduced the alcohol consumption and binge drinking of both the heavy and the dependent drinkers. The female heavy drinkers required minimal intervention to reduce their drinking. Simply a detailed assessment of their drinking was sufficient to bring about a significant reduction. This was not the case, however, for female dependent drinkers. These drinkers in the control group did not reduce their drinking from receiving just the assessment. On the other hand, male drinkers, irrespective of their level of dependency, benefited only from a computerised intervention.

There were some indications that the CBI-E was a more effective intervention than the CBI. For instance, there was a trend for student participants (especially males) in the CBI-E group to have better outcomes than those in the CBI. This trend might have reached significance had there been sufficient power to detect them. The hospital patients in the CBI-E group reported significant reductions in binge drinking and days drinking, unlike those in the CBI; however, although the CBI group did not report significant reductions in binge drinking and days drinking, the level of reductions were equivalent to the CBI-E group.

A general conclusion to be reached from the findings of both studies is that the CBI-E is the more appropriate intervention for students. The PCI component of the intervention, delivered in such a brief format, was neither too arduous nor too complex for the students. However, it appears that people with lower intellectual abilities, those preoccupied with a health concern, or those with greater levels of dependency would benefit from a more intensive PCI session. With such people, it would seem advisable to deliver the CBI-E in two sessions. The first session would include the CBI, and the second one, the PCI. In the case of hospital patients, this second session might best be delivered after the participant has been discharged from hospital. The benefits of the PCI session

could be maximised because the participants would be better able to thoroughly consider their concerns.

The thesis also sought to establish the correlates of students' drinking (see Study One in Chapters 4 and 5 and Study Three in Chapter 7). Chapter 5 describes correlates of students' alcohol consumption and alcohol-related problems that Study One identified. Consistent with earlier research (e.g., Bagby et al., 1992; Cloninger, 1987; Cooper et al., 1995; Nixon & Parsons, 1989; Sher et al., 1995; Stewart et al., 2001), coping motives and enhancement motives and novelty seeking were significant predictors of both alcohol consumption and alcohol-related problems. However, unlike previous research, this study demonstrated that higher scores on reward dependence were associated with heavier alcohol consumption. Particularly unexpected was more distal, personality factors explained more of the variance in alcohol consumption than did drinking motives.

Study One highlighted the importance of social influences on students' heavy drinking. First, students cited social motives as their most important reason for drinking. At the baseline assessment, in addition to coping and enhancement motives, reward dependence was associated with greater alcohol consumption. Reward-dependent people are sensitive to cues signalling reward, particularly social approval. Thus, the reward-dependent students probably drank in order to gain social approval. Social motives and excitement seeking at baseline continued to significantly predict alcohol consumption at the follow-up. That is, students who were higher on social drinking motives and novelty seeking at the baseline had higher levels of alcohol consumption at the follow-up. This implies that social reasons for drinking and novelty seeking are enduring correlates of excessive drinking. More importantly personality factors are perhaps the more resistant to change.

After controlling for the influence of alcohol consumption, it was coping motives, enhancement motives, and novelty seeking that predicted alcohol-related problems. Again, these findings replicated earlier research (e.g., Hosier, 2001; Sher et al., 1995; Stewart et al., 2001). Except for enhancement motives, these variables continued to predict alcohol-related problems at the follow-up. It seems likely that participants who drank to cope experienced more interpersonal problems related to drinking than other students, whereas those who were impulsive experienced more alcohol-related problems that were related to risk-taking or interpersonal conflicts. That is, specific types of drinking problems were probably related to specific patterns of alcohol consumption.

The third study (a) examined the relationship between drinking problems and patterns of alcohol consumption, and (b) tested the validity of a new questionnaire measure of alcohol consumption. A total of 158 university students met the inclusion criteria and participated. The drinking patterns of these participants mirrored those of participants in Study One. For instance, males consumed an average of 34 units per week and females 26 units per week, compared to 35 units and 26 units, respectively, in Study One. Also like those in Study One, participants had an average of two binge sessions per week.

The heavy drinking students in Study Three, consistent with previous research (e.g., Engs et al., 1996, Wechsler and colleagues, 1993, 1997, 1999, and 2001) and Study One, reported frequently experiencing alcohol-related problems, which were similar to the kinds of problems that the students in Study One reported (e.g., hangovers, missing classes, damaging property)<sup>1</sup>. Although there were no gender differences in responses to the DrInC questionnaire, males reported significantly more problems than females on the RAPI questionnaire. In addition, males reported different kinds of problems than females. For example, males reported problems related to developing a tolerance for alcohol and

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<sup>1</sup> Drinking problems in study three, as in Study One, were measured with the DrInC questionnaire.



trying to reduce drinking, whereas females reported missing work or school and having bad experiences because of drinking.

The DrInC questionnaire was factor analysed in order to identify its factor structure with students. It should be recalled that (a) the items included on the DrInC scales were identified through inter-rater agreement rather than factor analysis, and (b) the psychometric properties of the DrInC were identified with dependent drinkers rather than student drinkers. The factor analysis with students provided an interpretable solution—however, it is noted that there were several weak factors in the solution. Problems were grouped into the following categories: *relationship difficulties*, *harm to personal growth*, *inappropriate behaviour*, *lack of role fulfilment*, *control*, and *harm to appearance*. There was one gender difference. Males were significantly higher than females on problems related to inappropriate behaviour (e.g., taking risks; having accidents, injuries, or fights).

As discussed above, Engs et al. (1996) and Wechsler et al. (1993, 1997, 1999, 2001) reported that students experienced problems both as a result of heavy weekly alcohol consumption and frequent binge drinking. Study Three established that specific drinking patterns predicted particular types of problems. For instance, being male and engaging in heavy weekly drinking—rather than by binge drinking—were associated with inappropriate behaviour. Likewise, heavy weekly alcohol consumption rather than binge drinking were associated with harm to appearance. Recall that the harm-to-appearance scale includes items such as damage to one's reputation, being overweight, and harm to physical appearance. On the other hand, binge drinking rather than average weekly consumption were associated with a lack of role fulfilment. Lack of role fulfilment includes behaviours that either directly (e.g., missing classes, not doing what was expected) or indirectly (e.g., having a hangover, using other drugs) indicate that a person is disregarding what is expected of him or her. Binge drinking—defined as a BAC greater

100mg%—negatively predicted harm to personal growth (e.g., interference with personal growth, spiritual life, interests and activities, and the kind of life that one wants). That is, students who binge drank were less likely to report harm to their personal growth.

Study Three also hypothesised that binge drinking, defined in terms of the BAC that is reached, would better predict problems than would a specific number of units of alcohol consumed (e.g., 8 units for males and 6 units for females on one occasion). As described in Chapters 1, 3, and 7, BAC gives a better estimation of intoxication than the traditional criteria for binge drinking (e.g., see Gose, 1997; Lang & Voas, 2001; Lo, 1996; Thombs, et al., 2003). Indeed, when the students in this study drank at levels that met the traditional binge-drinking criteria, they had BAC levels that corresponded to only mild impairment. It was expected that drinking to intoxication would be associated with specific kinds of problems (e.g., those related to impaired coordination); however, this was not confirmed.

Binge drinking, when defined by BAC, was not a better predictor of inappropriate behaviour and lack of role fulfilment than were other drinking measures. This finding replicates Borsari et al's. (2001) results. Interestingly, when binge drinking did independently predict problems (i.e., lack of role fulfilment), it was defined according to the traditional criterion rather than in terms of BAC. This finding suggests that lower levels of drinking, which do not always result in impairment, are sufficient to cause some negative consequences. As discussed earlier, students characteristically drink because drinking brings them social benefits. Perhaps the setting in which drinking occurs (e.g., late nights socialising) rather than the level of consumption per se results in a lack of role fulfilment (e.g., failing to attend lectures).

Study Three also provided an opportunity to measure changes in students drinking from before to after the start of the academic year. Student drinking increased

substantially in the weeks after the term began. Male students increased their drinking by more than 60 percent, and females by more than 30 percent; male students increased their binge drinking episodes by more than 136 percent and females by more than 85 percent. It is impossible to know from this study exactly why these increases in drinking occurred. However, given that students frequently drink for social reasons, the increased drinking was likely related to the increased opportunity to participate in social events that being at university provided.

Finally, Study Three validated two retrospective alcohol-consumption measures against drinking indices obtained from an interview. The two measures were the Khavari Alcohol Test (KAT, Khavari & Farber, 1978) and a new retrospective diary technique (i.e., the Typical and Atypical Drinking Diary; TADD); the interview technique was the Alcohol Timeline Followback (TLFB; Sobell & Sobell, 1992). In Study One and Study Two the TLFB was the principle tool used to measure alcohol consumption. During the TLFB interview, participants often reported that their drinking could be characterised by one or two weekly patterns—a typical and an atypical one. The TADD asks participants to estimate their typical and atypical pattern of drinking and the number of weeks that their drinking occurred in each pattern during a given time period. The TADD was designed to be a quicker and less arduous measure of the two patterns of drinking than the TLFB provides.

Consistent with some (e.g., Midanik et al., 1987), but not other (e.g., Sobell et al., 1982), earlier research, both of the questionnaires overestimated participants' alcohol consumption in comparison to the interview technique. The TADD questionnaire gave indices of drinking that more closely corresponded to those from the TLFB interview than did those from the KAT. Furthermore, the TADD could accurately estimate the participants' number of drinking days and binge drinking episodes (i.e., using both

traditional and BAC techniques to define binge drinking); the KAT cannot estimate such measures due to the questionnaire design. Therefore, the TADD questionnaire was shown to be a good alternative to the TLFB, and one that was quicker and easier to use than the TLFB.

### **Conclusions and Recommendations**

In Study One, the heavy-drinking students reported that they drank for social reasons. Therefore, their drinking might have been influenced by the frequency of social events and by course demands. For instance, their drinking might have decreased during the weeks before an examination period as they began to spend more time on revision, but in the weeks after this period, it might have increased again. The quantity and frequency of their drinking might also have been influenced by financial demands. Students in British universities receive their loan payments in large deposits on just three occasions per year. Thus, those students who are inexperienced or poor at budgeting their finances might experience financial hardships prior to loan payments. It seems reasonable that periods of excessive drinking by students will fluctuate according to such external events; such fluctuations in drinking might either facilitate or impede interventions. For example, interventions timed to coincide with natural reductions in drinking might have better outcomes than those occurring during celebration periods.

It is not entirely clear that students' drinking does fluctuate over time. Study Three of this thesis showed that students' drinking increased substantially during the first week of the academic year, and then it was reduced. The students' average weekly consumption remained stable during the remaining weeks of the assessment period; however, Study Three assessed students' alcohol consumption for a maximum of just eight weeks after the start of the academic term. Furthermore, the sample was limited to excessive drinking students. Until additional, more inclusive surveys of student drinking are conducted in

British universities, the issue of *naturally* occurring fluctuations in student drinking will remain unclear. Nevertheless, the present findings (i.e., students substantially increased their consumption after the start of the academic year) suggest preventative interventions should target students before they attend university (see Cronin, 1996 below).

Study Two underscores the importance of a *well-timed* intervention. This study intervened with hospital patients, many of whom had recently experienced pronounced negative consequences because of their drinking. This crisis period has been described as a *teachable moment* (e.g., Williams et al., 2005)—a time when people are more likely to consider changing. The brief interventions evaluated in Study Two were designed to emphasize the negative consequences of drinking, and thereby maximise the “teachable moment.” Jones and McMahon (2001) also showed that highlighting the negative expectancies resulted in better outcomes for patients who were entering treatment.

The timing of a brief intervention, which highlights a person’s recent negative consequences of drinking, to coincide with teachable moments offers great promise. There are many examples of such teachable moments. For instance, arrest referral schemes intervene with people who have been arrested for offences caused by alcohol consumption; when such a person is spending a night in a police cell for inappropriate behaviour whilst intoxicated is a teachable moment. Another example is employee assistance programmes. Many companies in the United Kingdom have drug and alcohol testing programmes. Employees tested for their substance use and who screen positive are often disciplined and can face dismissal; such a situation would provide a teachable moment. Intervening by highlighting the negative consequences of the use at these opportune times should be particularly effective. Study Two suggested that when the *window of opportunity* is missed (i.e., by not intervening with hospital patients at the appropriate time), people will return to their earlier problematic level of drinking.

Cronin (1996) devised an intervention whose effectiveness might have been enhanced by its timing. Prior to a university springtime academic vacation in the United States—traditionally American students drink excessively during their spring vacation—Cronin allocated students to either an intervention group or a control group. The intervention group were asked to estimate how much they intended to drink during the spring vacation. They were also asked to select from a list the negative consequences that they expected to experience as a result of their drinking during this period. During the week immediately following the spring vacation, students in both groups were asked to report their actual consumption and the negative consequences that they had experienced during the spring vacation. The results showed that although there was no difference in alcohol consumption between the two groups, the intervention group reported significantly fewer problems. It is possible that the timing of the intervention (i.e., prior to a high-risk period) enhanced its effect.

One effective method of intervening with students might be to deliver an intervention to coincide with a teachable moment (e.g., immediately after a period of excessive drinking). As shown in Study Three, students typically drink excessively—and probably experience many problems—during the beginning of the academic term. An intervention that asks students to consider the negative expectancies of their drinking at a time when they are particularly salient could be extremely effective. The intervention could follow the format that Jones and McMahon (2001) used. For example, students could be asked to estimate the likelihood of experiencing negative expectancies immediately after consuming alcohol (e.g., doing embarrassing things, vomiting), in the short-term (e.g., having a hangover, missing a class, spending too much money), and in the longer-term (e.g., getting poor grades, struggling to pay their expenses). It is the timing of this intervention that would make it particularly effective.

The motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a) could account for the processes by which such an intervention would be effective. It will be recalled that people expect alcohol to change their affect either directly through its pharmacological effects, or indirectly through its instrumental effects on other life incentives (see Chapter 2). For many students, drinking alcohol enhances positive affect instrumentally (e.g., by increasing their confidence to socialise), and this is the most important determinant of their decision to drink. Social motives might be particularly true of first-year university students whose self-confidence is low in their new environment. The intervention suggested above would highlight how alcohol can actually interfere with other positive incentives. For example, drinking alcohol might interfere with being a popular student (e.g., by causing the student to do embarrassing things or otherwise engage in inappropriate behaviour) and academic performance (e.g., by causing the student to miss classes or get poor grades).

Dependent drinkers (like those who participated in Study Two) are less likely than social drinkers to drink for the instrumental effects. The majority of the dependent drinkers in Study Two reported that they drank in order to cope. Thus, it seems that the direct effects of the alcohol (e.g., alleviating negative affect, such as anxiety) was the most important factor motivating these people to drink. Accordingly, an intervention for dependent drinkers might be enhanced by (a) highlighting how the direct pharmacological effects of alcohol are only short-lived and sometimes opposite of what the person expects, and (b) providing the person with healthier strategies to cope with negative affect. Regardless of the person's level of dependency, interventions for excessive drinking should help the drinker obtain emotional satisfaction in life without consuming alcohol. As Cox and Klinger's motivational model (1988, 1990, 2004a) discusses, it is essential that people have emotionally rewarding and healthy goals to pursue.

The implications from the findings discussed above demonstrate that the computerised brief interventions described are appropriate for early stage problem drinkers. Many students who drink excessively whilst at university will mature out of their excessive drinking; however, clearly there is an immediate negative consequence to them (e.g., there is a significantly increased risk of accidents and injuries and impaired academic performance). In addition, some of the excessive drinking students might, if their drinking continues unchanged, go on to develop problems of dependency. As described in study two, people who develop problems of alcohol dependency suffer profound negative consequences to their health and well being.

The findings described above also demonstrate that the computerised brief interventions are appropriate for dependent drinkers. The results of Study Two clearly showed that dependent drinkers who did not receive any intervention continued to drink excessively whereas those who received intervention significantly reduced their consumption. Given that the majority of these dependent drinkers had been admitted to hospital because of an alcohol-related illness or injury highlights the importance of such intervention. Therefore, intervention to reduce excessive drinking in general hospitals would not only reduce the harm to the individual but also reduce the annual £3 billion NHS expenditure treating excessive drinkers.

This thesis highlights the importance of understanding the relationship between alcohol consumption and drinking motives, drinking situations, and drinking-related negative consequences. Many questions await further research. For instance, do people who drink to cope have different drinking patterns than those who drink for enhancement motives? Do the two types of drinkers experience different types of drinking-related problems? Do drinkers who experience frequent or specific types of problems do so



because of the situation in which they drink? Answers to these questions would greatly improve our understanding of excessive drinking and methods for intervening.

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**APPENDIX A*****Alcohol Units Ready Reckoner***

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# ALCOHOL CONCERN

## Alcohol Units ready reckoner

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To help calculate alcohol consumption levels DRINKWISE, London have devised the Units Ready Reckoner below. The table enables the calculation of units in any given bottle or can of beer, cider, wine or spirits. Just look down the left hand column until you come to the strength of the drink in question. Then read along the line horizontally until you come to the relevant can, bottle or glass size. The figure shown is the total number of units in the container, rounded to the nearest manageable fraction.

Usual

%Alcohol by Volume	PUB MEASURES					BOTTLES AND CANS						Wines Spirits Beer Cider 1litre		
	Beer Cider 1/2 pint	Beer Cider 1pint	Spirits 1/8 gill	Ver-mouth 1/3 gill	Wine 125ml 4oz	Beer Cider 275ml	Beer Cider 330ml	Beer Cider 440ml	Wines Spirits 70cl	Wines Spirits Cider 75cl	Beer Cider 1litre			
1%	1/4	1/2	-	-	-	1/4	1/3	1/2	2/3	3/4	1	Low alcohol wines & beers		
3%	3/4	1 3/4	-	-	1/3	3/4	1	1 1/3	2	2 1/4	3	Low strength beers		
3 1/2%	1	2	-	-	1/2	1	1 1/4	1 1/2	2 1/2	2 2/3	3 1/3	Standard strength beers & cider		
4%	1	2 1/4	-	-	1/2	1	1 1/3	1 3/4	2 3/4	3	4			
4 1/2%	1 1/4	2 1/2	-	-	1/2	1 1/4	1 1/2	2	3 1/4	3 1/3	4 1/2	Export strength beers, strong ciders	Babycham	
5%	1 1/2	2 3/4	-	-	2/3	1 1/3	1 2/3	2 1/4	3 1/2	3 3/4	5			
5 1/2%	1 1/2	3	-	-	2/3	1 1/2	1 3/4	2 1/2	3 3/4	4	5 1/2	Table wines	Super strength beers	Pomagne
6%	1 3/4	3 1/2	-	-	3/4	1 2/3	2	2 2/3	4 1/4	4 1/2	6			
8%	2 1/4	4 1/2	-	-	1	2 1/4	2 2/3	3 1/2	5 1/2	6	8	Barley wine		
9%	2 1/2	5	-	-	1	2 1/2	3	4	6 1/4	6 3/4	9			
10%	2 3/4	5 2/3	-	-	1 1/4	2 3/4	3 1/3	4 1/2	7	7 1/2	10			
11%	3	6 1/4	-	-	1 1/3	3	3 2/3	4 3/4	7 3/4	8 1/4	11			
12%	-	-	-	-	1 1/2	-	-	-	8 1/2	(9)	12			
13%	-	-	-	-	1 2/3	-	-	-	9	9 3/4	13			
13 1/2%	-	-	-	-	1 2/3	-	-	-	9 1/2	10 1/4	13 1/2	Ginger wine, Mondillo wine		
14 1/2%	-	-	-	3/4	1 3/4	-	-	-	10 1/4	11	14 1/2	Vermouths, Sanatogen		
15%	-	-	-	3/4	2	-	-	-	10 1/2	11 1/4	15	British sherry		
17%	-	-	-	3/4	2	-	-	-	(12)	12 3/4	17	Cream liqueurs <i>BAILEYS</i>		
17 1/2%	-	-	-	1	2 1/4	-	-	-	12 1/4	13	17 1/2	Sherry, Advocaat		
20%	-	-	-	1	2 1/2	-	-	-	14	15	20	Port		
24%	-	-	2/3	1 1/4	3	-	-	-	16 3/4	18	24	Cherry brandy, Campari, Malibu-21% Pimms		
25%	-	-	2/3	1 1/4	3	-	-	-	17 1/2	18 3/4	25	Liqueurs		
26 1/2%	-	-	2/3	1 1/3	3 1/3	-	-	-	18 1/2	20	26 1/2	"Sub-norm" Spirits		
37 1/2%	-	-	1	-	4 2/3	-	-	-	(26 1/4)	28	37 1/2			

40%	-	-	1	-	5	-	-	-	28	(30)	40	Standard Spirits
43%	-	-	1	-	5 1/3	-	-	-	30	32 1/4	43	"Import" Strength Spirits

To see For a full list of the number of units in different drinks see the Big List available from the Book Shop Section L



## Drinkers Needed for Research

**Do you drink alcohol? Would like to earn some money, or are you interested in research?**

**This study is investigating people who drink alcohol. You do not need to be experiencing problems related to your drinking, or even to be thinking of changing your drinking, to take part.**

The study involves you being randomised into one of three groups: two groups are intervention groups and one is a control. Participants in all groups will receive 30 minutes of assessments. If you are in one of the intervention groups, you will receive feedback of these assessments, and you will take part in a computer-aided interview. This will take approximately 30 minutes. If, however, you are in the control group, you will be placed on a 12-week waiting list for your feedback. All participants will be asked to return for an assessment in 12 weeks time, which will take approximately 40 minutes.

**You will receive payment for taking part (£5 for the first session and entry into £50 draw and £5 for the second session).**

**To see if you are eligible to take part, contact:** Lee Hogan (Ph.D. student)

by email: [l.hogan@bangor.ac.uk](mailto:l.hogan@bangor.ac.uk)

by telephone: 01248 382218 (messages at 382211)

by letter: School of Psychology; Brigantia Building, Bangor, LL57 2AS.

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# Angen Yfwyr ar gyfer Ymchwil

**A ydych chi'n yfed alcohol? A hoffech chi ennill ychydig o arian, neu a oes gennych chi diddordeb mewn ymchwil?**

**Mae'r astudiaeth hon yn gwneud ymchwil i bobl sy'n yfed alcohol. Er mwyn cymryd rhan, nid oes raid i chi fod yn cael problemau'n ymwneud â faint rydych yn ei yfed, neu hyd yn oed feddwl am newid faint yr ydych yn ei yfed.**

Mae'r astudiaeth hon yn golygu y cewch eich rhoi mewn un o dri grŵp ar hap: mae dau grŵp yn rhai ymyrraeth ac mae'r trydydd yn un rheoli. Bydd y rhai sy'n cymryd rhan ymhob un o'r grwpiau yn derbyn 30 munud o asesiad. Os ydych yn un o'r grwpiau ymyrraeth, byddwch yn derbyn atborth ar yr asesiadau hyn, a byddwch yn cymryd rhan mewn cyfweiliad â chymorth cyfrifiadur. Bydd hyn yn cymryd tua 30 munud. Fodd bynnag, os ydych yn y grŵp rheoli, fe'ch rhoddir ar restr aros 12 wythnos ar gyfer eich atborth. Gofynnir i bawb sy'n cymryd rhan ddychwelyd am asesiad mewn 12 wythnos, a fydd yn cymryd tua 40 munud.

**Byddwch yn derbyn tâl am gymryd rhan (£5 ar gyfer y sesiwn gyntaf a rhoddir eich enw mewn het i ennill £50 a £5 am yr ail sesiwn).**

**I weld a ydych yn gymwys i gymryd rhan, cysylltwch â Lee Hogan (myfyriwr Ph.D.)**

Trwy e-bost: [l.hogan@bangor.ac.uk](mailto:l.hogan@bangor.ac.uk)

Trwy ffôn: 01248 382218 (negeseuon i 382211)

Trwy lythyr: Yr Ysgol Seicoleg; Adeilad Brigantia, Bangor, LL57 2AS.

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Trwy lythyr: Yr Ysgol Seicoleg; Adeilad Brigantia, Bangor, LL57 2AS.



**APPENDIX C*****Readiness to Change Questionnaire***

Subject Name ..... Hospital/Centre .....  
 Subject Number ..... Assessed by .....  
 Date .....

## READINESS TO CHANGE QUESTIONNAIRE

The following questionnaire is designed to identify how you personally feel about your drinking right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please tick the answer of your choice on each question. Your answers are completely private and confidential.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1. I don't think I drink too much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I am trying to drink less than I used to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I enjoy my drinking, but sometimes I drink too much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Sometimes I think I should cut down on my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It's a waste of time thinking about my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I have just recently changed my drinking habits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Anyone can talk about wanting to do something about drinking, but I am actually doing something about it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am at the stage where I should think about drinking less alcohol.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. My drinking is a problem sometimes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. There is no need for me to think about changing my drinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I am actually changing my drinking habits right now.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Drinking less alcohol would be pointless for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**APPENDIX D*****Drinking Motives Questionnaire***

Participant No. \_\_\_\_\_

## Motives Questionnaire

The following questionnaire lists a number of reasons people sometimes give for drinking alcohol. Thinking of all the times you drink, how often would you say that you drink for the following reasons? Please tick the answer of your choice to each question. **Your answers are completely private and confidential**

		almost never /never	some of the time	half of the time	most of the time	almost always /always
1	To forget your worries.					
2	Because your friends pressure you to drink.					
3	Because it helps you to enjoy a party.					
4	Because it helps you when you feel depressed or nervous.					
5	To be sociable					
6	To cheer up when you are in a bad mood.					
7	Because you like the feeling.					
8	So that others won't kid you about <i>not</i> drinking.					
9	Because it's exciting					
10	To get high.					
11	Because it makes social gatherings more fun.					
12	To fit in with a group you like.					
13	Because it gives you a pleasant feeling.					
14	Because it improves parties and celebrations.					
15	Because you feel more self-confident and sure of yourself.					
16	To celebrate a special occasion with friends.					
17	To forget about your problems.					
18	Because it's fun.					
19	To be liked.					
20	So you won't feel left out.					

**APPENDIX E*****A Quantity/Frequency Alcohol Consumption Questionnaire***

Alcohol Consumption Questionnaire – Example of consumption measures.

	June	July	August
<p><b>1<sup>st</sup> Week:</b>                      No. Days Drinking:</p> <p>Typical Amount Drunk per day:</p> <p>What was the Most you Drank per day:</p> <p>On how many days did you drink that much:</p>			
<p><b>2<sup>nd</sup> Week:</b>                      No. Days Drinking:</p> <p>Typical Amount Drunk per day:</p> <p>What was the Most you Drank per day:</p> <p>On how many days did you drink that much:</p>			
<p><b>3<sup>rd</sup> Week:</b>                      No. Days Drinking:</p> <p>Typical Amount Drunk per day:</p> <p>What was the Most you Drank per day:</p> <p>On how many days did you drink that much:</p>			
<p><b>4<sup>th</sup> Week:</b>                      No. Days Drinking:</p> <p>Typical Amount Drunk per day:</p> <p>What was the Most you Drank per day:</p> <p>On how many days did you drink that much:</p>			

**APPENDIX F*****Drinkers Inventory of Consequences (DrInC-2R)***



FOR OFFICE USE ONLY

Study

ID

Point

Date

RAID

## Drinker Inventory of Consequences (DrInC-2R)

**INSTRUCTIONS:** Here are a number of events that drinkers sometimes experience. Read each one carefully and indicate how often each one has happened to you *DURING THE PAST 3 MONTHS* by circling the appropriate number (0 = Never, 1 = Once or a few times, etc.). If an item does not apply to you, circle zero (0).

**DURING THE PAST 3 MONTHS, about how often has this happened to you?**

Circle one answer for each item.

Never

Once or  
a few  
timesOnce or  
twice a  
weekDaily or  
almost  
daily

I have had a hangover or felt bad after drinking.

0

1

2

3

I have felt bad about myself because of my drinking.

0

1

2

3

I have missed days of work or school because of my drinking.

0

1

2

3

My family or friends have worried or complained about my drinking.

0

1

2

3

I have enjoyed the taste of beer, wine, or liquor.

0

1

2

3

The quality of my work has suffered because of my drinking.

0

1

2

3

My ability to be a good parent has been harmed by my drinking.

0

1

2

3

After drinking, I have had trouble with sleeping, staying asleep, or nightmares.

0

1

2

3

Please continue on the next page.

The Drinker Inventory of Consequences (DrInC)

**DURING THE PAST 3 MONTHS, about how often has this happened to you?**

Circle one answer for each item.

Never

Once or  
a few  
times

Once or  
twice a  
week

Daily or  
almost  
daily

9. I have driven a motor vehicle after having three or more drinks.	0	1	2	3
10. My drinking has caused me to use other drugs more.	0	1	2	3
11. I have been sick and vomited after drinking.	0	1	2	3
12. I have been unhappy because of my drinking.	0	1	2	3
13. Because of my drinking, I have not eaten properly.	0	1	2	3
14. I have failed to do what is expected of me because of my drinking.	0	1	2	3
15. Drinking has helped me to relax.	0	1	2	3
16. I have felt guilty or ashamed because of my drinking.	0	1	2	3
17. While drinking, I have said or done embarrassing things.	0	1	2	3
18. When drinking, my personality has changed for the worse.	0	1	2	3
19. I have taken foolish risks when I have been drinking.	0	1	2	3
20. I have gotten into trouble because of drinking.	0	1	2	3
21. While drinking or using drugs, I have said harsh or cruel things to someone.	0	1	2	3
22. When drinking, I have done impulsive things that I regretted later.	0	1	2	3
23. I have gotten into a physical fight while drinking.	0	1	2	3

Please continue on the next page.

Now answer these questions about things that may have happened to you:

**DURING THE PAST 3 MONTHS, how much has this happened?**

Circle one answer for each item.	Not at all	A little	Some- what	Very much
24. My physical health has been harmed by my drinking.	0	1	2	3
25. Drinking has helped me to have a more positive outlook on life.	0	1	2	3
26. I have had money problems because of my drinking.	0	1	2	3
27. My marriage or love relationship has been harmed by my drinking.	0	1	2	3
28. I have smoked tobacco more when I am drinking.	0	1	2	3
29. My physical appearance has been harmed by my drinking.	0	1	2	3
30. My family has been hurt by my drinking.	0	1	2	3
31. A friendship or close relationship has been damaged by my drinking.	0	1	2	3
32. I have been overweight because of my drinking.	0	1	2	3
33. My sex life has suffered because of my drinking.	0	1	2	3
34. I have lost interest in activities and hobbies because of my drinking.	0	1	2	3
35. When drinking, my social life has been more enjoyable.	0	1	2	3
36. My spiritual or moral life has been harmed by my drinking.	0	1	2	3
37. Because of my drinking, I have not had the kind of life that I want.	0	1	2	3

Please continue on the next page.

**DURING THE PAST 3 MONTHS, how much has this happened?**

Circle one answer for each item.	Not at all	A little	Some-what	Very much
My drinking has gotten in the way of my growth as a person.	0	1	2	3
My drinking has damaged my social life, popularity, or reputation.	0	1	2	3
I have spent too much or lost a lot of money because of my drinking.	0	1	2	3

**Now please indicate whether these things have happened to you DURING THE PAST 3 MONTHS.**

**Has this happened to you DURING THE PAST 3 MONTHS?**

Circle one answer for each item.	No	Almost	Yes, once	Yes, more than once
I have been arrested for driving under the influence of alcohol.	0	1	2	3
I have had trouble with the law (other than driving while intoxicated) because of my drinking.	0	1	2	3
I have lost a marriage or a close love relationship because of my drinking.	0	1	2	3
I have been suspended/fired from or left a job or school because of my drinking.	0	1	2	3
I drank alcohol normally, without any problems.	0	1	2	3
I have lost a friend because of my drinking.	0	1	2	3
I have had an accident while drinking or intoxicated.	0	1	2	3
While drinking or intoxicated, I have been physically hurt, injured, or burned.	0	1	2	3

Please continue on the next page.

**Has this happened to you DURING THE PAST 3 MONTHS?**

Circle one answer for each item.

No

Almost

Yes,  
onceYes, more  
than once29. While drinking or intoxicated, I have  
injured someone else.

0

1

2

3

30. I have broken things while drinking or  
intoxicated.

0

1

2

3

**APPENDIX G*****Short Tridimensional Personality Questionnaire (Short-TPQ)***

# Short TPQ

In this questionnaire, you will find statements people might use to describe their attitudes, opinions, interests, and other personal feelings.

Each statement can be answered TRUE or FALSE. Read the statement and decide which choice best describes you.

We would then like you to fill out this questionnaire on your own using a pen. When you are finished, please return the questionnaire.

## HOW TO FILL OUT THIS QUESTIONNAIRE

To answer you only need to circle either "T" or "F" after each question. Here is an example:

### EXAMPLE

	TRUE	FALSE
I understand how to fill out this questionnaire.	T	F

(If you understand how to fill out this questionnaire, circle "T" to show that the statement is TRUE.)

.....

Read each statement carefully, but don't spend too much time deciding on the answer.

Please answer every statement, even if you are not completely sure of the answer.

Remember there are no right or wrong answers - - just describe your own opinions and feelings.

		TRUE	FALSE
1	I usually am confident that everything will go well, even in situations that worry most people.	T	F
2	I like to discuss my experiences and feelings openly with friends instead of keeping them to myself.	T	F
3	Usually I am more worried than most people that something might go wrong in the future	T	F
4	I nearly always stay relaxed and carefree, even when nearly everyone else is fearful.	T	F
5	I often have to stop what I am doing because I start worrying about what might go wrong.	T	F
6	My friends find it hard to know my feelings because I seldom tell them about my private thoughts.	T	F
7	I often stop what I am doing because I get worried, even when my friends tell me everything will go well.	T	F
8	I usually feel tense and worried when I have to do something new and unfamiliar.	T	F
9	I often feel tense and worried in unfamiliar situations, even when others feel there is little to worry about.	T	F
10	I often do things based on how I feel at the moment without thinking about how they were done in the past.	T	F
11	I often feel tense and worried in unfamiliar situations, even when others feel there is no danger at all.	T	F
12	I often break rules and regulations when I think I can get away with it.	T	F
13	I feel it is more important to be sympathetic and understanding of other people than to be practical and tough minded.	T	F
14	People find it easy to come to me for help, sympathy, and warm understanding.	T	F
15	I would probably stay relaxed and outgoing when meeting a group of strangers, even if I were told they are unfriendly.	T	F
16	It is difficult for me to keep the same interests for a long time because my attention often shifts to something else.	T	F
17	I think I would stay confident and relaxed when meeting strangers, even if I were told they were angry	T	F



	at me.		
18	I often follow my instincts, hunches, or intuition without thinking through all the details.	T	F
19	I have less energy and get tired more quickly than most people.	T	F
20	I usually think about all the facts in detail before I make a decision.	T	F
21	I <u>nearly always</u> think about all the facts in detail before I make a decision, even when other people demand a quick decision.	T	F
22	I often need naps or extra rest periods because I get tired so easily.	T	F
23	I don't go out of my way to please other people.	T	F
24	I am more energetic and tire less quickly than most people.	T	F
25	I can usually do a good job of stretching the truth to tell a funnier story or to play a joke on someone.	T	F
26	I have trouble telling a lie, even when it is meant to spare someone else's feelings.	T	F
27	I am better at saving money than most people.	T	F
28	I need much extra rest, support, or reassurance to recover from minor illnesses or stress.	T	F
29	I often spend money until I run out of cash or get into debt from using too much credit.	T	F
30	Because I often spend too much money on impulse, it is hard for me to save money - even for special plans like a holiday.	T	F
31	It is extremely difficult for me to adjust to changes in my usual way of doing things because I get so tense, tired, or worried.	T	F
32	If I am feeling upset, I usually feel better around friends than when left alone.	T	F
33	I usually feel much more confident and energetic than most people, even after minor illnesses or stress.	T	F
34	I recover more quickly than most people from minor illnesses or stress.	T	F
35	I hate to make decisions based on my first impressions.	T	F
36	I think I will have very good luck in the future.	T	F

37	If I am embarrassed or humiliated, I get over it very quickly.	T	F
38	I like to keep my problems to myself.	T	F
39	Even when I am with friends, I prefer not to "open up" very much.	T	F
40	I feel very confident and sure of myself in almost all social situations.	T	F
41	I usually like to stay cool and detached from other people.	T	F
42	I never worry about terrible things that might happen in the future.	T	F
43	I usually have good luck in whatever I do.	T	F
44	I like to pay close attention to details in everything I do.	T	F

**APPENDIX H*****Follow-Up Questionnaire***

## Follow-Up Questionnaire

Can you answer the following questions about your participation in this experiment?

1. Did you change the amount you drink following your participation in the experiment?  
(please tick one)

stopped	a lot less	slightly less	the same	slightly more	a lot more

2. If you were able to reduce your drinking, how did you do it?

3. If you didn't reduce your drinking and wanted to do so, what prevented you from doing so?

4. If you didn't want to cut down, is that what you still want?

5. Why did you volunteer to take part in this research?

6. For how long have you been drinking alcohol?

7. What have you gained from the experiment?

8. What part of the computer program do you remember after your first visit?

9. Was there any information that made you think more about the way you drink?

**APPENDIX I*****Table of Baseline Data for all 88 Participants in Study One***

*Baseline Means and Standard Deviations of Weekly Alcohol Consumption, Number of Binges, Total and Individual DrInC Items, Tridimensional Personality Questionnaire Items, and Drinking Motive Items for Males and Females in the Control, CBI, and CBI-E Groups and the Groups Combined (N = 88).*

Variable	Control				CBI				CBI-E				Groups Combined			
	Male (n = 13)		Female (n = 16)		Male (n = 12)		Female (n = 20)		Male (n = 9)		Female (n = 18)		Male (n = 34)		Female (n = 54)	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>Sd</i>	<i>M</i>	<i>Sd</i>	<i>M</i>	<i>sd</i>	<i>M</i>	<i>Sd</i>
Weekly units	36.87	31.74	28.78	23.32	34.17	16.97	26.83	19.59	33.55	14.37	22.21	9.31	35.04	22.68	25.87	18.08
Binge total	21.15	13.51	22.19	12.90	24.75	12.26	26.40	21.94	25.33	12.83	18.78	9.07	23.53	12.66	22.61	16.02
DrInC total	20.54	14.26	26.25	13.79	19.17	7.91	23.35	19.24	22.89	12.04	20.22	11.70	20.68	11.49	23.17	15.37
DrInC Physical	4.38	2.36	6.44	2.97	5.00	2.37	5.85	4.04	5.33	2.18	4.78	2.56	4.85	2.28	5.67	3.30
DrInC Interpersonal	3.62	4.59	3.94	2.93	2.33	1.37	3.45	3.38	3.89	3.26	2.94	2.82	3.24	3.37	3.43	3.04
DrInC Intrapersonal	2.23	2.71	5.06	3.82	3.08	2.19	4.50	4.72	3.33	2.69	2.94	2.24	2.82	2.50	4.15	3.81
DrInC Impulse	6.69	4.79	6.06	3.62	4.42	2.27	5.50	4.92	5.89	4.57	5.56	4.30	5.68	4.01	5.69	4.29
DrInC Social Responsibility	3.62	1.89	4.75	3.87	4.33	2.31	4.05	4.02	4.44	2.30	4.00	2.70	4.09	2.12	4.24	3.53
SADD	8.77	3.42	9.88	5.39	9.58	4.34	9.05	5.30	9.00	3.67	9.28	4.92	9.12	3.73	9.37	5.11
TPQ Novelty Seeking	7.54	2.88	5.81	3.33	6.67	2.93	5.75	3.16	6.78	2.95	6.33	2.79	7/03	2.85	5.96	3.05
TPQ Harm Avoidance	4.46	1.90	9.81	5.50	6.92	3.75	13.75	4.32	8.67	5.57	9.83	6.39	6.44	4.06	11.28	5.66
TPQ Reward Dependence	5.77	2.65	7.38	2.13	5.83	1.73	6.65	2.23	6.11	2.57	6.61	1.97	5.79	2.28	6.85	2.10
Motives Social	3.51	.87	3.55	.85	3.77	.67	3.45	.86	3.73	.71	3.57	.75	3.66	.75	3.52	.81
Motives Coping	1.83	.44	2.44	.65	2.08	.49	2.62	1.00	2.16	.38	2.43	.83	2.01	.46	2.50	.84
Motives Enhancement	3.05	.77	2.98	.87	2.75	.70	2.94	.94	3.24	.75	2.97	.85	2.99	.75	2.96	.87
Motives Conformity	1.45	.42	1.59	.68	1.42	.36	1.60	.63	1.53	.58	1.52	.82	1.46	.44	1.57	.70

**APPENDIX J*****Participant's Comments Study Two***



## **CBI-E participants who reduced consumption**

"I remember you asked me about goals and did you reach your goals. I said I had to sort my life out."

"It made me aware of how bad heavy drinking is. How much I drink in units and its effects on my physically and to my social life. When I sober up I realise what harm I have done to myself physically."

"I realised how much I am drinking and [the experiment] helped change my lifestyle."

"The experiment helped me to reduce my drinking. The facts about drinking to excess and the effects on my health."

## **CBI-E participants who did not reduce consumption**

"I kept the print-out and have it on my wall [points to wall]. If that was my friend I would be quite disgusted. It [the experiment] has made me look more inwardly at myself. Seeing you got the ball rolling. I saw a key-worker to get me into Detox."

"I want to cut down now. I am aware that I drink too much, but I don't see it as a problem. I can see it as being a problem if I don't do something about it though."

"I know that I drink too much. I have been off work with a broken arm so I guess I have used it as an excuse to drink. I am cutting down on my drinking from now on."

"Being above on one limit made me think, but then I thought that everyone else I know drinks more than me."

## **CBI participants who reduced consumption**

"I remember I was a really heavy drinker in the number of units I was drinking in a week. Taking part in the experiment was a motivator for me. It was a way for me to look at my lifestyle. It was like signing a contract or something."

"I was worried about my health and the damage I was doing to myself."

"Very high intake, so much, the blackouts I was having the hours I was out cold for, loss of memory. I must have been close to death, but did not realise what I was doing, and now I sit here and think I might not have been sitting here today."

"I was nearly killing myself. I wanted to change the quality of my life. You made me think more, someone else believed in me."

"Fear of death, I had no alternative if I wanted to see my family, home. You were sympathetic. I knew we would meet again in the future so that added to the stopping."

## **CBI participant who did not reduce consumption**

"I still have the print-out of what we did last time. [On why he didn't reduce] I have been drinking a lot more since I haven't been working."

"It helped me to think about my drinking. I am depressed and lonely. I have seen good friends die from alcohol."

"I still want to cut down."

### ***Control participants who reduced consumption***

"I just stopped. I realised that things were getting out of hand (being in hospital). The support of a close friend has helped me greatly."

"When I spoke about it I realised how much I had been drinking. You don't really think about it when you do it."

"By having a heart attack I realised that I might have another and not to be able to call for help if I am on my own."

## **Control participants who did not reduce consumption**

"I want to stop. I've got to stop. [On why he didn't reduce:]I experimented with drinking in moderation, but it didn't work. I just can't do that. The health effects on me have been terrible"

"It has made me think about my use and why I am using. When my amount of drinking was being written down I thought maybe I am drinking too much. It started to make me think about why I am drinking and its purpose in my life."

"I gained the awareness that you can go overboard with your drinking."

"Being in hospital and having a blackout made me think. It scared me. I felt I had to do something."

"There were questions I had never been asked before. Questions about friends."

**APPENDIX K*****Typical and Atypical Drinking Diary (TADD)***

## Typical and Atypical Drinking Diary (TADD)

Participant Number: \_\_\_\_\_

Date \_\_\_\_\_

Participant Age: \_\_\_\_\_

Participant Weight: \_\_\_\_\_

Gender (please circle)

Male

Female

\* \* \* \* \*

1. Do you still drink alcohol? (please circle)

Yes

No

When did you stop drinking? \_\_\_\_\_ (date)  
 (Please continue below with what you used to drink)

2. Please select which beverage(s) you drank in the LAST THREE MONTHS, and the size of the container you normally use when drinking the beverage(s), by ticking in the appropriate box.

Beverage	Alcohol content	Usual container size									
							Bottle				
		single	double	glass	can	pint	330 ml	750 ml	1 litre	2 litre	3 litre
Alcopops	5%	---	---	---	---	---		---	---	---	---
Beer (normal)	3.7%	---	---	---				---			
Beer (strong)	5%	---	---	---				---			
Beer (super)	9%	---	---	---				---			
Cider	7.5%	---	---	---							
Wine (white)	9-13%*	---	---		---	---				---	---
Wine (red)	9-13%†	---	---		---	---					---
Fortified wine	17%	---	---		---	---	---		---	---	---
Spirits	40%			---	---	---	---			---	---
Other (please state)											

\* If known, please state the exact alcohol content

† If known, please state the exact alcohol content







## An Example of a Typical and Atypical Drinking Diary

Diary 1 Typical Week					
Day	Beverage	%	Total amount drunk	Start time	Finish time
Monday	Beer	3.7	4 pints	8pm	11pm
Tuesday	Wine	12	1 bottle	7pm	10pm
Wednesday					
Thursday					
Friday	Beer	3.7	5 pints	6.30pm	12.30am
	Spirits	40	2 doubles		
Saturday					
Sunday	Beer	3.7	4 pints	12pm	3pm

How many weeks in the past three months have you drunk this TYPICAL amount?  
(please tick in the appropriate box)

0	1	2	3	4	5	6	7	8	9	10	11	12
								X				

Diary 2 ATYPICAL Week					
Day	Beverage	%	Total amount drunk	Start time	Finish time
Monday	Beer	3.7	5 pints	8pm	11pm
Tuesday	Wine	12	1 bottle	7pm	10pm
Wednesday					
Thursday					
Friday	Beer	3.7	5 pints	6.30pm	12.30am
	Spirits	40	2 doubles		
Saturday	Beer	5	4 cans	4pm	1am
	Beer	3.7	5 pints		
	Alcopops	5	2 bottles		
Sunday	Beer	3.7	4 pints	12pm	3pm
	Beer	5	4 cans	6pm	10pm

How many weeks in the past three months have you drunk this ATYPICAL amount?  
(please tick in the appropriate box)

0	1	2	3	4	5	6	7	8	9	10	11	12
				X								

**APPENDIX L*****Rutgers Alcohol Problems Index (RAPI)***

## R.A.P.I.

Different things happen to people when they are drinking ALCOHOL, or as a result of their ALCOHOL use. Some of these things are listed below. Please indicate how many times each has happened to you during the last 3 MONTHS while you were drinking alcohol or as the result of your alcohol use. When marking your answers, use the following code.

How many times did the following things happen to you while you were drinking alcohol or because of your alcohol use during the last 3 MONTHS

Circle one item for each answer.	Never	1-2 times	3-5 times	6-10 times	More than 10 times
Not able to do your homework or study for a test.	0	1	2	3	4
Got into fights, acted bad, or did mean things.	0	1	2	3	4
Missed out in other things because you spent too much money on alcohol.	0	1	2	3	4
Went to work or school high or drunk.	0	1	2	3	4
Caused shame or embarrassment to someone.	0	1	2	3	4
Neglected your responsibilities.	0	1	2	3	4
Relatives avoided you.	0	1	2	3	4
Felt that you needed more alcohol than you used to use in order to get the same effect.	0	1	2	3	4
Tried to control your drinking by trying to drink only at certain times of day or certain places.	0	1	2	3	4
Had withdrawal symptoms, that is, felt sick because you stopped or cut down on drinking.	0	1	2	3	4
Noticed a change in your personality.	0	1	2	3	4
Felt that you had a problem with school.	0	1	2	3	4
Missed a day (or part of a day) of school or work.	0	1	2	3	4
Tried to cut down on drinking.	0	1	2	3	4
Suddenly found yourself in a place that you could not remember getting to.	0	1	2	3	4
Passed out or fainted suddenly.	0	1	2	3	4
Had a fight, argument, or bad feelings with a friend.	0	1	2	3	4

---

---

How many times did the following things happen to you while you were drinking alcohol or because of your alcohol use during the last 3 MONTHS

Circle one item for each answer.

Never      1-2 times      3-5 times      6-10 times      More than 10 times

---

---

Had a fight, argument, or bad feelings with a family member.      0      1      2      3      4

---

Kept drinking when you promised yourself not to.      0      1      2      3      4

---

Felt you were going crazy      0      1      2      3      4

---

Had a bad time      0      1      2      3      4

---

Felt physically or physiologically dependent on alcohol.      0      1      2      3      4

---

Was told by a friend or neighbour to stop or cut down drinking.      0      1      2      3      4

---