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Evaluation of a Drinking-Related and a Motivational Intervention to Reduce Alcohol Consumption and Change Drinking Behaviour among University Students

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Evaluation of a Drinking-Related and a Motivational Intervention to Reduce Alcohol Consumption and Change Drinking Behaviour among University Students

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Abstract

College students' alcohol use has been a cause for concern for a number of years. The present study evaluated the relative effectiveness of two brief interventions (a brief personalized feedback and a motivational intervention) and their combination, aimed at reducing alcohol consumption among heavy-drinking students. The first intervention delivered personalized feedback about students' alcohol use and other alcohol-related information. The other one delivered motivational intervention based on systematic motivational counseling. It was hypothesized that these two interventions would be more effective compared to minimal intervention (control) and equally reduce alcohol consumption. It was further hypothesized that the combination would be comparatively more effective than individual interventions. The study began with a large-scale, screening survey of students' alcohol use. Questionnaire adapted from Youth Risk Behavior Survey was used not only to screen alcohol use but also to assess other alcohol-associated risk behaviours. The survey first identified heavy-drinking students, who then completed a baseline assessment comprising questionnaire measures related to alcohol consumption, motives of drinking, motivation structure, positive and negative affect, and alcohol-related problems. Following the baseline assessment, the heavy-drinking students (n= 123) were randomly assigned to either one of four groups; brief personalized feedback, motivational intervention, the combination of the two, or a minimal-intervention control group. Students (n= 115) in all four groups were followed-up 8-12 weeks after the interventions had been delivered. The results showed a trend towards reduction in alcohol consumption and alcohol-related consequences. However, there were no significant group differences. The study also conducted a psychometric evaluation of five-factor Modified Drinking Motives Questionnaire – Revised. Although no conclusive proof of model fit was obtained, the study found a clear distinction between coping-with-anxiety and coping-with-depression motives. Therefore, it was concluded that the findings of the present study have important implications for future brief interventions among students.

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Acknowledgements

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Chapter One

Introduction: An Overview of Alcohol Use and Drinking-Related Problems

Introduction

Alcohol, in its different forms, has been one of the most perennially discussed, debated, criticized, liked, glamorized, commercialized, and researched (of late) product one could think of since time immemorial. Its use has been recorded since ancient ages and is prevalent in almost all societies in the world. Alcohol is a product that has provided a variety of functions for people throughout all history. From the earliest times to the present, alcohol has played an important role in religion and worship. Historically, alcoholic beverages have served as sources of needed nutrients and have been widely used for their medicinal, antiseptic, and analgesic properties. The role of such beverages as thirst quenchers is obvious and they play an important role in enhancing the enjoyment and quality of life. They can be a social lubricant, can facilitate relaxation, can provide pharmacological pleasure, and can increase the pleasure of eating. Thus, while alcohol has always been misused by a minority of drinkers, it has proved to be beneficial to most.

The harmful use of alcohol is a problem worldwide resulting in millions of deaths. The young lives accounts for hundreds and thousands of such deaths. Alcohol is not only a causal factor in many diseases, but also a precursor to injury, violence, and unnatural deaths. Alcohol consumption and problems related to alcohol vary widely around the world, but the burden of disease and death remains significant in most countries. According to the World Health Organization (WHO, Global Status Report on Alcohol and Health 2011), alcohol consumption is the world's third largest risk factor for disease and disability; in middle-income countries, it is the greatest risk. Alcohol is a causal factor in 60 types of diseases and injuries and a component cause

in 200 others. Almost 4% of all deaths worldwide are attributed to alcohol, greater than deaths caused by HIV/AIDS, violence or tuberculosis. Alcohol is also associated with many serious social issues, including violence, child neglect and abuse, and absenteeism in the workplace.

Although the historical as well as the modern day norms towards alcohol reflects its usefulness in variety of settings when taken in limited amounts the misuse and abuse of it has been a much cause for concern. Excessive use of alcohol is not only harmful to the individual taking it in terms of his physical, psychological and economical health it is also distressful and annoying to the family and society in which the person lives.

Prevalence, Health Implications, and Costs of Drinking

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 minimized and the likelihood of benefits is maximized. 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.

Alcohol misuse is a major public health problem in the United Kingdom. Statistics from the Office for National Statistics (ONS, 2014) indicate that men were more likely than women to drink alcohol, as well as consuming higher amounts. In the week previous to the survey, 64% of men had drunk alcohol, with over half (52%) drinking more than 4.67 units on their heaviest drinking day. In comparison, 53% of women had drunk alcohol in the previous week, with only 37% of those drinking more than 4.67 units on the heaviest day. Men were 3 times more likely to

have drunk over 14 units on their heaviest drinking day, 12% of men compared with 4% of women. Young drinkers were more likely than any other age group to consume more than the weekly recommended limit in one day. Among 16 to 24 year old drinkers, 17% consumed more than 14 units compared with 2% of those aged 65 and over.

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, i.e., periodic heavy drinking, can greatly contribute to such events.

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.

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 then 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 Organization (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 ciders from 1.1 to 17%. 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) (550ml x 3.7%) x 0.79g = 16g 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 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, young drinkers (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 Wechlser 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). Regarding 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 12-month period. The criteria are (a) recurrent alcohol use resulting in a failure to fulfill 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. Mcleod, Stockwell, Stevens, and Phillips (1999) investigated the relationship between alcohol consumption and the risk of injury where 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: (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.

University Students' Alcohol Use

Emerging adulthood, the period in which the age ranges of majority of the undergraduate university students fall, is a distinct developmental period that serves as a critical transition from adolescence to adulthood. As the person passes through adolescence towards young adulthood, one passes through a period of major psychological change, as well as great changes in social

interactions and relationships. These social and psychological transitions lead to the need for independence, autonomy, identity formation, and peer acceptance. These contribute to risk taking behaviour among which use and abuse of substances, particularly alcohol use, especially by college students, is a matter of grave concern.

Drinking is a significant aspect of the university campus lifestyle. The majority of college students drink alcohol, and a significant proportion of those who drink can be classified as heavy drinkers (O'Hare, 1990; Wechsler, Lee, Kuo & Lee, 2000; O'Malley & Johnston, 2002). The environment of the university campuses in which the students live does have a definitive bearing on the reasons for their drinking. Alcohol, for its part, is a constituent of the socializing process in university life and for many of these students it is the social camaraderie that brings them together to indulge in alcohol. Social norms have been found to be the best predictors of alcohol consumption in college students (Borsari & Carey, 2001; Cronin, 1997; Neighbors, Lee, Lewis, Fossos & Larimer, 2007; Lewis & Neighbors, 2006). Although other motives like coping with negative feelings and emotions or to relieve stress (Cooper, 1994; Cooper, Russell, Skinner & Windle, 1992; Cox & Klinger, 1988, 2011; McCabe, 2002; Neff, 1997; Palmqvist, Martikainen & vonWright, 2003; Rutledge & Sher, 2001) and enhancement of positive feelings or pleasant emotions (Carey, 1993, 1995; Cooper, 1994; Cooper, Russell, Skinner & Windle, 1992; Cox & Klinger, 1988, 2004, 2011; Cronin, 1997; Kairouz, Gliksman, Demers & Adlaf, 2002) have also been the reasons for college students' drinking behaviour.

Other unique influence on alcohol consumption among college students are the interpersonal and intrapersonal drinking perceptions. A close friend's perceived drinking behaviour is more highly correlated to one's own drinking consumption than the perceived typical college drinking and the intrapersonal factors like drinking intentions and perceptions are related

to alcohol consumption across all drinking occasions (Baer, Stacy & Larimer, 1991; Mallett, Bachrach &Turrisi, 2008; Thombs, Wolcott & Farkash, 1997; Wood, Read, Palfai & Stevenson, 2001).

Heavy and problematic drinking during college years is a significant public health concern. Large-scale surveys done in the United States indicate that approximately 68% of college students drank alcohol in the past month (Johnston, O'Malley, Bachman, & Schulenberg, 2006), and approximately 40% of all college students engage in heavy episodic drinking, defined as consumption of 5 or more drinks for men and 4 or more drinks for women in one drinking episode during the past two weeks (Wechsler, Dowdall, Davenport, & Rimm, 1995). Heavy episodic alcohol consumption in college students is related to numerous consequences, including academic difficulties, property damage, risky sexual activity, blackouts, alcohol poisoning and death (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Wechsler & Issac, 1992). The first year of school is a particularly risky period, and many first-year students develop a pattern of heavy drinking that puts them at risk for adverse consequences (Borsari, Murphy, & Barnett, 2007).

Motivational Model of Alcohol Use

That brings about the question: why do some people drink to excess knowing fully well that it jeopardises their health and wellbeing, relationships and camaraderie, is economically draining and can have issues with law and order? Researchers have come out with theories that justify this behaviour. Among the theories, the motivational model espoused by Cox and Klinger (1988, 2011) best describes the different perspectives related to drinking behaviour. Consolidating and expanding on the incentive motivation theories propounded by Black (1968) and Stewart, de

Wit & Eikelbloom (1984), the motivational model propels these incentives into goals or pursuits that produces or has an ability to produce an affective change.

The motivational model combines the biological, psychological, and sociocultural determinants of drinking and shows how each variable is channelled through a motivational pathway (Cox & Klinger, 1988; 1990). The model takes into account that drinking motivations and the wishes, aspirations, and goals that people have or do not have in their life are intertwined. In the decision to drink or not to drink, the decisional framework of this model states that drinking motives are proximal factors that provide the pathway through which more distal factors like alcohol expectancies contribute to the decision of alcohol use (Cooper, 1994; Cox & Klinger, 1988; Kuntsche, Knibbe, Engels & Gmel, 2007; Read, Wood, Kahler, Maddock, & Palfai, 2003). Thus, the model as explained by Cox and Klinger (1988, 2011) can be classified into following four categories: (1) internally generated, positive reinforcement motives (i.e. drinking to enhance positive mood or well-being); (2) externally generated, positive reinforcement motives (i.e. drinking to obtain positive social rewards); (3) internally generated, negative reinforcement motives (i.e. drinking to minimise or regulate negative emotion such as distress or pain); and (4) externally generated, negative reinforcement motives (i.e. drinking to avoid social censure or rejection).

The concept of drinking motives assumes that drinking behaviour is motivated by different needs or serves different functions, and that specific drinking motives are associated with a unique pattern of precursors and consequences. The decision to drink is a combination of emotional and rational processes in that the decision is made on the basis of the affective change that the person expects to achieve by drinking compared to not drinking. The affective change can either be related to the direct chemical effects of alcohol, such as enhancement of mood or reducing tension,

or its indirect effects, such as social acceptance. As a matter of fact, a person does not have to be aware of either having made a decision or the factors affecting the decision. Such decisions in most cases are even unconscious and automatized. (Kuentsche, Knibbe, Gmel & Engels, 2005).

In the light of above presentation, this thesis sets out to examine the role brief interventions play in reducing alcohol use and alcohol related problems and with a focus on university students' drinking that has been described in detail in Chapter II. This chapter traces the history of brief interventions and its progression until date, describes different types and mode of presentation of brief interventions, tries to elucidate common elements of effective brief interventions, and provides evidence of effectiveness of brief interventions from selected reviews. While doing so, the chapter focuses on student drinking and the brief interventions that has provided good evidence of effectiveness in this population.

Chapter III examines the role different motives play in alcohol consumption and the types of brief motivational interventions that has shown to be effective in reducing alcohol consumption. While examining the role of drinking motives in student population, the chapter also tests the psychometric properties of five-factor Modified Drinking Motives Questionnaire (Revised) in the UK student population.

The evaluation of two different kinds of brief interventions, a brief personalized feedback (BPF) and a brief motivational intervention (BMI), compared to the combination of both and a control condition among university students'drinking behaviour is done in Chapter IV. The chapter tests the hypothesis that the above two interventions are equally effective in reducing alcohol consumption and alcohol related problems among university students, and that they are

comparatively more effective than the control. The further hypothesis is that the combination of interventions is superior to individual interventions, i.e., Control < BPF = BMI < BPF+BMI.

In Chapter V, the findings of the study is discussed, and critically analysed. The chapter reflects the present study in a new light where the individual interventions that were found to be effective in many studies is not only compared to the control, but also with the combination of different approaches. This chapter also discusses the future implications of the findings.

Chapter Two

Brief Interventions for Excessive Alcohol Use

Brief interventions, as the name suggests, are shorter in duration than other treatments for alcohol abuse. They usually last from a few minutes to a couple of hours at most, and consists of a single session or up to four sessions. Brief interventions have been found to be more effective and more efficacious in reducing alcohol consumption compared to assessment-only controls and equally effective compared to more intensive, longer and specialized interventions in a variety of settings and population groups (Bertholet, Daeppen, Wietlisbach, Fleming, & Burnand, 2005; Bien, Miller, & Tonigan, 1993; B. E. Borsari, 2003; DiFulvio, Linowski, Mazziotti, & Puleo, 2012; E. F. S. Kaner et al., 2009; Moyer, Finney, Swearingen, & Vergun, 2002; O'Donnell et al., 2014; Seigers & Carey, 2011; Wilk, Jensen, & Havighurst, 1997).

Definitions and descriptions of brief interventions abound in the alcohol literature. According to World Health Organization (WHO; Babor & Higgins-Biddle, 2001, p. 6), brief interventions are "practices that aim to identify a real or potential alcohol problem and motivate an individual to do something about it". The National Institute of Alcohol Abuse and Alcoholism (NIAAA; 2000) defines brief interventions as "time-limited counselling strategies that are especially useful in busy, high-volume health care practices, where physicians are often pressed for time and have multiple priorities". The distinguishing feature of brief interventions from other treatments for alcohol problems are summed up in the following five criteria. That brief intervention is (a) generally restricted to four or fewer sessions, (b) delivered to those at risk for alcohol dependence / serious consequences, (c) usually delivered in a primary health care setting,

(d) delivered by people not specialised in the treatment of alcohol problems, and (e) about drinking in moderation, rather than abstinence, as the goal of the intervention, (NIAAA, 1997).

While endorsing the NIAAA criteria in their study conducted among male heavy drinkers in general practice, Aalto et al. (2001) defined brief intervention as "any therapeutic or preventive consultation of short duration undertaken by a health care professional, consisting of one to five sessions, who is not a specialist in addiction treatment. Generally, these interventions take place elsewhere than in an addiction treatment setting and the usual treatment goal is moderate drinking rather than total abstinence." A more comprehensive description was provided by Heather (1995, p. 287), who described brief interventions as "a family of interventions varying in length, structure, targets of intervention, personnel responsible for their delivery, media of communication and several other ways including their underpinning theory and intervention philosophy."

There are many variations in the broad description of brief interventions. For example, according to the National Institute of Alcohol Abuse and Alcoholism (NIAAA, 1995), in a brief intervention, the health care provider basically follows three steps; they are: (1) State the medical concern, (2) Advise the patient either to abstain or cut down, and (3) Agree on a plan of action. Essentially, brief interventions comprise two components, advice and brief counselling. General and specific information on alcohol use and problems should be presented as advice that also includes recommendations for changing behaviour and provides health education as well as sensible drinking guidelines. Achievement of the specific goals of the intervention should form the counselling component that combines advice and information (Sanchez-Craig & Wilkinson, 1993). A little more clarity was provided by Brown (2001), who stated that brief interventions varied in length and the number of sessions, from a few minutes up to three sessions. Assessment and feedback are the core components of a brief intervention that aims to address various goals, which

can range from reducing consumption, providing skills training, enabling problem recognition, and enhancing commitment to change.

Brief interventions are usually carried out in general community settings and are delivered by non-specialist personnel. These interventions are directed at hazardous and harmful drinkers who are not necessarily seeking help for alcohol problems. The drinkers are usually identified by opportunistic screening in a routine healthcare system or another identification process, such as media recruitment. Brief interventions can be simple, i.e., giving only structured advice that takes no more than a few minutes; or extended, i.e., structured therapies that takes about 20-30 minutes and often involves one or more sessions (Raistrick, Heather, & Godfrey, 2006).

History of Brief Alcohol Interventions – The 'Golden Age'

Although alcohol abuse and adverse consequences of excessive drinking have been recognized from the beginning of recorded history, not until the middle of the twentieth century were these understood as the natural consequences of unfortunate personal decisions to drink excessively (Miller & Hester, 2003). The changes in ideas and conceptions towards alcohol use and alcohol abusers during this period, from a predominantly moralistic views and disease-centred approach towards more acceptable behavioural problem, and from a punitive approach towards a more liberal approach, led to progressive thinking and developments in alcohol treatment research, including brief interventions. The first brief intervention trials, the Boston trials, conducted by Morris Chafetz and colleagues at Massachusetts General Hospital in Boston began in 1957 and included investigations of the adequacy of existing emergency room care for alcoholics (McCambridge & Cunningham, 2014). At the same time, another study was being conducted at the Maudsley Hospital in London by D. L. Davies that focused on the achievement of 'normal drinking' among former alcoholics, rather than total abstinence, paving the way for the recognition

of controlled drinking as a legitimate outcome (McCambridge & Cunningham, 2014; Heather & Robertson, 1981).

These studies were seminal in that they led to the burgeoning of similar studies in brief interventions for alcohol use and problems. Indeed, the three decades between the early 1960's and the early 1990's could be termed as the 'golden age' in the development of brief interventions. The target populations were not only the problem drinkers or alcohol abusers, they also included heavy drinkers at risk of developing problems. The attitudinal change shifted from treatment to prevention and from abstinence to controlled drinking. The application of public health concepts to the genesis of alcohol use and abuse brought all the models and theories, often conflicting, into a single paradigm that could be easily understood and conceptualised (McCambridge & Cunningham, 2014).

The primary care revolution and the utilisation of primary care resources for the treatment and prevention of alcohol use disorders marked a steady growth in the development of brief interventions and clinical trials (McCambridge & Cunningham, 2014). In a study comparing a single session of advice with standard treatment at that time among 100 married men who were consecutive attenders at the outpatient Alcoholism Family Clinic, Edwards et al. (1977) found equivalent outcomes from the two approaches. This study at that time was considered very influential for alcohol treatment, leading treatments thereafter to become briefer and to be offered in outpatient settings (McCambridge & Cunningham, 2014).

In one of the trials with a long follow-up period of 24-60 months, Kristenson, Ohlin, Hultén-Nosslin, Trell, and Hood (1983) carried out an intervention among problem drinkers with an elevated level (i.e., in the top decile of the distribution) of serum gamma-glutamyltransferase (GGT) as the screening instrument. Participants were monitored with regular measurement of

GGT. The intervention consisted of successive contacts with both a doctor and a nurse at regular intervals, and counselling was focused on living habits and providing support and encouragement in patients' efforts to change their drinking habits. The treatment goal was moderate drinking rather than abstinence, and moderation was tolerated as long as GGT values did not rise. Two and four years after the screening investigation, the GGT values in both treatment and control groups had significantly decreased with large effects on alcohol and mental health outcomes. Moreover, the impact of the intervention was greater in preventing medical-social consequences of heavy drinking as shown by impacts on health services utilization, employment and mortality (Kristenson et al., 1983).

One of the early examples of a brief intervention with a minimum of resources is the one conducted by Chick, Lloyd, and Crombie (1985), who recruited 161 men fulfilling the criteria for problem drinking among those admitted to medical wards in a general hospital in Edinburgh. The treatment group received a session of counselling about their drinking habits from a nurse while the control group received only routine medical care. Both groups reported a reduction in alcohol consumption when interviewed 12 months later, but the counselled group had a significantly better outcome than the control group. The authors recommended that systematic screening for alcohol consumption and related problems should become a routine part of medical assessment, and they concluded that advice on drinking habits is effective if given before irreversible physical or psychosocial problems have developed (Chick et al., 1985).

The World Health Organization (WHO) during this period played a significant role in the development and promotion of the advantages of brief interventions. This led to a major shift in thinking away from traditional approaches to alcohol treatment towards public health responses emphasizing strategies that could be applied in primary care settings with a minimum of time and

resources (Babor & Grant, 1992). The classic studies that followed under the 'WHO Brief Interventions International Collaborative Project' included development of the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), a randomized clinical trial (Babor et al., 1994), and a cross-national trial (Babor & Grant, 1992). The cross-national study was conducted in eight countries to evaluate the relative effects of simple advice and brief counselling among heavy drinkers identified in primary health care and other health settings. The study found that five minutes of simple advice were as effective as 20 minutes of brief counselling in reducing daily alcohol consumption and intensity of drinking. The study concluded that 'brief interventions are consistently robust across health care settings and sociocultural groups and can make a significant contribution to the secondary prevention of alcohol-related problems if they are widely used in primary care' (Babor & Grant, 1992).

In one of the earliest reviews of brief interventions, Bien et al. (1993) summarised and analysed 32 interventions that either compared the intervention with a control or extended therapy. In 8 randomized trials in health care settings comparing brief intervention with a control, significant reductions in alcohol use and/or related problems were reported. The review also analyzed 13 randomized trials that compared brief interventions with a broad range of extended treatments for problem drinking and found remarkably few differences between treatments. Bien et al. (1993) concluded that a well-planned and consistently administered brief intervention can have an overall impact comparable to that of more extensive treatment. In a meta-analysis of 12 randomized control trials addressing brief interventions for heavy alcohol drinkers that met the inclusion criteria, Wilk et al. (1997) found that the outcome was significantly favourable, with an odds ratio of 1.91, in favour of brief interventions over no intervention. These findings were consistent across gender, intensity of intervention, type of clinical setting, and higher-quality

clinical trials. The duration of brief interventions they looked at was less than 1 hour and incorporated simple motivational counselling techniques. The study concluded that 'heavy drinkers who received a brief intervention were twice as likely to moderate their drinking 6 to 12 months after an intervention when compared with heavy drinkers who received no intervention' (Wilk et al., 1997).

Thus, the momentum was generated in the 'golden age' with brief intervention studies carried out in and across different countries, in different situations, across different settings, and among different population groups. Further refinement of tools and techniques brought about by changes in thinking and ideas about alcoholism and alcohol use in general, and their brevity and cost-effectiveness compared to established extended treatments, helped to establish brief interventions as a benchmark in the management of alcohol use disorders (for a review, see Bien et al., 1993), albeit in some studies these interventions were not very helpful for the dependant drinkers or those with a severe alcohol use disorder (eg., Chapman & Huygens, 1988; Kuchipudi, Hobein, Flickinger, & Iber, 1990). Well-planned and methodologically sound clinical trials were conducted that were systematically reviewed and analysed (Bien et al., 1993; Poikolainen, 1999; Wilk et al., 1997). These reviews helped to establish the efficacy and effectiveness of brief interventions, especially in primary care and outpatient settings, for the heavy drinking population. The 'treatment' approach that had abstinence as its goal was taken over by the 'harm reduction' approach to brief interventions that aimed for controlled or moderate drinking as its goal.

In the historical literature, descriptions and implementations of different variations of brief interventions in different contexts have been a problem for precisely defining what constitutes a brief intervention. For example, variations of brief interventions have been (a) used successfully to facilitate referrals in health care settings (e.g., Elvy, Wells, & Baird, 1988; Nirenberg, Sobell,

&Sobell, 1980; Stark & Kane, 1985), (b) compared with no treatment controls targeting drinking and alcohol-related consequences in health care settings (e.g., Chick et al., 1985; Kristenson et al., 1983; Persson & Magnusson, 1989; Wallace, Cutler, & Haines, 1988), (c) used in studies with self-referred drinkers recruited through media advertisements outside the context of treatment (e.g., Heather, Kissoon-Singh, & Fenton, 1990; Heather, Whitton, & Robertson, 1986; Miller, Benefield, & Tonigan, 1993; Miller, Sovereign, & Krege, 1988), (d) studied in treatment contexts compared with more extensive treatments (e.g., Chapman & Huygens, 1988; Drummond, Thom, Brown, Edwards, & Mullan, 1990; Edwards et al., 1977; Miller, Gribskov, & Mortell, 1981; Skutle & Berg, 1987), and (e) used as a motivational enhancement prior to an extended treatment (e.g., Brown & Miller, 1993; Miller, 1985).

Of late, we have a plethora of brief interventions packaged in new technological avatars, brought about as a result of advances made in information and communication technology. The use of Internet-based or web-based (online) and computer-delivered screening and interventions, especially in younger age groups and student populations, have seen a notable increase in recent years (e.g., Bewick et al., 2008; Elliott, Carey, & Bolles, 2008; Khadjesari, Murray, Hewitt, Hartley, & Godfrey, 2011; White et al., 2010, for the reviews). The reviews of the literature have found that computer-based interventions were more effective than no intervention, and as effective as alternative interventions. The advantages of these interventions over traditional interventions are that they are relatively inexpensive, use less time and fewer resources, are convenient to administer, and could be particularly useful for groups less likely to access traditional alcohol-related services, such as women, young people, and at-risk users (White et al., 2010).

Types of Brief Interventions

There is still a great deal of confusion regarding brief interventions because they are not unique and not well defined; rather, the term is an umbrella covering a range of methods or therapeutic activities. A way to circumscribe the problem was suggested by Nick Heather, who distinguished between two different kinds of brief interventions: (a) *opportunistic* or *primary care* brief intervention, which refers to interventions delivered at the primary care level to people who are not seeking help for an alcohol problem and who are identified by screening in settings they attended that were not related to such a problem, and (b) *specialist* brief interventions, where the intervention is delivered in specialist alcohol treatment centres which people have attended, or have been mandated or persuaded to attend, to seek help for their alcohol problems (Heather, 1995; Heather, 1996). It is clear from the above classification that opportunistic brief interventions are appropriate for excessive drinkers with a low-to-moderate level of dependence and a relatively low incidence of alcohol-related problems. The intervention here could be as brief as a few minutes of advice and not exceeding three sessions, and the aim is to reduce alcohol consumption to a moderate level. On the other hand, specialist brief intervention would be provided to drinkers with high levels of both dependence and alcohol-related problems, although it will not be the same as for drinkers receiving specialist alcohol treatment in specialized centres. Comparatively, specialist brief intervention would be longer and more intensive, but briefer than the treatment offered by specialist alcohol agencies, and the goal of treatment would be total abstinence from alcohol.

Another way brief interventions could be classified is by the nature and content of the intervention and the form of delivery. *Brief personalized feedback* regarding an individual's alcohol consumption patterns with feedback on variables such as mean weekly alcohol

consumption, blood alcohol concentration (BAC) levels, associated health and social risks of problem drinking, normative feedback, and self-help guidelines to curb problem drinking, is one such intervention (Riper et al., 2009). Brief personalized feedback may be delivered in many ways and forms, such as: (a) Mail-based intervention, i.e., by post or email (e.g., Bendtsen, Johansson, & Åkerlind, 2006; Bryant, Henslee, & Correia, 2013; Collins, Carey, & Sliwinski, 2002; Havard, Shakeshaft, Conigrave, & Doran, 2012; Juarez, Walters, Daugherty, & Radi, 2006; Larimer et al., 2007; Walters, Bennett, & Miller, 2000); (b) In-person or face-to-face intervention (e.g., Barnett, Murphy, Colby, & Monti, 2007; Borsari & Carey, 2000; Marlatt et al., 1998; Murphy, Dennhardt, Skidmore, Martens, & McDevitt-Murphy, 2010; Tevyaw, Borsari, Colby, & Monti, 2007); (c) Computerized or web-based intervention (e.g., Doumas, Haustveit, & Coll, 2010; Hendershot, Otto, Collins, Liang, & Wall, 2010; Hustad, Barnett, Borsari, & Jackson, 2010; Jouriles et al., 2010; Lewis & Neighbors, 2007); (d) in a group format (e.g., Larimer et al., 2001; McNally & Palfai, 2003; Walters et al., 2000); or (e) as peer-led personalized feedback (e.g., Fromme & Corbin, 2004).

Motivational interventions that aim to motivate alcohol users to change their drinking behaviour could be provided as brief interventions. For example, the Drinker's Check-Up (DCU; Miller & Sovereign, 1989) is an abbreviated version of more extensive Motivational Interviewing (MI; Miller, 1983), which was designed as a health promotion model for early identification of emerging alcohol-related problems. The DCU consists of 2 hours of assessment yielding several indicators of alcohol-related problems, followed by a one-hour feedback session. There is an interval of one week between the assessment and feedback sessions. The assessment usually consists of brief drinker's profile, alcohol use, perhaps serum profiles to indicate the effects of alcohol, and neuropsychological tests to assess the effects of alcohol. The feedback is personalized

based upon the personal profile drawn from the assessment and is presented orally, and the participant is given a written explanation of the results to take home. The important difference between the simple personalized (normative) feedback and the DCU is that in DCU the information is presented as objective data, and the focus is on the participant's own concerns and reactions rather than on the counsellor's interpretations. DCU has been adapted to be delivered in alternative versions such as manual-guided version that was developed in the Netherlands called the Dutch Drinker's Check-Up (DVA; Schippers, Brokken, & Otten, 1994), and a computerized version that can be delivered over the Internet (Hester, Delaney, & Campbell, 2012; Hester, Squires, & Delaney, 2005). The extant literature indicates that DCU can motivate both treatment seekers and non-treatment seekers with problematic alcohol use to take part in alcohol treatment services, and that the computerized version seems particularly promising (Emmen, Schippers, Bleijenberg, & Wollersheim, 2011).

Another brief motivational intervention to motivate alcohol users to reduce their drinking is the assessment and feedback using Personal Concerns Inventory (PCI; Cox & Klinger, 2000) or Personal Aspirations and Concerns Inventory (PACI; Cox, Klinger & Fadardi, 2006). Both PCI and PACI are short variants of the Motivational Structure Questionnaire (MSQ; Cox & Klinger, 2011), which are based on the principles of Systematic Motivational Counselling (SMC; Cox & Klinger, 2011) but designed to be much simpler and friendlier than the MSQ and could be adapted further to be used as a brief intervention. The PCI and PACI usually consists of two sessions, assessment and intervention, which may be on the same day or a few days apart. During the assessment, participants fill out the inventory, writing their goals in different life areas and rating each of them along a variety of motivational dimensions. Prior to the intervention, a motivational profile is generated from the different goals and their ratings and scores based on them are

graphically presented. The counsellor and the participant then go through each goal, and the meaning of each score is explained to the participant with suggestions for finding a suitable way to resolve each concern related to each goal. The rationale is that if participants can find ways to resolve their important concern, they will be able to achieve greater life satisfaction without the need to try to cope by drinking alcohol.

Common Elements of Effective Brief Interventions

The research on the efficacy and effectiveness of brief interventions for alcohol problems has shown beyond doubt that they: (a) are usually significantly more effective than no intervention, (b) have almost similar impact compared to that of more extensive interventions, and (c) have the ability to enhance the effectiveness of subsequent treatment. These findings have been reviewed and meta-analysed in several studies conducted among different population groups (Bien et al., 1993; E. F. S. Kaner et al., 2009; Moyer et al., 2002; Nilsen, 2009; O'Donnell et al., 2014; Poikolainen, 1999; Riper et al., 2009; Seigers & Carey, 2011; Vasilaki, Hosier, & Cox, 2006; Wilk et al., 1997).

So, what does this evidence tell us? It tells us that brief interventions contain ingredients that are essential to instigate change in a substantial proportion of the population studied. Examining all the evidence available, Miller and Sanchez (1994) enumerated the elements commonly included in brief interventions that have been shown to be effective. These elements are summarised by the acronym FRAMES which refer to the following: Feedback, Responsibility, Advice, Menu, Empathy, and Self-efficacy. These elements are described in some detail in the following paragraphs.

Although the type of information collected during an assessment may vary across different studies, the intervention usually includes information about the participant's drinking habits, which

may or may not be compared with other peoples' drinking; nature and extent of the person's alcohol-related problems; level of dependence; family history; and other risk factors. Most of the interventions provide *feedback*, in some form or another, of the assessment results, and how they are related to the person's personal risks or impairment. Making clients aware of their level of drinking and highlighting risks related to their current drinking pattern could be a powerful motivator to change. *Responsibility* for change is an important element because individuals are most likely to attempt to change and persevere with the course of action when they chose to do so (Miller, 1995). It is more about emphasising that the decision to change drinking patterns or to continue drinking at the same level is the choice of the person alone. Acknowledgement of personal *responsibility* has been identified as a key factor in motivating behaviour change. One of the potent elements of a brief intervention is the delivery of clear and direct *advice* to change mainly, but not exclusively, for health-related reasons. *Advice* may be about letting the client know about alcohol units and drinking limits, and the risk of excessive drinking. *Menu* refers to the provision of alternative strategies to accomplish change so that an individual could choose an approach that is appropriate and acceptable. Alternative strategies could be, e.g., setting personal drinking limits and sticking to them; alternating alcoholic drinks with soft drinks; switching to low-alcohol drinks; having regular alcohol-free days; engaging in alternative activities to drinking, etc. For the delivery of an intervention, the emphasis is on the developing rapport by using a warm, reflective, empathic, and understanding approach. Understandably, an aggressive, directive, authoritarian, coercive, or confrontational approach is counter-productive. Finally, encouraging client's self-efficacy for change and communicating a sense of optimism appears vital, rather than focusing on helplessness or powerlessness over alcohol. Different combinations of these elements have constituted successful brief interventions (Bien et al., 1993), but no one of them is sufficient

or necessary for a favourable outcome. The only element common to all brief interventions was *giving advice*.

The way brief interventions have an impact on outcome may be because they instigate natural change processes which otherwise would not occur, or in the event of occurring, would be delayed in onset (Bien et al., 1993). These natural change processes may be the result of motivational processes, which induce motivation for change (Miller & Rollnick, 1991). Thus, one may require minimal additional assistance to change the behaviour once the motivation for change has been enhanced. According to motivational interviewing, a set of five basic principles needs to be adhered to in order for problem recognition and to enhance motivation for change; they are: expressing empathy, developing discrepancy, avoiding argumentation, rolling with resistance, and supporting self-efficacy (Rollnick & Miller, 1995). There are several brief motivational interventions that aim to influence alcohol use by following these principles, such as Motivational Enhancement Therapy (MET: Project MATCH Group, 1993) and DCU (Miller et al., 1988), that are based on the principles of Motivational Interviewing (MI; Miller & Rollnick, 1991); whereas PCI (Cox & Klinger, 2000), and PACI (Cox, Klinger, & Fadardi, 2006) are based on SMC (Cox & Klinger, 2011). A detailed discussion on motivational interventions is presented in Chapter Three.

Evidence for the Effectiveness of Brief Interventions

A number of reviews and meta-analyses have concluded that brief interventions are effective in reducing alcohol consumption and alcohol-related consequences (Bertholet et al., 2005; Bien et al., 1993; Fachini, Aliane, Martinez, & Furtado, 2012; Kaner et al., 2009; Moyer et al., 2002; O'Donnell et al., 2014; Poikolainen, 1999; Riper et al., 2009; Vasilaki et al., 2006; White et al., 2010; Wilk et al., 1997). These reviews have evaluated interventions conducted in primary care settings, for college students, in alcohol treatment centres, and online. These

interventions included both opportunistic brief interventions and brief treatments. Opportunistic brief interventions are usually compared to no intervention, a sham control, or a minimal intervention, and greater reduction in the outcome measure obtained with opportunistic brief interventions is taken as evidence of their effectiveness. On the other hand, brief treatment is compared to a more intensive form of treatment, and no significant difference between them is taken as evidence for the effectiveness of brief treatment.

One of the earliest and most comprehensive of reviews of that time was conducted by Bien et al. (1993), who meta-analysed 32 controlled studies of the effectiveness of brief interventions in three contexts, viz., general health care settings, with self-referred drinkers, and in a treatment context. Two of the 32 studies (Elvy et al., 1988; Kuchipudi et al., 1990) that were reviewed used a brief intervention to facilitate referral by motivating problem drinkers to accept specialist treatment rather than directly targeting drinking outcomes. The study by Elvy et al. (1988) found that those who were first referred to and then accepted one session of alcohol counselling had better outcomes at a one-year follow-up compared to a control group, but at 18 months follow-up, this difference in improvement had disappeared due to improvement in the control group, which the authors attributed to reactive effects of the 1-year follow-up. The study by Kuchipudi et al. (1990) was an unsuccessful trial of a referral procedure. This may be because those selected for the study had also not responded to a previous advice-only intervention.

Ten of the studies reviewed by Bien et al. (1993) were opportunistic brief interventions in health care settings designed to impact drinking behaviour directly. The researchers in these studies compared brief interventions with no treatment or a minimal treatment. The most significant and most widely cited study among them was the WHO study conducted by Babor and Grant (1992). This study was carried out in ten countries with screening of over 32,000 patients in

general health care settings. Of these, 1,490 who were identified as at-risk drinkers received a 20-minute health interview prior to the intervention. The researchers evaluated two types of brief interventions, viz., five minutes of advice, or advice plus 15 minutes of counselling and a self-help manual. At 9-month follow-up, there were significant reductions in alcohol consumption among the intervention groups compared to the control group. The outcome, however, differed only for the males; females showed comparable reductions among both intervention and control groups. Two of the 10 studies reviewed (Heather, Campion, Neville, & Maccabe, 1987; Romelsjö et al., 1989) failed to find a significant effect for a brief intervention with problem drinkers.

Bien et al. (1993) reviewed five studies that examined the efficacy of brief interventions with problem drinkers responding to a media advertisement outside the context of treatment, or with self-referred drinkers. Two of them used DCU (Miller & Sovereign, 1989) as the brief intervention. The first of these trials (Miller et al., 1988) showed significant reductions in drinking among drinkers given the DCU compared to assessment only controls at the 6-week follow-up. These reductions were enduring throughout the 18-month follow-up for some of the drinkers. This trial was replicated five years later in another randomized trial (Miller et al., 1993) with significant mean reduction in alcohol consumption that was maintained through 1-year follow-up. The significant feature of these interventions were that the counsellor style was strongly predictive of outcomes in that with the more confrontational the approach, it was more likely the client would be drinking more a year later.

The final 15 studies reviewed by Bien et al. (1993) dealt with brief interventions that occurred in treatment contexts where participants were referred or self-referred with the intention of receiving alcohol treatment services. Thirteen of these studies compared brief interventions with more extensive treatments, while two studies evaluated the usefulness of brief interventions as a

motivational agent to prepare clients for formal alcohol treatment. All but two of the thirteen controlled trials (Chick, Ritson, Connaughton, & Stewart, 1988; Robertson, Heather, Dzialdowski, Crawford, & Winton, 1986) comparing brief interventions with extensive treatments that reported extended treatment to be more effective than brief counselling. All other studies reported no significant difference between brief interventions and extended treatments. These findings demonstrate that brief intervention, if well-planned and consistently administered, can be as effective as more extensive treatment.

Poikolainen (1999) meta-analysed seven studies using 14 datasets that focused on two alcohol use variables - alcohol consumption and γ-glutamyltransferase (GGT) activity. The sample was recruited from either the general population or from family or general practitioner (GP) practices. Studies with participants recruited from hospital wards or including highly alcohol-dependent individuals were excluded. This meta-analysis concluded that effectiveness varied across duration of the intervention and gender. The results showed that extended brief intervention, i.e., several sessions, had large effect sizes for reductions in alcohol consumption and GGT activity, but the effect sizes for both outcomes lacked statistical homogeneity. Two of the studies with extended brief interventions showed effectiveness for female drinkers. On the other hand, very brief interventions consisting of 5-20 minutes did show medium to large effect sizes relative to control conditions for alcohol consumption and GGT activity across both genders, but due to lack of homogeneity the results were inconclusive.

Three years later, another meta-analysis was conducted by Moyer et al. (2002) who reviewed controlled investigations in treatment-seeking and non-treatment-seeking samples. The review classified selected studies according to both the type of comparison, i.e., brief intervention versus a control or versus a more extended treatment, and the type of patient population, i.e.,

treatment-seeking versus non-treatment-seeking. The treatment-seeking participants were those who responded to advertisements or who were referred to alcohol treatment and the non-treatment-seeking participants were those identified opportunistically while being treated for other problems. In the non-treatment-seeking samples in which brief interventions were compared to control conditions, significant, largely homogenous, small-to-medium effect sizes were found, which indicated positive evidence for the effectiveness of brief interventions over no treatment. While examining the effects for studies comparing brief interventions with extended treatments in treatment-seeking samples, the effect sizes were statistically homogenous and not significantly different. The analyses also found that extended treatments were superior to brief interventions in reducing alcohol consumption only when the follow-ups were over 3-6 months with small-to-medium effect sizes.

In a meta-analytic review of 22 studies, Vasilaki et al. (2006) examined the efficacy of motivational interviewing (MI) as a brief intervention for excessive drinking. Only 15 studies qualified for further analysis, and nine of these studies compared MI with no treatment control group. Although the results were in favour of MI, significant heterogeneity was observed. Further analyses highlighted two reasons that might have had an effect on homogeneity: (a) the length of the follow-up period, i.e., effect sizes at shorter than a three-month follow-up were significant, but at shorter than 6 months, the effects for MI compared with no treatment were greater at the first follow-up than at the second follow-up, and (b) level of drinking, i.e., when dependent drinkers with more severe problems were excluded from the analyses, the effect of MI compared with no treatment was significant for those with less than 3-month follow-up and with significant heterogeneity. The remaining nine studies compared MI with another treatment, five of which compared brief MI with treatment as usual/brief advice/standard care, one with directive-

confrontational counselling, one with educational intervention, one with skill-based counselling (SBC), and one with cognitive behavioural treatment. These analyses showed that MI was more efficacious than a range of other treatments for alcohol problems, and the aggregate effect size was statistically homogeneous. The authors concluded that (a) about 87 minutes of brief MI is more efficacious than no treatment in reducing alcohol consumption among hazardous drinkers in the short term, i.e., less than 3 months, and (b) about 53 minutes of brief MI is more efficacious than a diverse set of other treatments.

Kaner et al. (2009) conducted a systematic review both to evaluate the effectiveness of brief alcohol interventions in primary care settings and also to determine whether the outcomes differed between efficacy and effectiveness trials. The authors meta-analysed 22 randomized controlled trials that evaluated outcomes in over 5,800 patients. Compared to controls, those receiving brief interventions had a significant reduction in alcohol consumption at 1-year follow-up. However, this outcome was significant in men but not in women. When the interventions were extended, brief interventions produced no significant reduction in alcohol consumption compared to controls. There was no significant difference in alcohol consumption between trials classified as efficacy and effectiveness trials in the effect of the brief intervention. This lack of difference suggests that the current literature on brief alcohol interventions is germane to routine primary care in that it takes into account its applicability in real-world situations.

Of late, there has been a significant increase in online interventions for alcohol problems, and most of the studies have claimed that they are as effective as traditional interventions. There are several interactive computer-based screening and intervention programmes that have been developed and are delivered through stand-alone computers (Neighbors, Larimer, & Lewis, 2004), or via the Internet, such as web-logs or discussion boards, for e.g., AlcoholHelpCenter.net

(Cunningham, van Mierlo, & Fournier, 2008). In addition, there are interactive software applications ranging from brief personalized normative feedback interventions (Bewick, Trusler, Barkham, et al., 2008) to modular multi-session programmes, for e.g., AlcoholEdu (Eisen et al., 2009). To review the efficacy of online programmes for alcohol problems, White et al. (2010) systematically analysed 17 online alcohol interventions, of which 12 were conducted with university students, and 11 studies were carried out with at-risk, heavy, or binge drinkers. Only those articles were included in the review that were either a primary intervention that was delivered and accessed via the internet, or an intervention that was focussed on moderating or stopping alcohol consumption, or a study that was a randomised trial of an alcohol-related screening, assessment and intervention. The review found that online alcohol interventions were effective in reducing alcohol consumption and in eliciting changes in blood alcohol concentration and other alcohol measures. Compared to assessment alone or general education about alcohol, they appear more efficacious. Other reviews of online alcohol interventions, both qualitative (Elliott et al., 2008), and quantitative (Bewick, Trusler, Barkham, et al., 2008; Khadjesari et al., 2011), have found them to be more efficacious compared to assessment only.

With such abundant evidence generated over the years on the efficacy and effectiveness of brief alcohol interventions, and despite considerable efforts over the years, these interventions still remain somewhat elusive for their adoption in routine practice. For these interventions to be inclusive in a system of care there are constraints that need to be resolved. They may be time constraints, inadequate training and resources, a false belief that patients will refrain from changing their behaviour in spite of providing them with necessary advice, and apprehensions among practitioners to discuss anything about alcohol with their patients, fearing that it could offend them (O'Donnell et al., 2014). Moreover, there are inconsistencies in their application and

incorporation in routine care. To understand these inadequacies, O'Donnell et al. (2014) conducted a systematic review of the reviews of brief alcohol interventions carried out in primary healthcare. The aim of the review was to evaluate the extent to which the evidence base on alcohol brief intervention in primary healthcare was saturated, and to determine whether there were any remaining gaps in knowledge that require further investigation. From 24 different systematic reviews, the authors summarised the evidence by answering several pertinent questions.

First, the effectiveness of brief alcohol intervention delivered in primary healthcare settings was summarised. Across the reviews, O'Donnell et al. (2014) found consistent reports of the effectiveness of brief alcohol interventions at reducing hazardous and harmful drinking (e.g., Bertholet et al., 2005; Bray, Cowell, & Hinde, 2011; Kaner et al., 2009; Moyer et al., 2002). However, some individual trials (Kaner et al., 2013) and systematic reviews (Bernstein, Bernstein, & Heeren, 2010; McCambridge & Kypri, 2011) were unsuccessful in differentiating the effect of a brief intervention from that of a control condition. The consistently reduced drinking in both intervention and control groups could be explained by the 'Hawthorne Effect' (Adair, 1984; Merrett, 2006; Parsons, 1974; Wickstrom & Bendix, 2000), or a regression to the mean (Barnett, van der Pols, & Dobson, 2005; Bland & Altman, 1994; Kelly & Price, 2005), or it could have been a reactive phenomenon of the screening and assessment procedures (O'Donnell et al., 2014).

The second point that O'Donnell et al. (2014) raised in the review was whether a brief alcohol intervention is equally effective across different countries and different health care systems. They found a geographical bias in that less than half of the included data from studies were based outside Europe or other places in the developed world. The findings from the research conducted mostly in developed countries may not be generalizable outside these contexts, i.e., to developing and transitional countries for the reasons of structural, cultural, and political

differences, as well as differences in drinking patterns, abstention rates, health care practices and health-related consequences (Babor et al., 2013). As Peltzer (2009) pointed out while reviewing brief interventions for alcohol problems in Sub-Saharan Africa, there remains a need for more culturally-specific research in countries outside North America and Western Europe to establish the effectiveness of brief interventions conclusively.

The third observation made by O'Donnell et al. (2014) relates to whether the brief alcohol intervention evidence base is applicable across different groups, such as those differing in gender, age, socioeconomic status, and level of alcohol dependence. Indeed, most of the reviews incorporated in the systematic review were unequivocal in proclaiming the effectiveness of brief intervention for both men and women. However, one review (Chang, 2002) reported no consistent improvement in women. The evidence for pregnant women is equally insufficient, although pregnancy itself may act as a powerful incentive to motivate some women to reduce their drinking (Chang, 2002). Most of the studies on brief alcohol interventions have been conducted among people 18 years or older, and the interventions appear to have been effective in improving alcohol-related outcomes in this age group. However, research among adolescents and older adults is inconclusive (Kaner et al., 2009). Similarly, those reviews that reported on disadvantaged or ethnic minorities found a lack of evidence for the effectiveness of brief interventions (e.g., Gordon, Graves, Hawkes, & Eakin, 2007). According to many reviews, brief alcohol interventions were particularly effective when they were administered to non-treatment seeking, non-dependent patients, but some reviews emphasize the lack of proper differentiation between dependent and non-dependent patients (e.g., Berglund et al., 2003).

The fourth and the final observation made by O'Donnell et al. (2014) is with regard to the optimum length, frequency and content of brief alcohol interventions and the longevity of their

effectiveness. Many reviews showed that brief interventions were effective at the earliest follow-up points, with subsequent decay in effects over time. Also, the effectiveness persisted where there were multiple-contact interventions. However, one of the reviews (Kaner et al., 2009) did not find any advantage for longer and more intensive brief interventions over shorter and less intensive ones. The actual content of the intervention differed in different reviews and within the studies in the reviews causing the interventions to lose their homogeneity. But most of the reviews that reported statistically significant outcomes had at least two of the following three elements, viz. feedback, advice, and goal-setting.

Five decades later following the advent of brief interventions, we are still trying to find out the optimum intervention that precisely fits the definition of a brief intervention. Moreover, the rise in computer, internet, and social media use fuelled by technological advances has completely changed the complexion of the interventions of yore and transformed them into being briefer, more accessible, and more easily administered. Development of computerized, computer-based and e-interventions has brought about a significant increase in the number and types of brief interventions in different contexts, situations, and population groups. This has resulted in more variations in the way brief interventions are described, conceived and delivered than before.

Brief Alcohol Interventions for University Students

University students are a special population group that has been recognized as having well-established levels of hazardous and harmful alcohol use and among whom abundant research on brief interventions has been carried out and with positive impacts (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Carey, Scott-Sheldon, Elliott, Garey, & Carey, 2012; Fachini et al., 2012; Miller et al., 2012; Seigers & Carey, 2011). A variety of approaches have been carried out to reduce drinking and prevent alcohol-related problems among university students. These approaches have

ranged from primary prevention programmes such as environmental interventions, i.e., changing the legal drinking age, increasing alcohol taxes, banning alcohol consumption in public places, etc.; community-based prevention programmes such as mass educational programmes, drink driving campaigns, etc. (Hingson, Berson, & Dowley, 1997; Toomey & Wagenaar, 2002); and behavioural economic approaches (Murphy, Correia, & Barnett, 2007), to secondary prevention programmes in the form of brief interventions. The brief alcohol interventions studied among university students usually include Alcohol Education (Alc Edu), Personalized Normative Feedback (PNF), Alcohol Expectancies (AE), Decisional Balance (DB), Protective Behavioural Strategies (PBS), Goal Settings (GS), and Identification of High Risk Situations (HR). Usually one type of intervention is compared with another or with assessment-only or wait-list control, and sometimes a combination of two or more of these brief approaches are used when brief alcohol interventions are administered. The majority of research on alcohol brief interventions for university students has been carried out in North America (e.g., Carey, Carey, Henson, Maisto, & DeMartini, 2011; Kazemi, Sun, Nies, Dmochowski, & Walford, 2011; Larimer et al., 2007; Martens, Smith, & Murphy, 2013; Turrisi et al., 2009) and Western Europe (e.g., Bendtsen et al., 2006; Bewick, Trusler, Mulhern, Barkham, & Hill, 2008; Ekman et al., 2011; Voogt, Poelen, Kleinjan, Lemmers, & Engels, 2013), but a few studies have been carried out in Australasia (e.g., Kypri, Saunders, & Gallagher, 2003).

One of the pioneering projects to address student drinking was started at the University of Washington in the early 1990s, where in order to test the effectiveness of alcohol skills training in moderating student alcohol consumption, Marlatt, Larimer, Baer, and Quigley (1993) developed a stepped-care model for college students with alcohol problems called the High-Risk Drinker's (HRD) project. Several studies were carried out over the years under the project for high risk

college drinkers at the University of Washington. In one of the initial studies, college students who drank heavily were recruited in two studies to participate in either an eight- or six-week small-group programme to discuss their alcohol use and related risks. The programme was non-confrontational and sought to challenge students' assumptions about the effects of alcohol. In particular, the assumption that if some alcohol is good, "more is better" was challenged, as was the presumed necessity of alcohol consumption for improved social relationships and parties. These beliefs were challenged via information and class discussions of blood alcohol levels, biphasic effects of alcohol, homework assignments to experiment with drinking less, and placebo beverage consumption. The results of this type of project among high risk college drinkers showed drinking-rate reductions of 40% to 50%, which was encouraging, and reductions were maintained for 1- and 2-year follow-up periods (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990).

In the second study among the series of studies under the HRD project, an attempt was made to replicate the efficacy of a skills-based approach to reduce alcohol use among college students (Baer et al., 1992). In this study, a group intervention was compared with a single feedback and advice interview, which tested 3 forms of alcohol risk reduction programming for young adults. Participants were randomly assigned to receive either a 6-week class and discussion group, or a 6-unit self-help manual, or a single 1-hr feedback and advice session with professional staff. The professional staff had individual meetings with the students and gave them feedback about their drinking patterns, risks, and beliefs about alcohol effects. Drinking rates were compared to college norms and averages, and alcohol-related risks, such as grades, blackouts, accidents, were addressed as issues to be considered. Beliefs about alcohol effects were more directly confronted through discussions of placebo effects and about alcohol's effects on social behaviour. An outline of how to reduce the risks associated with drinking was provided. The

effects of this brief intervention were comparable to those achieved with a complete 6-week course.

Further evaluation of the efficacy of a brief intervention to reduce harmful consequences among high-risk student drinkers under the HRD project was improved upon by including a control group. This study (Marlatt et al., 1998) was a randomized controlled trial in which students were screened for risk while in their senior year (i.e., final year) of high school, and 348 students, 188 women and 160 men, were randomly assigned to receive an individualized motivational brief intervention in their freshman year of college or to a no-treatment control condition. A normative group selected from the entire screening pool provided a natural history comparison. High-risk was defined as either drinking monthly and consuming at least five drinks on one occasion in the previous month or experiencing three alcohol-related problems 3 to 5 times in the previous three years as assessed by Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The intervention consisted of the interviewer meeting individually with students, reviewing their alcohol self-monitoring cards, providing feedback about drinking patterns, risks, and beliefs about alcohol effects. Students' self-reported drinking rates were compared with college averages, and perceived risks for current and future problems, for e.g., grades, blackouts, and accidents, were identified. Beliefs about real and imagined alcohol effects were addressed through discussions of placebo effects and the nonspecific effects of alcohol on social behaviour. The delivery of the intervention was according to the motivational interviewing techniques (Miller & Rollnick, 1991), where confrontational communications were strictly avoided; instead, students were allowed to evaluate their situation and to begin contemplating the possibility of change. The control group received assessment only, and both groups were followed up post-intervention at 6, 12, and 24 months. At the end of 12 months following the intervention, the intervention group were mailed

graphic personalized feedback pertaining to their reports of drinking at baseline, and 6- and 12-month follow-ups.

The main finding of the study was that students with high-risk drinking who received brief personalized feedback followed by mailed graphic feedback showed significantly lower levels of alcohol use and alcohol-related problems in comparison to those in the control condition. Although on average all high-risk students drank less and reported fewer alcohol-related problems over the 2-year follow-up period, participants who received the brief intervention showed a significantly greater deceleration of drinking rates and problems over time in comparison with participants in the control group. Significant reductions were found for both harmful consequences on the RAPI scores and for alcohol dependence for high-risk students who received the intervention in comparison with those in the assessment-only control condition. Over the two-year period, most of the high-risk drinkers continued to experience more alcohol problems compared to a natural history comparison group. Ultimately, most of them showed a decline over time which might reflect a developmental maturational effect, a "maturing-out" process that occurs among young heavy drinkers (Gotham, Sher, & Wood, 1997). Brief interventions, in such cases, facilitate or accelerate the process.

These pioneering and many other studies of alcohol brief interventions for high-risk college drinkers under the HRD project at the University of Washington led to the development and publication of a manual called Basic Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999), designed specifically for college students who abuse alcohol. BASICS is a two-session brief intervention and is based on the model that combines capability deficits with developmental and motivational aspects. BASICS is a harm reduction method where the primary goal is to move a student in the direction of reducing risky

behaviours and harmful effects from drinking as opposed to focusing explicitly on a specific drinking goal.

The effectiveness of BASICS impacting college students' alcohol consumption and alcohol-related consequences has been well documented. Following soon after the publication of the manual, BASICS as an individual preventive intervention was studied among high-risk college drinkers to examine its long-term effects relative to the natural history of college drinking (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001). The study was a 4-year follow-up covering the entire undergraduate years. The participants were recruited during their final high school year prior to matriculation at the university. The high-risk drinkers (n = 348) were those who were drinking at least once a month and had consumed 5 to 6 drinks on at least one occasion in the last month, or had experienced at least three alcohol-related negative consequences, as indicated by scores on the RAPI. The high-risk drinkers were randomized to interventional and control groups in equal proportions. The "high-risk" intervention group (n = 174) were compared to the "high-risk" control group (n = 174) and natural history comparison group (n = 113). Over four years, although the intervention group showed positive effects on alcohol use measures, the magnitude of change was highly significant for measures of negative drinking consequences. Baer et al. (2001) described this effect as important in that negative consequences measure the degree to which individuals may be harmed as a result of drinking, and also because BASICS targeted individual choices and reduction of risk, rather than just drinking rates.

In a systematic review and meta-analysis, Fachini et al. (2012) reviewed 18 randomized controlled trials of BASICS that included 6,233 college students who were "at-risk" drinkers. The meta-analysis looked at two outcome measures, alcohol consumption and alcohol-related problems. Significant differences between the intervention and control groups were found in mean

reduction in alcohol consumption and alcohol-related problems at the end of follow-up. Some of the trials reported moderational effects for gender (e.g., Butler & Correia, 2009; Murphy et al., 2004, 2010) and age (e.g., Baer et al., 1992) in that BASICS was more effective in reducing drinking among women, and that the treatment response to BASICS was related to age, with the students showing increased drinking behaviour as they reached legal drinking age. A couple of reported trials (Larimer et al., 2001; Turrisi et al., 2009) found perceived alcohol peer norms as the mediator of the effects of intervention for all drinking outcomes. In a recent large-scale intervention using BASICS with 1,390 students in the intervention and 508 students in the comparison groups (DiFulvio et al., 2012), males in the intervention group showed a significant reduction in drinking with respect to the comparison group at 6-month follow-up, whereas no significant difference could be seen with female students; both the intervention and comparison groups decreased their drinking.

Among the multifarious group of interventions, one approach that has been most promising for college student drinking and alcohol-related consequences is personalized feedback interventions (PFIs). In a recent and one of the most comprehensive reviews of PFIs, Miller et al. (2013) examined 41 studies that investigated PFIs as a college student drinking intervention. In addition to discussing the efficacy of PFIs to impact upon alcohol use and related consequences, this review made an attempt to determine the most essential aspect of feedback content influencing alcohol use outcomes. The review consisted of studies with different modalities where PFIs were administered either as a supplement to an individual or group meeting, or as computer-delivered or delivered via mail, or by using only the feedback profile or compared their effects in separate formats. Participants' eligibility criteria also differed among studies. Participants comprised mandated college students (e.g., Carey et al., 2011; Tevyaw et al., 2007; White, Mun, & Morgan,

2008); high-risk or heavy drinking college students (e.g., Butler & Correia, 2009; Murphy et al., 2004; Palfai, Zisserson, & Saitz, 2011; Wagener et al., 2012); heavy drinking college freshmen (e.g., Hustad et al., 2010; Marlatt et al., 1998; Neighbors et al., 2010; Walters, Vader, & Harris, 2007); binge drinkers, i.e., drank 5 or more drinks for men and 4 or more drinks for women in a single session, at least once in the past 2 weeks or a month (e.g., Collins et al., 2002; Jouriles et al., 2010; Lewis & Neighbors, 2007; Walters, Vader, Harris, Field, & Jouriles, 2009); or excessive drinkers, i.e., consuming over 40 drinks in the past month (e.g., Agostinelli, Brown, & Miller, 1995; Walters et al., 2000; Walters, 2000). One study each in the review (Miller et al., 2013) included drinkers with elevated BDI, i.e., Beck Depression Inventory (Geisner, Neighbors, Lee, & Larimer, 2007), Asian American college students as participants (Hendershot et al., 2010), or drinkers with Alcohol Use Disorders Identification Test (AUDIT) score of 8 or more (Saitz et al., 2007).

While examining the variability in content components in the review, Miller et al. (2013) found that the most frequent components were those based on drinking profiles, i.e., patterns of quantity and frequency of alcohol consumption, and normative comparisons, i.e., comparison of personal data (either behaviour or perceptions) to a reference group, with 98% of studies including them in their personalized feedback. Somewhat less frequent components were didactic information, i.e., educational information about alcohol, its effects, or tips on using alcohol safely (86%), and information on risk factors for future consequences, i.e., individual factors that place individuals at increased risk for developing alcohol use disorders or for encountering health or social consequences (77%). Half to three-quarters of the components included level of intoxication as measured by blood alcohol concentration (BAC) where estimated level of intoxication achieved for typical or peak drinking occasions were provided (72%), behavioural strategies to limit

consumption or intoxication or protective strategies to limit risk exposure (65%), providing a list of negative consequences reported by individual (60%), and information about practical costs of drinking in terms of monetary implications, calorie consumption and time spent drinking (53%). Challenging the alcohol expectancies, i.e., psychological, physical, emotional, or social effects that individuals expect to occur as a result of alcohol consumption, as a feedback component, were included in 30% of studies, and decisional balance, i.e., summary of individual's reported pros and cons of drinking behaviour and making changes to that behaviour were included in 28% of studies.

Miller et al.'s (2013) review could not clearly define which components in the feedback were efficacious in addressing college student drinking in the long-term, although significant effect sizes were found for three components at shortest follow-ups in changes in number of drinks per week. The three components were: written profiles that included a decisional balance, interventions incorporating practical costs, and strategies to limit risk. The review could not clarify that greater change could be elicited by providing more information. However, the review suggested that the addition of more feedback components could be more effective although the findings were not significant.

Several brief interventions for university students have focused on specific risk behaviours, risk activities or risk situations among students and during their student activities. Research on alcohol-related problems among university students has provided enough evidence of the harmful consequences related to alcohol misuse (Perkins, 2002), and such risk behaviours and situations are associated with excessive drinking resulting in more severe consequences (Hummer, Napper, Ehret, & LaBrie, 2013; Neighbors et al., 2011). Alcohol-oriented risky activities or risky behaviours such as drinking games (Bhullar, Simons, Joshi, & Amoroso, 2012; Borsari, 2004), and pregaming, i.e., the process of drinking and getting drunk before going out partying and for social

occasions (Borsari et al., 2007; Merrill, Vermont, Bachrach, & Read, 2013) is popular among college students. Similarly, risky situations or occasions such as 21st birthday celebration (Brister, Sher, & Fromme, 2011; Lewis, Lindgren, Fossos, Neighbors, & Oster-Aaland, 2009), and spring-break parties (Grekin, Sher, & Krull, 2007; Lee, Maggs, & Rankin, 2006) are associated with excessive alcohol consumption. In American universities, being a member of Greek system (Borsari, Hustad, & Capone, 2009; Larimer, Anderson, Baer, & Marlatt, 2000) or another fraternity or sorority (Larimer, Turner, Mallett, & Geisner, 2004; Ragsdale et al., 2012) entails large amounts of alcohol use and increased alcohol-related problems.

Brief alcohol interventions for college students that have specially targeted these risky behaviours and events have primarily focused on 21st birthday drinking (Neighbors, Lee, Lewis, Fossos, & Walter, 2009; Smith, Bogle, Talbott, Gant, & Castillo, 2006) and spring break drinking (Lee et al., 2014; Patrick, Lee, & Neighbors, 2014). In a randomized controlled trial of an event-specific prevention intervention, Neighbors et al. (2009) screened and assessed 259 college students a week before their 21st birthday who intended to drink 2 or more drinks on their birthday. The participants either received a web-based personalized feedback or assessment only. Feedback included normative information, protective behaviours, and personalized BAC information and the components in the feedback were tailored to target 21st birthday specifically. At the follow-up one week after the birthday, the intervention group, compared to the assessment only group, showed a significant reduction in BAC, and the effect was moderated by drinking intentions, and the protective behavioural strategies were associated with lower intentions to drink and actual drinking. The study also found that the intervention was primarily effective among those who intended to reach higher levels of intoxication during the birthday celebrations.

In another study of an intervention to address 21st birthday drinking among college students, Smith et al. (2006) examined the efficacy of sending cards designed to prevent alcohol-related problems during 21st birthday celebrations. Five different cards were used in the study: (1) a control card with a simple birthday greeting; (2) the Be Responsible About Drinking (BRAD) card, which is designed to encourage safer drinking by sharing the story of a young man incidentally called Brad, who died during his 21st birthday celebration, and by providing information about behaviours that should reduce the risk of alcohol-related problems; (3) an information card providing tips on behaviours designed to prevent alcohol-related problems, such as eating before drinking and spacing drinks with non-alcoholic beverages; (4) a social norms card that presented data designed to correct misperceptions of drinking norms; or (5) a card combining the information and social norms messages. The study did not find a significant effect of intervention cards over control cards in both drinking and consequences measures. Although the intervention was similar in respect to the target population and objectives to that of Neighbors et al. (2009), the null finding may be due to the absence of personalized feedback based on a pre-intervention assessment, which was an essential component of the later study.

Interventions to reduce drinking among college students during spring breaks have not been studied until very recently. In one of the first interventions focusing on spring break alcohol use and sexual behaviour, Patrick et al. (2014) found no significant effect of web-based personalized feedback in reducing alcohol use and sexual behaviour which included components that addressed intentions, expected consequences, norms, motivations, protective behavioural strategies, and pacts with friends. Although the intervention succeeded in reducing perceived social norms, the authors conclude that changing norms alone is not sufficient for changing risk behaviour during this event and alternative strategies are needed to impact other putative

mediators. While this study was inconclusive about achieving its desired outcome, another recent study (Lee et al., 2014) compared web-based, spring break-specific intervention modelled on BASICS with in-person, spring break-specific intervention modelled on BASICS, and other interventions such as web BASICS with friend, general BASICS and attentional control, found that the in-person intervention had significant effects in reducing drinking compared to other interventions. The results from these two studies suggest that an in-person, event-specific intervention is effective at reducing drinking, and the interventions that contain non-event-related content are web-based, or seek to involve friends may be less effective at reducing event-related drinking. Moreover, the principles of BASICS seem more relevant in addressing alcohol outcomes in the college population.

Brief Interventions for High-Risk College Drinkers

College students who are considered to be at highest risk for engaging in hazardous drinking and suffer from related consequences are first-year students (or freshmen), mandated students, college athletes, and students belonging to a Greek system or another fraternity or sorority. A number of studies have used different approaches to reduce or prevent drinking among first-year students or freshmen, for e.g., social norms intervention (Werch et al., 2000); parent-based intervention (Doumas, Turrisi, Ray, Esp, & Curtis-Schaeffer, 2013; Ichiyama et al., 2009; Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001); motivational enhancement group intervention (LaBrie et al., 2008; LaBrie, Pedersen, Lamb, & Quinlan, 2007); alcohol education intervention with Alcohol Edu (Paschall, Antin, Ringwalt, & Saltz, 2011); motivational interviewing (Kazemi et al., 2011; Kazemi, Levine, Dmochowski, Nies, & Sun, 2013); and personalized normative feedback (Doumas, Kane, Navarro, & Roman, 2011; Lewis, Neighbors, Oster-Aaland, Kirkeby, & Larimer, 2007). In a meta-analytic review, Scott-Sheldon, Carey, Elliott, Garey, and Carey (2014)

summarised the scientific evidence regarding the efficacy of alcohol interventions targeting first-year students and identified intervention components that increased the efficacy of these programmes. Efficacy, in this review, was measured using two categories of outcomes: (a) alcohol consumption (quantity consumed, quantity consumed during specific intervals, frequency of drinking days, frequency of heavy drinking) and (b) alcohol-related problems. A total of 41 randomized controlled trials, using either an individual or group level intervention, were included in the meta-analysis. The outcome of the review was that first-year students participating in an alcohol intervention reduced the overall quantity of drinking; quantity of drinking during specific intervals, such as during the weekend or on a specific night; and frequency of drinking days compared with controls. There were no differences between the intervention and control participants on frequency of heavy drinking or alcohol-related problems.

A significant highlight of the review (Scott-Sheldon et al., 2014) was that when compared with an active comparison condition, alcohol interventions produced no differential changes in alcohol consumption or alcohol-related problems, whereas compared with participants in assessment-only conditions, those who received an alcohol intervention reduced their quantity of drinking, quantity of drinking during specific intervals, frequency of drinking days, and frequency of heavy drinking, and they reported fewer alcohol-related problems. Another finding of the review was that the content of the interventions were significant moderators of the efficacy of intervention. In particular, personalized feedback as the content of the intervention accounted for reductions in drinking quantity, frequency of heavy drinking, and drinking-related consequences. Goal setting as a component were effective in reducing drinking quantity and frequency of heavy drinking. Challenging the expectancy of alcohol effects seemed effective in reducing frequency of heavy drinking and alcohol-related problems. Making the students aware of their high-risk

drinking situations seemed effective in reducing drinking quantity. The information on moderation strategies worked in favour of reductions in frequency of heavy drinking. Moreover, the review found that interventions that included between four and six components were more successful at reducing the quantity of alcohol consumed, the frequency of heavy drinking, and alcohol-related problems.

One of the most extensively researched areas in college alcohol use is among students who have violated college alcohol use policies or caused problems with their drinking. The college administrators usually mandate these students to participate in an alcohol-related intervention, and there is evidence that these group of students are on average heavy drinkers who drink more heavily than their closest peers (Barnett et al., 2004). Numerous studies have been conducted to examine the effect of brief alcohol interventions among these mandated or adjudicated students. Most of the earlier studies of alcohol interventions for mandated students tended to be much longer, comprised of several sessions, were often group-based, and were focused primarily on alcohol education (e.g., Brown, Tucker, & Brandon, 1991; Gonzalez & Wiles, 1981; Look & Rapaport, 1991; Ramsey, 1982). Recent studies have examined the effect of brief motivational intervention (BMI) with alcohol education sessions (e.g., Borsari & Carey, 2005); BMI with no treatment control (e.g., Terlecki, Larimer, & Copeland, 2010); and BMI with other computerized interventions such as Alcohol 101 Plus, Alcohol Edu for Sanctions and delayed treatment control (e.g., Carey et al., 2011). Other studies have compared self-guided personalized normative feedback (PNF) with counsellor-guided PNF (e.g., Doumas, Workman, Smith, & Navarro, 2011), and web-based PNF with web-based alcohol education (e.g., Doumas, McKinley, & Book, 2009). The results showed that BMIs were superior to the comparators in reducing drinking and related consequences; counsellor-guided PNF was more effective compared to self-guided PNF: and web-

based PNF showed significant reductions in alcohol outcomes than in the web-based education condition at a 30-day follow-up. These studies effectively suggest the usefulness of brief interventions among mandated students, similar to the other college student population.

Another high-risk group of students who have a propensity to drink hazardously are college student athletes (Nelson & Wechsler, 2001; Yusko, Buckman, White, & Pandina, 2008). Evidence suggests several possible issues that athletes have to contend with, such as fear of success; identity conflict; social isolation; poor athletic performance; academic problems; and career or vocational concerns (Pinkerton, Hinz, & Barrow, 1989), which may lead to increased alcohol consumption and subsequent harm (Martens, Dams-O'Connor, & Beck, 2006). Despite these significant effects on drinking behaviour, there are very few studies reported in the literature that have specifically evaluated the impact of alcohol use outcomes among college student athletes. Two studies that have addressed this issue have used social norms campaigns as environmental strategy (Perkins & Craig, 2006; Thombs & Hamilton, 2002); two intervened with normative feedback intervention, where one used the web-based format (Doumas et al., 2010) and the other used group-specific personalized normative feedback (Labrie, Hummer, Huchting, & Neighbors, 2009); and another two used personalized feedback in which one intervention specifically targeted student athletes (Martens, Kilmer, Beck, & Zamboanga, 2010) and the other used web-based feedback (Doumas & Haustveit, 2008). The studies that evaluated normative feedback and personalized feedback reported having a positive impact on alcohol outcomes, whereas only one of the social norms campaign studies (Perkins & Craig, 2006) reported reductions in alcohol misuse and in misperceptions of frequent alcohol consumption and high-quantity social drinking as the norm among student-athlete peers. The social norms study that was unable to produce an impact (Thombs & Hamilton, 2002) on reducing alcohol use among student athletes was not able to

reduce perceptions of alcohol use among one's peers. It seems that changes in the perceptions in peer drinking norms and the students' acknowledgement of the misperceptions about drinking norms is a prerequisite for the success of these kind of interventions.

Motivational Interventions for Alcohol Use

Although *motivational intervention* is an all-encompassing term used widely to denote many different types of interventions, it is important to distinguish between motivational approaches and personalized feedback when we think about interventions for alcohol use. Motivational approaches, such as Motivational Interviewing (MI; Miller, 1983) and Systematic Motivational Counselling (SMC; Cox & Klinger, 2011b) and its variants are approaches that are client-centred and which aim to elicit behaviour change by helping clients to explore and resolve ambivalence and change their maladaptive behaviour patterns. On the other hand, feedback, either personalized or in terms of social norm, or a combination of these, includes presentation of information on personal drinking patterns and comparison of this drinking with drinkers' peers or institutional/national norms, and risky factors and consequences experienced as a result of excessive drinking. Often these two approaches are packaged as a single entity, which makes it difficult to distinguish one from the other while obscuring the individual effectiveness.

Motivational Interviewing

Motivational Interviewing (MI) is defined as "a directive, client-centred counselling style for eliciting behaviour change by helping clients explore and resolve ambivalence" (Rollnick & Miller, 1995, p. 326). Motivation, rather than a personality trait that need to be dealt with in aggressive confrontation, has been conceptualised as a state which is open to change (Miller, 1983), and this motivation to change is viewed as something which is evoked in the client rather

than imposed. It is the therapist's task to expect and recognise ambivalence, and to be directive in helping clients to examine and resolve their ambivalence.

MI is non-judgmental, non-confrontational and non-adversarial. The approach is to make the client aware of the potential problems caused by drinking, consequences experienced, and risks faced as a result of the behaviour. Therapists help clients to envision a better future and to motivate them to achieve their vision. The plan is to help clients think differently about their behaviour and ultimately to consider the gains changing it could provide. The focus of MI is on the present. It involves working with a client to access motivation to change a particular behaviour, which is not consistent with a client's personal value or goal.

Rollnick and Miller (1995) stressed that the spirit of MI, which should be distinguished from the technique itself, is important. The spirit of the method is more enduring and is summarized with some important points: (a) Motivation to change is elicited from the client, and not imposed from without. (b) It is the client's task, not the counsellor's, to articulate and resolve his or her ambivalence. (c) Direct persuasion is not an effective method for resolving ambivalence. (d) The counselling style is generally a quiet and eliciting one. (e) The counsellor is directive in helping the client to examine and resolve ambivalence. (f) Readiness to change is not a client trait but a fluctuating product of interpersonal interaction. (g) The therapeutic relationship is more like a partnership or companionship than expert/recipient roles (Rollnick & Miller, 1995, p. 326-327). Thus, instead of technique or a set of techniques, MI is an interpersonal style of approach that brings together directive and client-centred components balanced in a subtle way. And this balance in approach is guided by an understanding of the triggers that result in changed behaviour.

The principles of MI have been incorporated into specific interventions to reduce drinking. Examples are: (a) the *Drinker's Check-Up* (DCU; Miller & Sovereign, 1989), which combines MI with assessment and feedback. It was developed as a brief intervention for early-stage problem drinkers and includes a comprehensive assessment of the client's drinking and related behaviours, followed by systematic feedback to the client about the findings. The style in which this feedback is delivered is based on MI. (b) *Motivational Enhancement Therapy* (MET; Miller, Zweben, DiClemente, & Rychtarik, 1992) is a four-session adaptation of the DCU intervention that was developed specifically as one of three interventions tested in Project MATCH (Project MATCH Research Group, 1993), a multisite clinical trial of treatments for alcohol abuse and dependence. In addition to the two-session format of the DCU, there are two follow-up sessions (at week 6 and week 12). This was done to parallel the 12-week (and 12 session) format of two more intensive treatments in the trial. (c) *Brief Motivational Interviewing* (BMI; Rollnick, Heather, & Bell, 1992) was developed for use in a single session (around 40 minutes) in primary care settings with non-help-seeking excessive drinkers. This is designed as a set of quick, concrete techniques, which manifest the spirit and style of MI in brief contact settings.

One of the interventions incorporating MI strategies that has been shown to be effective in lowering alcohol consumption and reducing negative consequences in college students is the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999). BASICS is specific to college students and is based on motivational interviewing techniques and personalized feedback about students' drinking behaviour. It is usually delivered face-to-face over two structured sessions. In a systematic review and meta-analysis of 18 randomised controlled trials of BASICS for college students, Fachini, Aliane, Martinez, and Furtado (2012) found that BASICS lowered both alcohol consumption and negative consequences

in college students and was found to be more favourable and acceptable by students in comparison with others interventions or control conditions.

More recently, the research on BASICS has been extended to include specific high-risk events or occasions in the college students' life such as the *spring break* of a *21st birthday celebration*. In a randomized controlled trial of a spring break intervention to reduce heavy drinking among college students, Lee et al. (2014) found significant intervention effects for in-person BASICS in reducing spring break drinking, particularly on trip days. In another trial aimed at reducing high-risk drinking during 21st birthday celebrations, Neighbors et al. (2012) found a significant intervention effect for BASICS in reducing blood alcohol content reached and number of negative consequences experienced. In studies conducted in a Brazilian university and among Hispanic students in the United States, BASICS showed significant improvement on several alcohol outcomes and showed decreases in alcohol consumption per occasion with improvement in both RAPI and AUDIT scores (Simão et al., 2008; Tomaka, Palacios, Morales-Monks, & Davis, 2012), thus justifying its cross-cultural utility.

Systematic Motivational Counseling

Systematic Motivational Counseling (SMC; Cox & Klinger, 1988; Cox & Klinger, 2011b) is a technique for restructuring clients' motivational structure from maladaptive to adaptive. This is because sufferers of many forms of psychological disturbance, including those who misuse or abuse alcohol, show maladaptive patterns of motivation that significantly cause or contribute to their disorder. By assessing and changing these maladaptive patterns, SMC help the clients to improve their psychological functioning and aims to guide people to happier and more fulfilling lives.

SMC is based on the motivational model of alcohol use, which is briefly described at the beginning of the chapter. After identifying a client's maladaptive pattern as the targets of change with the help of assessments designed to do so, which will be discussed in the following paragraphs, the client is provided with help to find better ways to resolve key concerns by using SMC motivational restructuring components. The components that help a person to restructure their motivational patterns are: (a) setting treatment goals, (b) constructing goal ladders, (c) setting between-session goals, (d) improving the ability to meet goals, (e) resolving conflict among goals, (f) disengaging from inappropriate goals, (g) identifying new incentives to enjoy, (h) shifting from an aversive to an appetitive lifestyle, and (i) re-examining sources of self-esteem (Cox & Klinger, 2004, 2011).

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 ….). 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 goals to be able to derive emotional satisfaction from any of them. Such a person will have difficulty successfully achieving them, and this may jeopardise his or her more important goals. The counsellor should help focus the individual on a smaller number of goals. In contrast, a small number of goals might suggest that

the individual has too few goals to gain much emotional satisfaction. Thus, a person might feel unfulfilled. It is the role of the counsellor to help the individual to identify new incentives with corresponding goals for the person 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 nonchemical 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 commitment 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. 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.

In addition to the use of SMC technique in individual counselling sessions with substance-abusing clients (Cox & Klinger, 2004, 2011), it has been used in different set of clients and in different contexts. For example, people who have sustained traumatic brain injuries have responded well to SMC to overcome motivational deficits (Miranti & Heinemann, 2011); SMC has been adapted for use in group sessions to help clients suffering from alcohol and other substance abuse, affective disorders, personality disorders, or psychosis (Schroer, Fuhrmann & de Jong-Meyer, 2011); developed as a self-help version and used with nonclinical participants to help them set appropriate goals, plan concrete steps in pursuit of them, and break maladaptive habits (de Jong-Meyer, 2011); developed as workplace applications that lead to better styles of management and increased employee job satisfaction and work performance (Roberson & Sluss, 2011); and adapted in offender populations for assessing and changing motivation (McMurran, 2011).

Not many studies have been conducted among college students using SMC technique. A few unpublished studies (e.g., Hosier, 2002; Hogan, 2005) have shown significant improvements in alcohol use parameters and reduction in negative consequences among college students. A modified and abridged version of MSQ, namely Personal Concerns Inventory (PCI; Cox & Klinger, 2000), which is a simple and more user-friendly, was used to assess the motivational structure in these studies.

Discussion

Alcohol brief interventions that had their genesis, albeit serendipitously, in the 1950s, are now in their seventh decade. Over all these years, brief interventions have been the subject of numerous research topics, have changed their form and character in how they are perceived, presented and accepted, and have been transformed into one of the essential arsenals in the armoury of alcohol researchers, practitioners, and addiction professionals. With the dawn of the 21st century, the process of their assimilation into healthcare system has been facilitated by the advances in the field of information and communication technology. The pencil-and-paper based assessments and in-person interventions have been supplanted, in many cases, by computer-based assessments and on-line, web-based interventions. However, the core of the intervention, i.e., the components that is crucial to bring about the desired effects, has endured the transformation.

It has been increasingly recognised, now more than before, that brief alcohol interventions has a significant role to play in reducing the public health burden as a result of alcohol misuse and related consequences by addressing these issues in a cost-effective way. And there is strong evidence from the research conducted internationally for the effectiveness of brief interventions to reduce harmful and hazardous alcohol use in different settings and population groups (Bien et al., 1993; Carey et al., 2007; Fachini et al., 2012; Kaner et al., 2007; Miller et al., 2013; Moyer et al., 2002). From a public health perspective, brief interventions have been quite a success in that it fills the gap that is apparent between primary prevention and intensive treatment approaches (Babor & Higgins-Biddle, 2001). Indeed, Heather (1996) remarked that brief interventions at the primary healthcare level could be integrated as "shared care" with specialist agencies where it will play a role as a form of early intervention, or could be used as the first step in a "stepped care" approach. But the difficulty of integration with primary healthcare as a public health model lies with the issue

of delivering brief interventions to a large enough group of problem alcohol users in order to have a measurable impact on alcohol consumption at the population level (Cunningham, Neighbors, Wild, & Humphreys, 2008). Another problem is the lack of treatment seeking behaviour among alcohol users or to receive a preventive alcohol intervention in the context of primary health care (Cunningham & Breslin, 2004; Denny, Serdula, Holtzman, & Nelson, 2003).

Although brief alcohol intervention can be applied in various settings and various population groups, and at varied levels of alcohol use, the context in which the intervention is administered influences its efficacy (Bertholet et al., 2005). For example, brief intervention administered in an emergency department or in a specialized treatment centre may have a different outcome compared to administration in routine care or when delivered in an opportunistic setting. In the same vein, there might be differential effects of the intervention in heavy or high-risk drinkers and less hazardous drinkers, or when interventions are delivered to individuals rather than in groups (Carey et al., 2007). Regarding alcohol dependence, a review (Moyer et al., 2002) did not find brief intervention to be effective in people seeking treatment for alcohol dependence; however, Al et al. (2008) found that a brief intervention had an equal effect on both alcohol-dependent and non-dependent population. Thus, there exists ambiguity in the literature regarding efficacy of brief interventions for dependent drinkers. Nonetheless, the consensus is that brief interventions should be restricted to hazardous and harmful alcohol users.

An intervention package based on MI and/or personalized feedback delivered in the style of FRAMES model (Bien et al., 1993; Miller & Sanchez, 1994) seems to be the ideal form of brief intervention for efficaciousness or effectiveness. FRAMES do not require the delivery of a formal psychological intervention, nor does it necessitate a qualified and well-trained therapist. The essential elements incorporated in the FRAMES style of engagement with an alcohol misuser

cover areas that motivate changes in alcohol use. Making a person feel responsible for the problems, encouraging him or her to be self-efficacious and to face the problems confidently, and providing evidence that change can happen could all be strong motivators for an individual to make a change. Further, offering a menu of options that will suggest how to go about making the desired change can lend to a sense of control and suggest achievable alternatives to enable the individual to proceed. The empathetic style of the person delivering the intervention will help in facilitating the process of change.

Screening for alcohol use and problems is an essential part of a brief intervention because many hazardous and harmful drinkers do not appreciate or recognize the negative health consequences of excessive drinking because they usually do not experience immediate ill-effects of their alcohol use. Furthermore, they are not actively seeking treatment for their alcohol use and problems and are not served by regular health-care services. Moreover, they have a tendency to deny the presence of any alcohol-related problems because these problems may not be apparent to themselves but that could be recognized by health professionals. Also, the denial could be because of the stigma attached to having them. Even if they acknowledge that there could be a relation between their alcohol consumption and their problems, they may not appreciate the strength of the relationship. Thus, screening people who consume alcohol in a problematic way and who are not actively seeking treatment is necessary to identify this group of drinkers who are ideal for the desired outcome of brief interventions (Boland, Drummond, & Kaner, 2008).

Thus, early identification through screening procedures and followed by brief interventions has been increasingly supported by the vast literature to address problem drinking among hazardous and harmful drinkers (Institute of Medicine, 1990; NIAAA, 2005; WHO, 2003). There is a strong evidence for the effectiveness of brief interventions to reduce alcohol use and alcohol-

related problems administered in primary and secondary care settings (Bertholet et al., 2005; Cayley, 2009; Kaner et al., 2007; O'Donnell et al., 2014), as well as in general population settings as a public health approach (Moyer et al., 2002; Raistrick et al., 2006), and among college or university settings (Carey et al., 2012; Fachini et al., 2012; Miller et al., 2013; Scott-Sheldon et al., 2014; White, 2006). Indeed, the Mesa Grande project (Miller & Wilbourne, 2002), over a decade ago, methodologically analysed clinical trials of treatments for alcohol use disorders that looked at over 80 different types of intervention and assessed the quality of their evidence for efficacy from the extant literature on alcohol interventions. Among the psychosocial interventions, the strongest evidence of effectiveness as a result of the large number of studies with positive findings and of high-quality design was found for brief interventions, which were rated *Number One* in the league table. However, no distinctions between the opportunistic interventions and less intensive specialist interventions were made (Miller & Wilbourne, 2002).

With such a vast array of evidence in favour of brief interventions to address the issue of problem drinking and negative consequences, there remain some questions whose answers are still not very apparent. The *first* is what exactly should be the duration and frequency of the intervention that will produce the optimum effect? Because the duration of effective interventions varies substantially between studies, the answer is still elusive. Although longer and more intensive brief interventions performed no better than the shorter and less intensive ones (Kaner et al., 2007), there are few studies that have compared the effectiveness of brief and much briefer interventions on alcohol outcome measures. A 50-minute intervention session (Marlatt et al., 1998) and a 5-minute session (Dimeff & McNeely, 2000) were equally efficacious in reducing college student alcohol use. The pioneering multinational WHO study (Babor & Grant, 1992) found that 5 minutes of simple advice was as effective as 20 minutes of brief counselling in reducing daily

alcohol consumption. Similarly, no significant differences were found on alcohol outcomes between a 10-minute and a 50-minute brief intervention (Kulesza, Apperson, Larimer, & Copeland, 2010). An ultra-brief intervention (Cunningham, Neighbors, Wild, & Humphreys, 2012) in which personalized feedback pamphlets were mailed to participants found no significant difference between the intervention and control groups. Due to the dearth of clear evidence as to what the length of an intervention should be for it to be most potent, it is prudent to assume that the most effective and cost-effective interventions are those that produce the desired outcomes utilising the fewest number of resources in a minimum of time.

Secondly, which brief intervention produces a long-lasting effect or a sustained effect over a long period? Brief interventions have mostly been shown to be effective for a short period of time up to 6-12 months following the intervention. Research on long-term effectiveness of brief interventions is limited (Wutzke, Conigrave, Saunders, & Hall, 2002). There is a lack of studies with sufficient evidence for periods beyond 6 months (Jonas et al., 2012) or limited evidence beyond 12 months (Moyer et al., 2002; Solberg, Maciosek, & Edwards, 2008). However, longitudinal research on brief interventions with college students has found that long-term positive impact of the intervention is more on the negative consequences than on alcohol consumption (Baer et al., 2001), which, in concurrence with developmentally limited model of adolescent drinking, may be due to maturing out of risky behaviour as adolescents become more experienced and encounter more responsibilities in life (Gotham et al., 1997).

The *third* and the most debated as well as researched question is what are the active ingredients that make a brief intervention effective? As brief interventions typically emphasize reducing alcohol consumption with a focus on reducing adverse consequences with mostly non-dependent drinkers as the target population, the components that have been tried have varied in

range and intensity. It has been recognised that the structure and content of the intervention matters more than the total length of delivery (Kaner et al., 2007). Although interventions with at least 2 out of 3 the following key elements, i.e., feedback, advice, and goal setting, have shown significant improvement in outcomes (Whitlock, Polen, Green, Orleans, & Klein, 2004), the content of the feedback is equally important in determining the outcome, especially so with college drinking populations. The feedback that contain assessment of their own drinking and normative drinking behaviour of their peers have been found efficacious in reducing drinking and related problems among college students (White, 2006). Risk reduction strategies and information on practical costs of drinking as feedback components have been found to enhance short-term effectiveness of brief interventions (Miller et al., 2013).

Computer-delivered brief interventions have become common in alcohol intervention research and its use has been growing rapidly. It provides a more convenient and cost-effective alternative to traditional face-to-face interventions. These interventions have been conducted mainly with college/university students, with only a few studies that has targeted other population groups (Khadjesari et al., 2011). Equivalent effects of both face-to-face and computer-delivered brief interventions have been found on alcohol outcomes (Butler & Correia, 2009; Carey et al., 2012; Khadjesari et al., 2011) when identical content were delivered. These encouraging results suggest that the way forward is to tap these initiatives and conduct more computer-intensive prevention intervention research in other population groups and settings.

Thus, brief interventions delivered in different forms have been shown to impact alcohol outcome measures, especially the reduction in drinking and harmful consequences, at least in the short-term. Further research is required to evaluate their effectiveness in more diverse settings, different population groups, crisscrossing geographical and cultural barriers, so that they are not

specific to a limited populace only. Moreover, the active ingredients of the effective interventions need to be teased apart so that interventions could be made more specific and individually tailored. Finally, more research is warranted to ascertain the cognitive and bio-behavioural mechanisms involved in these interventions.

Motivational interventions targeted specifically to change the motivation to drink alcohol have shown promise in reducing drinking. Stand-alone motivational interventions have proven less successful than in combination with other interventions, such as personalised feedback or a social norms intervention. Thus, to achieve a more holistic outcome, motivational interventions need to be used in combination with other interventions. Also, briefer and easier-to-implement versions that have been developed need to be used more systematically in routine practice.

Chapter Three

Motives for Drinking and Psychometric Evaluation of Five-Factor Modified Drinking Motives Questionnaire (Modified) among UK University Students

Many of the brief interventions for excessive alcohol use that were discussed in Chapter Two include motivational components for eliciting behaviour change. The purpose of this chapter is to discuss (a) university students' motivations alcohol use and (b) interventions that are specifically motivational as opposed to ones such as personalized feedback or social-norms training. Two schools of thought will be discussed that have used motivational approaches to address substance use in general and alcohol use in particular; they are Motivational Interviewing (MI) and Systematic Motivational Counselling (SMC), and their variants. Before embarking on the description of these motivational approaches, how motivation and different motives play a role in substance use and abuse, especially the use of alcohol, will be discussed.

Motivation in simple terms could be defined as behaviour that is goal-oriented. Motivation may be ingrained in the basic need to minimize physical pain and suffering, and maximize pleasure and wellbeing, or it may include specific biological or emotional needs such as eating and resting, or a desired goal—which might be an object, hobby, state of being, ideal, etc.—or it may be a goal attributed to less-apparent reasons such as altruism, morality, or avoiding consequences that may be harmful. Motivation can be *intrinsic* when an act or an activity is done voluntarily without thinking about any reward or gain to be derived from such an act because such action is inherently interesting and pleasurable; or it can be extrinsic when one is motivated by external factors, as opposed to the internal drivers of intrinsic motivation. *Extrinsic motivation* leads to a separable outcome and drives one to do things for tangible rewards or pressures, rather than for the

fun of it (Ryan & Deci, 2000). Oftentimes, both intrinsic and extrinsic motivations are involved in the pursuit of a goal.

Drinking Motives and Alcohol Use

Drinking motives have been identified as one of the strong predictors of alcohol consumption and alcohol-related problems among university students (Carey & Correia, 1997; Kuntsche, Knibbe, Gmel, & Engels, 2005; Read et al., 2003). People attribute different reasons for their alcohol use. Some drink primarily as a social lubricant or as a ceremony; others may want to have a fun time or because they feel good; while some others may want to forget their troubles or just relax after a strenuous day. These different reasons or motives to imbibe alcohol are important because they are predictive of distinct patterns of alcohol use and drinking-related consequences.

The research on drinking motives and alcohol use suggests that there is a strong link between the types of motives endorsed and the type of alcohol use, especially among college students (Foster & Neighbors, 2013; Kuntsche et al., 2005; Mohr et al., 2005). It has been found that the most frequently endorsed motives among undergraduate students are enhancement and social motives, which are often associated with heavy alcohol use (Kuntsche et al., 2005; LaBrie, Hummer, & Pedersen, 2007; Lewis, Phillippi, & Neighbors, 2007). Although the endorsement of conformity and coping motives is less consistent among undergraduate students, these motives are stronger predictors of alcohol-related problems than are social and enhancement motives (Kuntsche et al., 2005; Lewis et al., 2008).

Examination of drinking motives reflects the reasons why individuals drink to achieve certain valued outcomes, and they fit well with motivational models of alcohol use (Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988, 2011), which propose that individuals drink

alcohol to regulate negative versus positive affect. Thus, drinking to cope, or having a coping drinking motive, is defined as imbibing alcohol to escape or avoid unpleasant emotional experiences (Cooper et al., 1995), which is likely to be more common in individuals who are prone to depressed or anxious feelings. The findings showing associations between coping motives and anxiety and depression are quite consistent in the literature (Comeau, Stewart, & Loba, 2001; Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007). Enhancement-motivated drinking relates to an appetitive motivational process in which individuals drink to attain or maintain positive affective states or emotional experiences (Cooper et al., 1995). Consequently, enhancement motivation is often found among individuals driven by a desire to experience a particular affective state rather than to change a pre-existing emotional state. Individuals with certain personality traits such as sensation seeking (Comeau et al., 2001), extraversion (Cooper, Agocha, & Sheldon, 2000), and aggressive behaviour (Mihic, Wells, Graham, Tremblay, & Demers, 2009), often predict enhancement-related alcohol use. Therefore, it could be inferred that drinking motives are closely associated with specific alcohol use profiles which reflect a motivational style of responding based on a subjectively derived decisional framework (Mackie, Conrod, Rijsdijk, & Eley, 2011).

Development and Dimensionality of Drinking Motives

According to the motivational model of alcohol use (Cox & Klinger, 1988, 2004, 2011), various influences such as biological, psychological, environmental, and sociocultural are mediated through a motivational pathway, either proximally or distally leading to expectations of affective change and, therefore, towards a decision to drink or not to drink. The expectations of affective change leading to a decision to drink may be positive (e.g., to feel good), or negative (e.g., to forget painful memories). This is consistent with the Reasons for Drinking Scale (Farber,

Khavari, & Douglass, 1980), which consists of two, i.e., positive reinforcement (*social drinking*) and negative reinforcement (*escape drinking*) motives.

Expanding on the two-motive theory of alcohol use, Cooper, Russell, Skinner, and Windle (1992) developed and tested a three-dimensional model in an adult population that confirmed the existence of a third factor that was distinct from social and escape or coping motives, i.e., drinking to enhance positive affect. This model provided a good fit to the data across gender and ethnic groups. This three-factor model, the 15-item Drinking Motives Questionnaire (DMQ), consists of external positive reinforcement (*social*), internal positive reinforcement (*enhancement*), and internal negative reinforcement (*coping*) motives. Each of these motives was associated with a unique pattern of alcohol use and alcohol-related outcomes. For example, enhancement motives were strongly associated with a pattern of frequent, heavy drinking; coping motives were associated with frequent but not substantially heavier drinking but were predictive of problem drinking. Interestingly, Cooper et al. (1992) also assessed drug use in this sample and each of the motives was associated with different patterns of drug use, e.g., social motives did not predict drug use; enhancement motives were associated with use of marijuana and enhancing drugs, such as cocaine and stimulants; and coping motives were associated with use of depressants, such as barbiturates and tranquilizers.

The DMQ has been psychometrically evaluated in a young adult university sample (Stewart, Zeitlin, & Samoluk, 1996), intercollegiate athletes (Martens, Cox, Beck, & Heppner, 2003), older adults (Gilson et al., 2013), and cross-culturally among US and Nigerian participants (Gire, 2002). Stewart et al. (1996) in their study of undergraduate students found strong support for the construct validity of the DMQ, and they detected differences in the relative frequency of drinking for each of the three motives. Martens et al. (2003) initially evaluated the four-factor

model among intercollegiate athletes, but they found some inconsistency with the *conformity* subscale of the measure. They suggested that this subscale may not be as meaningful among student in college as it is during the adolescent, high school years. Instead, the three-factor model measured with the DMQ provided the best fit with drinking motives in this population. Gilson et al. (2013) evaluated the DMQ among older adults and found support for a three-factor structure, which explained similar levels of variance in drinking measures of quantity and frequency.

Further extension of the model was inspired by Cox & Klingers' (1988) motivational model of alcohol use, where Cooper (1994) posited that a four-factor model may better explain the alcohol use motives. She tested the four-factor model of drinking motives, the 20-item Drinking Motives Questionnaire – Revised (DMQ-R), in a sample of adolescents and found it to be psychometrically sound, and which provided a better fit than the earlier models. In this four-dimensional model, drinking motives are categorized according to valence (i.e., positive or negative reinforcement) and source (i.e., internal or external). Conformity motives (e.g., "to fit in with a group I like") are the external negative reinforcement in DMQ-R, in addition to the three-factor DMQ consisting of social, enhancement, and coping motives.

The DMQ-R has been extensively used and cited in drinking motives literature (e.g., Crutzen, Kuntsche, & Schelleman-Offermans, 2012; LaBrie, Lac, Kenney, & Mirza, 2011; Leigh & Neighbors, 2009; Lewis, Phillippi, & Neighbors, 2007; Lyvers, Hasking, Hani, Rhodes, & Trew, 2010; O'Connor & Colder, 2005; Read et al., 2003). It has been psychometrically evaluated and validated among adolescents (Kuntsche, Knibbe, Gmel, & Engels, 2006; Mushquash, Stewart, Comeau, & McGrath, 2008), university students (MacLean & Lecci, 2000; Martens, Rocha, Martin, & Serrao, 2008), and adults (Crutzen & Kuntsche, 2013). Kuntsche et al. (2006) in their study of adolescents in multilingual Switzerland found an acceptable model fit for the DMQ-R that

conformed to the four-dimensional factor structure. The factor structure was found to be consistent among age, gender, and regional variations. However, Mushquash et al. (2008) in a study of drinking motives among First Nation adolescents in Nova Scotia, Canada, did not find the existence of social motives in this cultural group. They infer that drinking in social contexts for this different cultural group of adolescents seems less motivated by social affiliation than by enhancement reasons.

In a confirmatory factor analytic study comparing different models of drinking motives in a sample of university students, MacLean and Lecci (2000) found that the four-factor DMQ-R had a stronger fit with the data compared to other models, i.e., DMQ, two-factor (positive and negative reinforcement), two-factor (external and internal source), or a single factor model. However, their study did not validate whether different motives predicted different drinking patterns and outcomes commensurate with Cooper's (1994) study. Further examination of university students by Martens et al. (2008) found that the four-factor DMQ-R provided an acceptable fit to the data that was significantly better than other tested models, although a three-factor model without the *conformity* motive also provided a reasonable fit to the data. A short version of the DMQ-R (DMQ-R SF; Kuntsche & Kuntsche, 2009) consisting of 12 items, with each subscale consisting of 3 items each was developed and validated among a national representative sample of Swiss adolescents that provided a good fit to the data and concurrent validity of the original DMQ-R. DMQ-R SF showed consistent findings in another study conducted among Italian adolescents (Mazzardis, Vieno, Kuntsche, & Santinello, 2010). On examination of the DMQ-R in an adult sample (mean age = 53±17 years), Crutzen and Kuntsche (2013) found it to be a robust measure of drinking motives, and that the four-factor structure, originally developed for adolescents, holds for the adult population as well.

The nature of coping motives is complex because of its generic nature where both anxiety and depression motives are measured within the same paradigm. There are mixed and sometimes ambiguous findings in the literature regarding its relationship with negative affect, alcohol parameters, and consequences. These suggest that anxiety and depression may have their own mechanisms to influence these variables. Accordingly, Grant, Stewart, O'Connor, Blackwell, and Conrod (2007) psychometrically evaluated the 28-item, five-factor structure of drinking motives among undergraduate students that was a further modification of DMQ-R, i.e., Modified Drinking Motives Questionnaire – Revised (Modified DMQ-R), where motives for *coping-with-anxiety* and *coping-with-depression* were two distinct constructs. The Modified DMQ-R consisted of five items each on *social*, *enhancement* and *conformity* subscales, four items on *coping-anxiety*, and nine items on *coping-depression* subscales. The five-factor model provided a better fit compared to Cooper's (1994) DMQ-R and supported factorial invariance across gender. Moreover, the modified DMQ-R showed distinct characteristics of coping-anxiety and coping-depression motives in predicting alcohol use. They found that coping-depression, but not coping-anxiety, was a significant predictor of a higher quantity of alcohol consumed per occasion. They also found coping-anxiety to be *directly* related to prospective alcohol-related problems, whereas the coping-depression motive appeared to predict alcohol-related problems *indirectly* through higher consumption of alcohol.

Drinking Motives as Predictors of Alcohol Use and Alcohol-Related Consequences

Research among university students has often shown that drinking motives plays an important role in predicting alcohol use and alcohol-related negative consequences. In a review of drinking motives among adolescents and young adults, Kuntsche et al. (2005) found that most young people reported drinking for social motives; some drank for enhancement reasons; and only

a few reported drinking for coping motives. Related to outcome, social motives were found to be associated with moderate drinking, enhancement motives with heavy drinking, and coping motives were associated with drinking-related problems.

The positively reinforcing motives of social and enhancement are the most commonly endorsed reasons for alcohol use in the university students' drinking motives literature (e.g., Arbeau, Kuiken, & Wild, 2011; Kuntsche et al., 2005; Kuntsche, Stewart, & Cooper, 2008; LaBrie et al., 2011), and they are often predictive of drinking behaviour (Cox, Hosier, Crossley, Kendall, & Roberts, 2006; Crutzen et al., 2012; Engels, Wiers, Lemmers, & Overbeek, 2005; Ham, Zamboanga, Bacon, & Garcia, 2009; Read, Wood, Kahler, Maddock, & Palfai, 2003), and drinking-related problems (Carey & Correia, 1997; Coskunpinar & Cyders, 2012; Cox et al., 2006; Gmel, Labhart, Fallu, & Kuntsche, 2012; Read et al., 2003).

Mediational/Moderational Role of Drinking Motives

In addition to their predictive ability, the extant research provides evidence that drinking motives have significant mediational and moderational effects on alcohol use and alcohol-related consequences across all age groups. A study to examine the relationship between personality domains, drinking motives and drinking quantity/drinking problems in a sample of university student drinkers demonstrated that coping motives partially mediated the relationship between high neuroticism and increased drinking problems, whereas enhancement motives mediated the relationship between low conscientiousness and increased drinking quantity (Stewart, Loughlin, & Rhyno, 2001). Similarly, in a sample of Swiss university students, Kuntsche, von Fischer, and Gmel (2008) found that the association between extraversion and alcohol use was mediated by enhancement motives, whereas the negative association between conscientiousness and alcohol

use was partially mediated by both enhancement and coping motives. Enhancement motives, compared to other drinking motives, have been found to be a significant mediator. Palfai, Ralston, and Wright (2011), while examining university students' drinking in the context of goal pursuits, found that enhancement motives, but not coping motives, mediated the association between goal meaning ratings and alcohol involvement. In a study among young adults, enhancement drinking motive mediated the association between social alcohol expectancies and alcohol misuse above and beyond the effect of other drinking motives (Kong & Bergman, 2010).

Examination of Undergraduate Students' Drinking Motives

To understand the drinking motives of undergraduate students participating in the study were screened as per the procedure described in Chapter Five, the Modified Drinking Motives Questionnaire (Revised), i.e., Modified DMQ-R (Grant et al., 2007) was administered along with the drinking measures recorded through Alcohol Timeline Follow Back (TLFB; Sobell & Sobell, 1992), and drinking-related consequences recorded through the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The purpose of the study was to explore the factor structure and psychometrically evaluate the 5-factor drinking motives (Modified DMQ-R) among UK undergraduates and to assess the predictive ability of different drinking motives on alcohol consumption and alcohol-related consequences.

Participants

The subset derived from the screening procedure consisted of 382 undergraduate students who were identified as excessive drinkers. These students were contacted with an invitation to participate in further research as described in Chapter Five. Just over 32% (123 students)

responded and took part in the study, and 60% of the respondents were females. The mean age of the sample was 20.15 years (*SD* = 1.61).

Measures

Drinking motives. The Five-factor Modified Drinking Motives Questionnaire – Revised (Modified DMQ-R; Grant et al., 2007; see Appendix 'A' p. 239) is a 28-item measure to assess five motives for alcohol use: Social (e.g., "To be sociable"), Enhancement (e.g., "Because it is exciting"), Conformity (e.g., "To fit in with a group I like"), Coping with anxiety (e.g., "Because it helps me when I am feeling nervous") and Coping with depression (e.g., To forget painful memories"). The social, enhancement and conformity subscales contain five items each; coping with anxiety subscale contains four items; and the subscale coping with depression has nine items. Respondents are asked to indicate how frequently each of the reasons motivated them to drink on a five-point scale ranging from 1 (almost never/never) to 5 (almost always/always). Responses are averaged to create a score for each subscale. Internal consistency estimates in the present study were: Social (.61), Enhancement (.77), Conformity (.78), Coping with anxiety (.60), and Coping with depression (.93).

Alcohol use. Alcohol consumption was measured with the Alcohol Timeline Follow Back (TLFB; Sobell & Sobell, 1992) (Appendix 'B', p. 241), a calendar-prompted, retrospective measure of alcohol consumption. Alcohol consumption, i.e., number of units of alcohol consumed each day for the previous 30 days were recorded on a calendar with identified reference points, such as holidays, important events, etc. to enhance recall. The TLFB is a well-established tool that provides reliable self-reported drinking data and provides a detailed, clinically useful picture of the full range of an individual's drinking.

Alcohol-related problems. The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) (Appendix 'C' p. 243) is a 23-item measure for alcohol-related problems for use with adolescents and young adults. On a scale from 0 (never) to 4 (more than 10 times), respondents indicated how frequently they had experienced each consequence of alcohol use in the past three years. The mean RAPI score in the study was 22.72, and Cronbach's α was .89.

Procedure

According to the screening procedure described in detail in Chapter Four, those students who were identified as excessive drinkers and who responded to the invitation to participate in the study were sent e-mail messages with the testing schedule for the baseline assessment. During the assessment, in addition to obtaining their demographic characteristcis, they were asked to complete a number of questionnaires, including the modified DMQ-R, Alcohol TLFB, and RAPI. The study was explained to potential participants, and they were provided with an Information Sheet (Appendix 'D', p. 246) giving full details about the study. After signing the consent form (Appendix 'E', p. 247), they completed the questionnaires in a quiet and private room in the School of Psychology.

Plan of Analysis

There were two phases of the statistical analysis. In the first phase, data collected from the modified DMQ-R were explored to assess the factor structure using exploratory factor analysis (EFA), and psychometrically evaluated using confirmatory factor analysis (CFA). In the CFA, the five-factor model was tested against four- and three-factor models to assess the model with the best fit. These results are interpreted and discussed later. It is often useful to use EFA in conjunction with CFA. An initial EFA analysis will provide a basis for specifying a CFA model in

a subsequent study (Fabrigar, Wegener, MacCallum, & Strahan, 1999). In the second phase of analysis, correlations and multiple regressions were performed to identify the significant motivational predictors of alcohol consumption and alcohol-related problems.

Although EFA is usually carried out to explore the dimensions that represent defined constructs within a scale during the development of a new instrument, the purpose of conducting EFA in this sample was to validate whether the five-factor structure held true with regard to the endorsement of drinking motives in an UK undergraduate sample. It was especially important to determine whether coping motives for drinking consisted of two distinct motives, namely, coping-with-anxiety and coping-with-depression (cf. Grant, Stewart, & Mohr, 2009; Grant et al., 2007). The CFA was conducted on data from the modified DMQ-R to cross-validate the EFA and to confirm the model fit of the modified DMQ-R among UK university undergraduate students compared to US undergraduate students (Grant et al., 2007), and to compare the model fit of the five-factor modified DMQ-R against the frequently cited four-factor DMQ-R (Cooper, 1994) and three-factor DMQ (Cooper et al., 1992) models of drinking motives.

Exploratory Factor Analysis (EFA) of the Modified DMQ-R

The EFA was conducted according to guidelines provided by Kline (1994). To derive a simple factor structure, the following criteria need to be met: (a) the factor model must be designated by at least three variables, although a factor with two variables could be considered reliable if the variables are highly correlated with each other ($r > .70$) and uncorrelated with other variables (Yong & Pearce, 2013), (b) to ensure higher factor loadings, the sample should be heterogeneous to account for the amount of variance explained, (c) a minimum sample size of 100 participants is required to obtain reliable factors, (d) at least 2:1 should be the ratio of the sample

size to the number of variables, (e) principal axis factoring or the maximum-likelihood method should be used for factor extraction, (f) a scree test or a statistical test such as parallel analysis should be used to obtain the best possible factors to extract, and (g) the factors should be rotated to derive a simple structure using either Varimax or a Direct Oblimin procedure depending on the degree of correlation among the factors and the ease of interpretability.

Results of the EFA

The sample characteristics are discussed in Chapter Five. The sample of 123 participants was deemed to large enough to be statistically appropriate for using an EFA on the modified DMQ-R consisting of 28 variables. Frequency distributions, normality plots, and tests of skewness and kurtosis showed many items violating the assumptions of normality. Some items, especially those endorsing coping and conformity motives, showed severe skewness and kurtosis (e.g., *"to stop me feeling so hopeless about the future"* and *"so that others won't kid me about not using"*) indicating a non-normal distribution of the data. The fact that students usually do not strongly endorse coping and conformity motives relative to social and enhancement motives for drinking might explain skewed data. The test for normality indicated homogeneity of the sample in response to these items and a non-normal distribution. In view of the issues associated with this kind of data, and the fact that more than 50% of the items showing heterogeneity, the sample was considered a representative one.

The correlation matrix for the 28 drinking motives was examined to determine whether the items shared common variance. The matrix showed that 36 percent of the coefficients were greater than .2, which is indicative of a relationship between the items that would produce an appropriate factor model. Also, no correlations showed a value greater than .9, suggesting that there was no

issue with multicollinearity. Bartlett's Test of Sphericity ($\chi^2 = 102.23$, $p < .0001$) supported this conclusion, because the test is a measure of whether each item is related only with itself and unrelated to any other item, and whether or not the coefficient matrix is an identity matrix. Additionally, computation of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy showed a value of .80, which indicates sampling adequacy. These results showed that correlations between pairs of items were explained by the other items. This indicated that underlying factors would explain the correlations observed in the matrix. All of this initial examination suggested that we could proceed with factor analysis with confidence with the knowledge that the data would provide a satisfactory factor solution.

The initial factor solution was obtained using Principal Axis Factoring (PAF). Principal Component Analysis (PCA) is a widely used procedure in EFA, maybe because it is the default setting in most statistical packages, including SPSS. Studies have shown that PCA and PAF can produce similar results in cases of strong measurement reliability or if there are a large number of variables in each factor (Guadagnoli & Velicer, 1988; Thompson, 2004). PAF was used in this analysis because this procedure eliminates error variance from the resultant factors and does not aim to explain all of the variance in a given correlation matrix (Kline, 1994). Moreover, the aim of this study was to confirm the factor structure using CFA, whereas the PCA was less likely to generalize to CFA because it does not account for measurement error (Schmitt, 2011).

The initial factor solution yielded six factors with eigenvalues (EVs) > 1; however, examination of scree plot, which is a visual plot of the EVs, showed that the slope of the large factors tapered between three and four, suggesting a three-factor structure. Further confirmation of factors that could be retained was performed using parallel analysis (Horn, 1965), which uses a series of randomly generated data sets based on the sample size and number of variables where

actual EVs are compared with randomly selected EVs. Those factors are retained whose actual EVs exceed random-order EVs. Thus, components of real data with a valid underlying factor structure should have larger EVs than parallel components derived from random data having the same sample size and number of variables (Lautenschlager, 1989). An SPSS programme developed by O'Connor (2000) was used to conduct the parallel analysis. The syntax for the programme is shown in Appendix 'F'.

The result of the parallel analysis showed only three factors that had actual EVs greater than random order EVs (*see* Table 3.1). Thus, the parallel analysis using Monte Carlo procedure to generate random EVs is in agreement with the scree plot, compared to the Kaiser criterion of EV > 1, which also showed that three factors could be retained. However, the Modified DMQ-R is a five-factor measure. Therefore, this study compared the EFA structure of the original retention model reported in the study by Grant and colleagues (Grant et al., 2007). Furthermore, based on the factor retention criteria as informed by theory and the parallel analysis conducted above, the best EFA model that might seem applicable to UK undergraduate students' drinking motives will be discussed.

Table 3.1: Results of Parallel Analysis (Monte Carlo PA Output)

Component Number	Actual Eigen Value	Random Order Eigen Value from parallel analysis
1	6.942	2.198
2	4.329	1.954
3	2.842	1.823
4	1.611	1.705
5	1.289	1.591
6	*1.081*	1.521
7	.985	1.434
8	.944	1.359
9	.797	1.299
10	.730	1.241

To get a simple factor structure, the factors must be rotated because rotation maximises high item loadings and minimises low factor loadings, thus producing a more simplified and interpretable solution. Kline (1994) suggests that a simple structure could be derived by using both orthogonal and oblique rotations, such as Varimax or Direct Oblimin methods. Varimax rotation produces orthogonal factors in which the factors are uncorrelated, whereas in Direct Oblimin the factors that are retained are correlated. Usually with a measure like drinking motives, it is prudent to assume that the factors should be correlated to some extent. However, in practice orthogonal and oblique rotations produce virtually identical solutions because of negligible correlations between the factors. In a comparison of the two procedures, the oblique factor solution produced by Direct Oblimin rotation seemed a better model in that it maximised the distinction between the

factors in terms of high and low loadings. Therefore, Direct Oblimin was used in this study to get the simplified factor structure, and the *pattern matrix* was examined for factor/item loadings.

Table 3.2 displays the pattern matrix of factor loadings for the 5-factor model described above an absolute value of .32 for each item. Loadings above .32 are considered to be moderately high, whereas loadings above .6 are considered high loadings. Moreover, a minimum loading .32 for an item equates to approximately 10% overlapping variance with the other items in that factor. An item that loads.32 or higher on two or more factors is a "crossloading" item (Tabachnick & Fidell, 2008). In the five-factor Modified DMQ-R model (Grant et al., 2007), there are five items each for social, enhancement and conformity motives, four items for coping with anxiety, and nine items for coping with depression. In Table 3.2, Factor 1 is defined by 11 items containing all nine items of coping with depression and two items of coping with anxiety motives, i.e., *'to reduce my anxiety'* and *'to relax'* which shows loadings of .59 and .52, respectively. However, the item *'to reduce my anxiety'* also has a weak negative loading (-.33) on Factor 4. Six items identifies Factor 2, four items of conformity and two items of social motives, namely *'because it is what most of myfriends do when we get together'* and *'to be sociable'*, which show moderate loadings of .44 and .40, respectively. The later item also has a moderate negative loading (-.33) on Factor 3. Five items define Factor 3, which consists of four items related to enhancement and a single item *'because it makes a social gathering more enjoyable'* related social motives; the latter item also has a moderate loading (.32) on Factor 2. Factor 4 consists of four items, two on coping with anxiety, one on enhancement *'to get a high'* and one item on conformity *'to be liked',* which also has a moderate loading (.34) on Factor 2. Factor 5 is represented by only two items on social motives.

Table 3.2: Factor Loadings for the Five-Factor Modified Drinking Motives Questionnaire-Revised

	Factor				
	1	2	3	4	5
Because it helps me when I am feeling depressed*	.874				
To stop me from dwelling on things*	.836				
To numb my pain*	.803				
To turn off negative thoughts about myself*	.798				
To clear me up when I am in a bad mood*	.790				
To forget my worries*	.773				
To forget painful memories*	.758				
To help me feel more positive about things in life*	.619				
To reduce my anxiety***	.591			-.327	
To stop me feeling so hopeless about the future*	.586				
To relax***	.516				
To fit in with a group I like**		.826			
So I won't feel left out**		.763			
Because my friends pressure me to use**		.728			
So that others won't kid me about not using**		.574			
Because it is what most of my friends do when we get together#		.438			
To be sociable#		.397	-.330		
Because it is fun##			-.767		
Because it makes me feel good##			-.665		
Because it is exciting##			-.620		
Because I like the feeling##			-.588		

Because it makes a social gathering more enjoyable#	.324	-.543		
Because it helps me when I am feeling nervous***			-.760	
To get a high##			-.563	
Because I feel more confident or sure of myself***			-.547	
To be liked**	.340		-.403	
As a way to celebrate#				.528
Because it is customary on certain occasions#				.400

Notes: *Coping with depression motives **Conformity motive; ***Coping with anxiety motives; #Social motives; ##Enhancement motives

The factor solution shown in Table 3.2 does not give a clear picture about the five-dimensional nature of drinking motives in this dataset. Because the scree plot and the parallel analysis supported the three-factor solution, further analyses were conducted to determine whether four-factor and three-factor models would provide a better factor solution. The EFA for a four-factor structure was conducted for the DMQ-R (Cooper, 1994), consisting of 20 items, five items each on social, enhancement, coping and conformity motives. The items can be seen in Table 3.3. All five items corresponding to social, enhancement and conformity were retained. Four items on coping motives, which corresponded to the DMQ-R, were retained. A mean was taken for the coping with anxiety item *"because it helps me when I am feeling nervous"* and coping with depression item *"because it helps me when I am feeling depressed"* to form the DMQ-R item *"because it helps me when I am feeling depressed or nervous"* (CopA&B) as the fifth coping item. Similarly, 15 items corresponding to the DMQ (Cooper et al., 1992; *see* Table 3.4) were retained to examine the three-factor model. However, as the DMQ does not contain *conformity motive* items, they were not included in the model.

Examination of the four-factor EFA showed the following: (a) Seven items loaded on Factor 1, four on conformity and three on social motives with one social item, *"to be sociable"* also showing negative loading (-.38) on Factor 3. All three social items had weak loadings (.33 to .44) compared to the conformity items (> .57); (b) Factor 2 comprised four items on coping motives with excellent factor loadings (> .71); one of the items *"because it helps me when I am feeling depressed or nervous"* also had a weak negative loading (- .37) on Factor 4; (c) five items loaded on Factor 3, four items on enhancement and one item on social motives. The social item *"because it makes a social gathering more enjoyable"* had a loading of .58. One enhancement item *"because it is exciting"* also showed a weak loading of .32 on Factor 4; (d) three items, one each on enhancement *"to get a high"* (.67), coping *"to relax"* (.49), and conformity *"to be liked"* (.46), loaded on Factor 4; the conformity item also loaded weakly (.36) on Factor 1; and (e) one social motive item *"as a way to celebrate"* did not load on any of the four factors.

Table 3.3: Items on Cooper (1994) Drinking Motives Questionnaire - Revised

Subscale	Items
Social motives	1. As a way to celebrate
	2. Because it is what most of my friends do when we are together
	3. To be sociable
	4. Because it is customary on certain occasions
	5. Because it makes a social gathering more enjoyable
Enhancement motives	1. Because you like the feeling
	2. Because it is exciting
	3. To get a high
	4. Because it is fun

	5. Because it makes you feel good
Coping motives	1. To relax
	2. To forget your worries
	3. Because you feel more self-confident or sure of yourself
	4. Because it helps when you are feeling nervous or depressed
	5. To cheer up when you are in a bad mood
Conformity motives	1. Because your friends pressure you to drink
	2. So that others won't kid you about not using
	3. To fit in with a group you like
	4. To be liked
	5. So you won't feel left out

Note: Each item is self-rated on a scale from 1 (almost never/never) to 5 (almost always/always).

The three-factor EFA provided the following information: (a) All five enhancement items and one coping *"because I feel more confident or sure of myself"* loaded on Factor 1, the coping item had the weakest loading (.34). (b) Four coping items loaded on Factor 2 with good to excellent loadings (.52 to .89). (c) Factor 3 consisted of four items on social motives with one item *"because it makes a social gathering more enjoyable"* also loading weakly (.32) on Factor 1. (d) One social motive item *"as a way to celebrate"* did not load on any of the three factors.

Table 3.4 : Items on Cooper et al. (1992) Drinking Motives Questionnaire

Subscale	Items
Social motives	1. As a way to celebrate
	2. Because it is what most of my friends do when we are together
	3. To be sociable
	4. Because it is customary on certain occasions
	5. Because it makes a social gathering more enjoyable
Enhancement motives	1. Because you like the feeling
	2. Because it is exciting
	3. To get a high
	4. Because it is fun
	5. Because it makes you feel good
Coping motives	1. To relax
	2. To forget your worries
	3. Because you feel more self-confident or sure of yourself
	4. Because it helps when you are feeling nervous or depressed
	5. To cheer up when you are in a bad mood

Note: Each item is self-rated on a scale from 1 (never/almost never) to 4 (almost always/always).

Table 3.5 shows the factor correlations for 5-factor Modified DMQ-R, 4-factor DMQ-R, and 3-factor DMQ. It can be seen that there are few small to moderate correlations between the factors suggesting that oblique rotation was justified in this sample.

Table 3.5: Factor Correlations

	5-F Modified DMQ-R					4-F DMQ-R				3-F DMQ		
	1	2	3	4	5	1	2	3	4	1	2	3
Factor 1		-.03	-.03	-.21	-.09		.04	-.16	-.03		.06	.24
Factor 2			-.14	-.15	.13			-.07	-.07			.12
Factor 3				.29	-.02				.35			
Factor 4					.04							
Factor 5												

Confirmatory Factor Analysis (CFA) of Drinking Motives

As explained earlier, the purpose of conducting the CFA in this study was to assess the model fit of the Modified DMQ-R and to compare this model fit with that of the DMQ-R and DMQ. All procedures were conducted with software package AMOS 20 (Arbuckle, 2011). The CFA was carried out with maximum-likelihood estimation procedures with the variance of the factors and the error terms set to 1 for identification purposes. The covariance among the factors was freely estimated. Hu and Bentler (1998) in their study of fit indices showed good performance in simulation studies with the following fit indices which were used here to evaluate the model goodness of fit: (a) the standardized root mean square residual (SRMR; Bentler, 1995), (b) the comparative fit index (CFI; Bentler, 1990), (c) the incremental fit index (IFI; Bollen, 1989), and (d) the root mean square error of approximation (RMSEA; Steiger, 1990). Values at or below .08 to .10 for the SRMR, values at or above .90 to .95 for CFI and IFI, and values at or below .06- to 08 for RMSEA have been considered indicative of a good model fit (e.g., Sun, 2005; Weston & Gore, 2006).

The model examined was the hypothesized five-factor Modified DMQ-R. The model fit statistics of the hypothesized model compared with other two models are presented in Table 3.6. Model 1 is the 28-item, five-factor Modified DMQ-R; Model 2 is the 20-item, four-factor DMQ-R (see Table 3.3, p. 80); and Model 3 is the 15-item three-factor DMQ, which does not include conformity items (see Table 3.4, p. 81).

Table 3.6: Summary of Fit Indices for Drinking Motives Questionnaire Confirmatory Factor Analytic Models

Model	χ^2	*Df*	SRMR	CFI	IFI	RMSEA
1. 5-factor Modified DMQ-R	656.87	340	.10	.80	.80	.09
2. 4-factor DMQ-R	322.29	164	.11	.82	.82	.09
3. 3-factor DMQ	207.01	87	.11	.79	.80	.11

Note: *df* = degrees of freedom; SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = Root-mean-square error of approximation

Overall, the five-factor model of drinking motives provided a poor fit to the data: χ^2 (340, N = 123) = 656.87, p< .001; SRMR=.10; RMSEA=.09; CFI=.80; IFI=.80. The standardized loadings of the indicator variables on their hypothesized factors were salient, i.e., ≥.30, with the exception of the item *"as a way to celebrate"* on the social factor which has a very low loading of .07 (see Table 3.7 for standardized factor loadings). Although the model fit statistics showed a poor model fit, except for SRMR, which was just adequate at .10, the overall result of sufficiently high standardized factor loadings suggests that post-hoc modifications could improve the model fit. However, considering that the purpose of conducting the CFA was to assess the model fit and to test this model with four-factor and three-factor models, the modification exercise was not carried out. Moreover, such modifications may entail removing or rearranging items that might

compromise the theoretical aspects of the principle that the construct of drinking motives is based upon.

Table 3.7: Item Standardized Regression Coefficients for Five-factor Modified DMQ-R

Item	Coefficient
Social motives ($\alpha = .61$)	
Because it makes a social gathering more enjoyable	.65
Because it is customary on certain occasions	.36
To be sociable	.70
Because it is what most of my friends do when we get together	.65
As a way to celebrate	.07
Enhancement motives ($\alpha = .77$)	
Because it makes me feel good	.71
Because it is fun	.64
To get a high	.46
Because it is exciting	.74
Because I like the feeling	.64
Coping with anxiety motives ($\alpha = .60$)	
To reduce my anxiety	.79
Because it helps me when I am feeling nervous	.60
Because I feel more confident or sure of myself	.43
To relax	.38

Item	Coefficient
Coping with depression motives (α = .93)	
To forget painful memories	.73
To stop me from feeling so hopeless about the future	.62
To help me feel more positive about things in life	.62
To turn off negative thoughts about myself	.82
To stop me from dwelling on things	.81
Because it helps me when I am feeling depressed	.85
To numb my pain	.80
To cheer me up when I am in a bad mood	.82
To forget my worries	.82
Conformity motives (α = .78)	
So I won't feel left out	.73
To fit in with a group I like	.87
Because my friends pressure me to use	.76
So that others won't kid me about not using	.55
To be liked	.40

Note: α = Cronbach's Reliability Index

The CFA was conducted with the entire sample (n = 123). The testing of gender invariance was not done because splitting the sample by gender resulted in much reduced sample size for each gender (74 females and 49 males) to adequately justify the process.

Correlations among Drinking Motives, Alcohol Use and Alcohol-Related Problems

Pearson correlations and hierarchical multiple regression analyses were carried out using SPSS (Version 20) to assess the correlations among the Modified DMQ-R subscales and alcohol use and RAPI total scores, and to determine the contribution of the Modified DMQ-R to concurrent predictive validity on alcohol use and alcohol-related problems. The alcohol use variables were: (a) frequency of past 30 day drinking, (b) average quantity (in number of units) drunk on a given drinking day in the past 30 days, and (c) heavy episodic, or binge, drinking (i.e., number of occasions of having 8 or more units for men, and 6 or more units for women), in the past 30 days. The total RAPI scores indicated the alcohol-related problems in the past three years.

The correlation matrix (Table 3.8) showed some highly statistically significant correlations among the motive subscales: social motives with enhancement and conformity motives; coping-with-anxiety motives with enhancement and coping-with-depression motives; and a significant but small correlation between social and coping-with-anxiety motives.

Correlations among motive subscales and measures of alcohol use showed some statistically significant findings: social and enhancement motives showed strong correlation with average number of drinks on a drinking day and with binge drinking; coping-with-depression motives with drinking frequency and binge drinking; and small but significant correlations between coping-with-anxiety and frequency of drinking and binge drinking. Alcohol-related problems showed highly significant correlations with all types of motives, with *r* values ranging from .20 to .54. The significant correlations were in the expected direction in that university students usually consumed alcohol for social and enhancement motives, and those who drank to cope usually drank frequently as well as indulged in frequent heavy drinking episodes.

Table 3.8: Means, Standard Deviations, and Correlations among Modified DMQ-R, Alcohol Use, and Alcohol Related Problems

Measure	M	SD	Modified DMQ-R					Alcohol use variables			
			1	2	3	4	5	6	7	8	9
Modified DMQ-R											
1. Social	3.49	0.69	-								
2. Enhance	2.74	0.80	.31**	-							
3. Cope-A	2.34	0.77	.19*	.28**	-						
4. Cope-D	1.68	0.78	.12	.07	.61**	-					
5. Conform	1.53	0.61	.48**	.09	.06	-.01	-				
Alcohol-use variables											
6. RAPI	22.71	13.73	.35**	.20*	.40**	.54**	.35**	-			
7. Freq 30	8.08	4.03	.13	.13	.18*	.43**	-.03	.29**	-		
8. Av Qty 30	8.21	4.35	.27**	.38**	.02	-.01	.03	.26**	-.05	-	
9. Binge 30	8.31	3.28	.35**	.39**	.18*	.35**	.03	.38**	.63**	.48**	-

Note: Social = social motive; Enhance = enhancement motive; Cope-A = coping-with-anxiety motive; Cope-D = coping-with-depression motive; Conform = conformity motive; RAPI = Rutgers Alcohol Problem Index; Freq 30 = Number of days having at least one drink in the past 30 days; Av Qty 30 = Average number of drinks in units consumed per drinking day in the past 30 days; Binge 30 = Number of occasions of having 8 or more units (men), 6 or more units (women) in the past 30 days.

*p < .05; **p < 01.

Hierarchical multiple regression analyses were performed to assess the predictive ability of the drinking motive subscales on alcohol use and alcohol-related problems. Age and sex (female = 0; male = 1) in Step 1 were controlled to determine the contribution of drinking motives in Step 2

(*see* Table 3.9). Demographic variables, i.e., age and sex, were not significant predictors of alcohol use. Drinking motives together were significant predictors of alcohol use and alcohol-related problems even after controlling for the demographic variables. The explained variance ranged from 22% (average number of drinks consumed on a drinking day) to 44% (alcohol-related problems). Frequency of drinking was strongly predicted by coping-with-depression motives. Social and enhancement motives also predicted the number of drinks consumed on a drinking day, although enhancement motive was a stronger predictor. Except for conformity motives, all motives significantly predicted heavy episodic or binge drinking, but enhancement and coping-with-depression motives were stronger predictors, and coping-with-anxiety motives had negative association with binge drinking. Alcohol-related problems as measured by the RAPI were significantly predicted by coping-with-depression and conformity motives.

Table 3.9: Multiple Regression Analyses of Drinking Motives Predicting Concurrent Alcohol Use and Alcohol-Related Problems

Outcome Variable	Step	Indicator Variable(s)	B	SE (B)	β	R^2
Freq 30	1	(Constant)	8.28	4.58		
		Age	-.03	.23	-.01	
		Sex	1.24	.75	.15	.02
	2	(Constant)	-.12	4.82		
		Age	.13	.21	.05	
		Sex	.83	.69	.10	
		Social	.61	.58	.10	
		Enhancement	.66	.46	.13	
		Coping-Anxiety	-1.05	.57	-.20	
		Coping-Depression	2.67	.54	.52***	

		Conformity	-.44	.62	-.07	.23***
Av Qty 30	1	(Constant)	7.53	4.93		
		Age	.01	.25	.00	
		Sex	1.42	.81	.16	.03
	2	(Constant)	-3.41	5.23		
		Age	.15	.23	.06	
		Sex	1.41	.75	.16	
		Social	1.63	.63	.26*	
		Enhancement	1.90	.50	.35***	
		Coping-Anxiety	-.79	.62	-.14	
		Coping-Depression	.06	.59	.01	
		Conformity	-.76	.67	-.11	.22***
Binge 30	1	(Constant)	7.75*	3.75		
		Age	-.18	.19	-.09	
		Sex	.42	.61	.06	.01
	2	(Constant)	-4.34	3.62		
		Age	.00	.16	.00	
		Sex	.15	.52	.02	
		Social	1.44	.43	.30**	
		Enhancement	1.41	.35	.34***	
		Coping-Anxiety	-.99	.43	-.23*	
		Coping-Depression	1.79	.41	.43***	
		Conformity	-.71	.47	-.13	.35***

RAPI	1	(Constant)	34.96*	15.71		
		Age	-.64	.78	-.08	
		Sex	1.75	2.57	.06	.01
	2	(Constant)	-19.11	14.01		
		Age	.17	.62	.02	
		Sex	.41	2.00	.01	
		Social	2.36	1.68	.12	
		Enhancement	1.64	1.34	.09	
		Coping-Anxiety	.24	1.66	.01	
		Coping-Depression	8.99	1.58	.51***	
		Conformity	6.44	1.80	.29***	.44***

Freq 30 = Number of days having at least one drink in the past 30 days; Av Qty 30 = Average number of drinks in units consumed per drinking day in the past 30 days; Binge 30 = Number of occasions of having 8 or more units (men), 6 or more units (women) in the past 30 days; RAPI = Rutgers Alcohol Problem Index.

*p < .05; **p < .01; ***p < .001.

Discussion

The present study examined the psychometric properties of drinking motives on UK university undergraduates, particularly, the five-factor DMQ-R (Grant et al., 2007), which has been developed and evaluated using US university undergraduates. This model distinguishes itself from the four-factor DMQ-R (Cooper, 1994) by having two different dimensions for coping motives, coping-with-anxiety and coping-with-depression, and from three-factor DMQ (Cooper et al., 1992) with the inclusion of conformity motives in addition to two dimensions of coping motives. The psychometric properties were examined using EFA by exploring the factor structure, CFA by testing the model fit and comparing the model fit with those of DMQ-R and DMQ.

Further examination was done to test the predictive validity of the hypothesized drinking motives of the Modified DMQ-R on alcohol use parameters and alcohol-related problems.

In the first stage of the analysis, EFA was carried out on the five-factor Modified DMQ-R to explore its factor structure. The EFA did not show consistent item loadings on the hypothesized factor. The five-factor model could not be established as there was cross loading of some items and many items did not load on the corresponding factor that they were expected to. This inconsistency indicates that the five-factor model is not the right model to fit the data collected in this study. Although the Kaiser criterion of EV>1 allowed for six-factor solution, a scree plot and a parallel analysis showed a three-factor solution of drinking motives in this sample, further validating the non-existence of a five-factor structure. The Kaiser criterion is one of the most widely used, and it is the default retention criterion in a number of commonly used statistical packages. However, it generally tends to overestimate the number of factors (Horn, 1965), and the rule that it follows is somewhat arbitrary in that it draws distinctions between factors with eigenvalues just above and just below 1.0 (Fabrigar et al., 1999). A scree test is another commonly used factor retention criterion. It is available in many statistical packages, but it also suffers from subjectivity and ambiguity, especially when the sample size is small and the ratio of factors to variables is low (Linn, 1968).

The evidence presented in factor analysis literature has shown that parallel analysis (Horn, 1965) is one of the most accurate methods for making a decision on the number of factors to retain (Hayton, Allen, & Scarpello, 2004; Zwick & Velicer, 1982). The overestimation of matrix rank due to sampling error in the Kaiser criterion is overcome in parallel analysis by adjusting the effect of sampling error (Hayton et al., 2004). Parallel analysis is, therefore, a sample-based alternative to the population-based Kaiser criterion (Zwick & Velicer, 1982). By constructing a number of

correlation matrices of random variables based on the same sample size and number of variables in the real data set, parallel analysis compares the average eigenvalues from these random correlation matrices with eigenvalues from the real data correlation matrix. Factors corresponding to actual eigenvalues that are greater than the parallel average random eigenvalues are retained (Hayton et al., 2004). In this study, the first three factors had EVs greater in the real data compared to randomly generated data. Therefore, parallel analysis indicated that three factors in this sample of participants should be retained. However, the purpose of the study was to psychometrically evaluate the five-factor drinking motives. Thus, further analysis, i.e., CFA and regression analyses were carried out on the five-factor model.

The CFA of the Modified DMQ-R yielded a poor fit to the data with the values of the χ^2 statistic and descriptive fit indices, such as SRMR, CFI, IFI and RMSEA, not falling within acceptable limits (e.g., Hu & Bentler, 1998). Although the χ^2 statistic is very sensitive to conceptually unrelated technical conditions, such as sample size (e.g., Bandalos, 1993) or a violation of the multivariate normality assumption (e.g., Curran, West, & Finch, 1996; Hu, Bentler, & Kano, 1992), the descriptive fit indices are much less sensitive to these conditions. However, calculation of these indices also suggested that the hypothesized five-factor model was a poor fit to the data. To assess whether other models would show a better fit to the data, the fit of the five-factor (28 item) model was compared with a four-factor (20 item, i.e., coping-with-anxiety and coping-with-depression as a single coping motive) model, and a three-factor (15 item, i.e., minus conformity motives) model. The descriptive fit indices of these alternative models also yielded poor model fit with no improvement from that of the five-factor model.

The poor fit of the data to the three CFA models is contrary to similar studies that examined and evaluated model fit in drinking motives among college students. Grant et al. (2007),

while evaluating psychometric properties, found that the five-factor model provided a good fit to the 28-item Modified DMQ-R used with undergraduate student drinkers, and provided superior fit to the data when compared to the four-factor DMQ-R. For the four-factor model, the studies by Cooper (1994) and Martens et al. (2008) found acceptable fit to the data, although the study by Cooper (1994) evaluated the model among adolescents who were younger than university students. Stewart et al. (1996) found that the three-factor model had an acceptably good fit to the data in a sample of university students. Interestingly, Martens et al. (2003) found the three-factor model to have a better fit to the data compared to the four-factor model in a study among intercollegiate athletes.

The poor fit of the model to the data in the current study for all three models, i.e., the five-factor Modified DMQ-R, the four-factor DMQ-R, and the three-factor DMQ models, might have occurred for several reasons, namely: (a) The *sample size* of 123 could have been inadequate a factor analytic model to obtain adequately stable factor solutions. The current study had 28 variables giving a variable sample ratio of 1:4.4, which according to some authors may not be an adequate sample size (e.g., Gorsuch, 1983; Hair, Anderson, Tatham & Black, 1995). However, according to Guadagnoli and Velicer (1988), samples size as a function of the number of variables is not an important factor in determining stability of factors. (b) *Low communality* values associated with several variables particularly those related to social motives, e.g., the motives 'as a way to celebrate' had a communality of .27, and 'because it is customary on certain occasions' had a communality of .39, respectively. According to Costello and Osborne (2005), common magnitudes are low to moderate communalities of .40 to .70. If the communality of an item is less than .40, it may either be not related to other items, or it may suggest an additional factor.

Interestingly, these two social motive items constituted the fifth factor and the other three social motive items corresponded with conformity and enhancement motives items.

Despite these limitations, further analysis to evaluate the predictive validity of drinking motives on the drinking variables was unequivocal. For example, drinking frequency was significantly associated with *coping with depression* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; Kuntsche et al., 2008; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003). Quantity of drinking, i.e., the amount of alcohol consumed per drinking occasion was highly significantly associated with *social* and *enhancement* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003), although *enhancement* motives was a more powerful predictor. Binge or heavy episodic drinking was significantly associated with *social*, *enhancement*, *coping-with-anxiety* and *coping-with-depression* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003), but *social* and *coping-with-anxiety* motives were less powerful predictors. Drinking related consequences as measured with the RAPI was highly significantly associated with coping-with-depression and conformity motives (e.g., Carey & Correia, 1997; Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; Merrill, Wardell, & Read, 2014; Read et al., 2003).

However, similar study of five-factor drinking motives on alcohol use parameters (Grant et al., 2007) has found social and enhancement motives as significant predictor of drinking frequency; and enhancement, conformity and coping-with-depression motives as significant predictors of drinking quantity, i.e., amount of alcohol consumed per drinking occasion. In this study, coping-with-depression was the single most significant predictor of alcohol problems. The inconsistency between the two studies on predictive abilities of drinking motives could have

resulted because of the differences in sample size, the current study having a much smaller sample size. Another reason could be that Grant et al. conducted their studies in two waves with different alcohol use parameters examined in different waves, i.e., frequency and quantity of drinking were measured at Time 1, and alcohol problems were measured at Time 2. Moreover, the differences in drinking patterns and situations and legal drinking age between the university students in the United Kingdom and North America might have resulted in different outcomes.

Conclusions

This chapter discusses the different types of motives for alcohol consumption and examines the motivations of the university students in the current study. Exploratory and a confirmatory factor analyses were carried out to examine whether the five-factor drinking motives for undergraduate students holds true in the context of UK undergraduates as compared to North American students.

The five-factor drinking motives questionnaire, as well as the three- and four-factor ones, yielded a poor fit in the confirmatory factor analysis. The limitations of the study that could have had an impact on the outcome are described early in the chapter. However, the results showing the ability of specific motives to predict specific patterns of drinking were unequivocal.

Chapter Four

Methodology for Evaluating Brief Interventions

Introduction

In order to examine the effect of different interventions on university students'alcohol use behaviours and alcohol related problems, the following methodology was adopted. To begin with, a power analysis was carried out to find out the adequate sample size for each of the four groups. Following that, the screening procedure is described and the way they were randomized into different groups. A description of assessment procedures for each group during baseline (pre-intervention), at-intervention, and at follow-up is made. Different instruments to determine the drinking measures, alcohol use motives, alcohol related problems, affective states, and motivational structure is described in detail. The intervention procedure for different groups is also detailed. Lastly, how the intervention sessions were closed and what information were provided to the participants are incorporated in this chapter.

Participants

Participants were 123 undergraduate students aged between 18 and 25 years who were enrolled at Bangor University. Participants reported having had at least two episodes of binge drinking ($\geq$ 5 drinks for men and $\geq$ 4 drinks for women in a single session) and having consumed alcohol on at least 6 occasions in the past 30 days. Approximately three-fifths (60.2%) of the sample was women. The mean age of the sample was 20.15 years (SD = 1.61).

A power analysis was carried out to determine the sample size needed for each group in the study. Evaluations of brief interventions in comparison to a no-intervention control group have found a wide variation in effect sizes. However, Moyer, Finney, Swearingen, and Vergun (2002)

found that for studies of brief intervention versus no treatment effect sizes obtained at three-month follow-up periods were in the medium-to-large range. According to Cohen (1992), to detect a large effect when testing the difference between two independent means at an alpha level of .05, the sample size necessary for .80 power is 26 participants per group. Thus, with an expected 15 per cent 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 = 4), a sample size of 120 participants was needed.

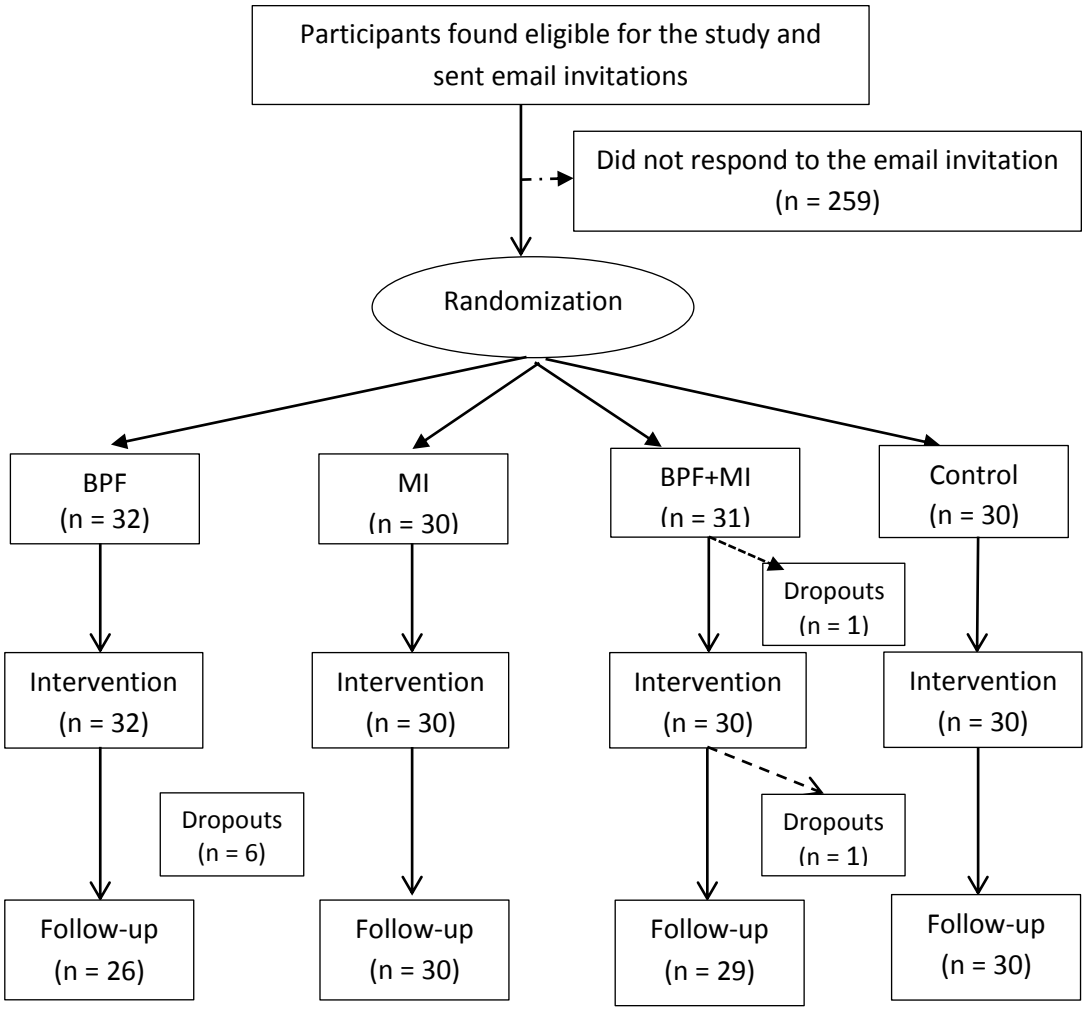
Procedure

Following administration of an online risk behaviour questionnaire to screen undergraduate students for alcohol use as described in detail in Chapter Four, a total of 1,014 students responded to the screening survey over two waves during spring and autumn semesters, 2014. Five participants who did not provide their age and 82 who were older than 25 years old were excluded. Further exclusions included 99 participants who did not provide their identification; five did not report the number of days having at least 1 drink, and two who did not report the number of days of binge drinking; 335 binged for less than 2 days, and 104 drank at least one drink on less on 6 occasions. Overall, 382 participants fulfilled the eligibility criteria and were sent e-mail invitations to participate in the study; of these 123 accepted the invitation. A copy of the email inviting participants into the study is shown in Appendix 'H', p. 259.

The invitation informed students that they would be paid £20 for their participation if they completed all three sessions of the study, i.e., baseline assessment, intervention, and follow-up. Students who completed the baseline questionnaire and subsequent intervention on their second visit within 7-14 days were paid £10 after they received the intervention. The remaining £10 was

paid after they completed the follow-up and debriefing. The psychology students who registered through SONA were given a choice of course credits in lieu of £10 for the baseline assessment and intervention. Those who completed the follow-up were given paid £10 in addition to course credits.

A total of 123 students who responded to the email were asked to meet the researcher in the School of Psychology at a designated time and date. They were told in the email that it would take about an hour for the first session. After reading the Participant Information Sheet (PIS), all 123 students gave informed consent to participate in the study. A total of 122 students reported for the intervention (second session) within one-to-three weeks (range = 7-21 days) of the baseline assessment (mean = 9.28 days, S.D. = 3.07 days), with one drop-out from the intervention who did not keep the scheduled appointment. A total of 115 students completed the follow-up within eight and twelve weeks (range = 51-81 days) of the intervention. There was seven drop-outs from the follow-up. Five of them did not respond to at least three email reminders; one reported being out of the country; and one reported not having time to continue participating. For the study flowchart, please see Figure 4.1.



Note: BPF = Brief Personalized Feedback; MI = Motivational Intervention

Figure 4.1: Flow Diagram

After completing the baseline assessment, the participants were randomized into one of four groups, namely (a) Brief Personalized Feedback (BPF) (consisting of personalized feedback about drinking and comparison with norms, drinking-related consequences, and drinking motives, (b) Motivational Intervention (MI) (consisting of feedback on the participant's motivational profile, (c) (BPF + MI) (a combination BPF and MI), and (d) Minimum Intervention (Control; consisting of generalized information about alcohol limits, units, consequences, etc. and different

risk behaviours common among adolescents and young adults). In addition, the latter group also received generalized feedback about their risky behaviours obtained from the assessment (Table 4.1)

Table 4.1: Group Allocation Details Post-Randomization

Group	Assessment	Intervention	Follow-up
1. Brief Personalized Feedback (BPF)	X	X	X
2. Motivational Intervention (MI)	X	X	X
3. BPF + MI	X	X	X
4. Control	X	X	X
Instruments	Modified DMQ-R RAPI TLFB PANAS PCI (S-F)	TLFB	TLFB RAPI PCI (S-F) PFQ

Note: Assessment sessions lasted 45 minutes on average.

Modified DMQ-R = Modified Drinking Motives Questionnaire – Revised; TLFB = Alcohol Timeline Follow Back; RAPI = Rutgers Alcohol Problem Index; PANAS = Positive Affect and Negative Affect Schedule; PCI-SF = Personal Concerns Inventory (short-form); PFQ = Participant Feedback Questionnaire.

Baseline Assessment

The baseline assessment included a demographic questionnaire and five other questionnaires (described below), which were administered individually in a private, quiet room in the School of Psychology. Dates and times of assessments were scheduled through emails as per mutual availability of the researcher and the students. Each student was asked to read the PIS (Appendix 'D', p. 246) carefully and ask the researcher for any clarification that might be needed. If they felt that they would like continue with the study, they were asked to read and sign the

consent form (Appendix 'E', p. 247) before completing the questionnaires, which took about 45 minutes. For the initial five minutes of the session, the questionnaires were explained to the students, and they were referred to the instructions at the beginning of each questionnaire. The participants were left on their own to complete the questionnaires. On completion, a date and time for the next intervention session were scheduled within one to three weeks (preferably within two weeks) of the assessment according to the availability of the participant. Assessment sessions were conducted over a period of about one month in the autumn semester and about two months in the following spring semester. Baseline data were obtained from a total of 123 students during this period.

Assessment Instruments

Alcohol Timeline Follow-Back (TLFB; Appendix 'B', p. 241). A technique for assessing self-reported alcohol consumption (Sobell & Sobell, 1992), the TLFB is a versatile technique in that it not merely gives a measure of alcohol consumption but allows several dimensions of a respondent's drinking to be separately examined: variability (i.e., scatter), pattern (i.e., shape), and extent of drinking (i.e., elevation, or how much). In addition, the TLFB can generate a variety of continuous variables that provide quite different and more precise information about an individual's drinking than estimation formulae. Thus, the TLFB provides a detailed, clinically useful picture of the full range of a subject's drinking. Compared to a 28-day daily diary and a 30-day electronic interview, the TLFB has been found to capture overall levels of drinking quite well (Carney, Tennen, Affleck, Del Boca, & Kranzler, 1998). Furthermore, this method has very good and well-established psychometric properties in terms of test-retest reliability and validity (Grant, Tonigan, & Miller, 1995; LaBrie, Pedersen, & Earleywine, 2005; Sobell et al., 2001).

For this study, the pen-and-paper version of the questionnaire was used. It consists of two pages: the instructions and a calendar. The first page instructs the participant on how to complete the questionnaire. The second page is a calendar of last 30 days with clear indication of the days and dates, the weekends, and any holidays or special days, e.g., the Queen's Diamond Jubilee, or University Open Day. The procedure was explained to the participants, and they were given a sheet of paper that illustrated the number of units each type of drink usually contains (*source: http://www.nhs.uk/Livewell/alcohol/Pages/alcohol-units.aspx*.). The participants were asked to think about the days they had had a drink and write the number of units they drank on those days.

Modified Drinking Motives Questionnaire – Revised (Modified DMQ-R; Appendix 'A', p. 239). Grant, Stewart, O'Connor, Blackwell, & Conrod (2007) psychometrically evaluated the five-factor drinking motives questionnaire in Canadian undergraduate students. They examined respondents' motives (reasons) for drinking along five dimensions: enhancement, social, conformity, coping with anxiety, and coping with depression. Chapter Three discusses the development of drinking motives questionnaire, and further psychometric evaluation of the questionnaire has been conducted with British undergraduates (see Chapter Four for a description of the Modified DMQ-R).

The questionnaire consists of a total of 28 items with five items each on social, enhancement, and conformity motives; four items on coping with anxiety motive; and nine items on coping with depression motive. The questionnaire instructs the participants to rate the frequency with which each of the reasons motivated them to drink. The response options are: one = almost never / never; two = some of the time; three = half of the time; four = most of the time; and five = almost always / always.

Rutgers' Alcohol Problem Index (RAPI; White & Labouvie, 1989, Appendix 'C', p. 243). The RAPI is one of the most frequently used assessment measures of alcohol problems among adolescents and university students. The RAPI is a 23-item (18-item) general screening measure that was designed and validated specifically for use with adolescents; as such it includes consequences of a general nature as well as consequences that are unique to adolescents (Neal, Corbin, & Fromme, 2006). In this questionnaire, respondents indicate the problems they have experienced either while drinking alcohol or as a result of their drinking. The response options range from zero to four, where zero = never; one = 1 to 2 times; two = 3 to 5 times; three = 6 to 10 times; and four = more than 10 times. Students were asked to indicate how many times each problem had occurred during the previous three years. The RAPI assesses the extent of alcohol-related problems by providing an index of the negative consequences of drinking. The items describe a range of consequences that occur as a direct result of drinking alcohol. The advantages of this screening tool lie in its ease of administration and its standardization, which make it possible to compare problem drinking scores across groups.

Positive Affect and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988, Appendix 'I', p. 260). The PANAS, i.e., the Positive Affect (PA) and Negative Affect (NA) Schedule comprises two 10-item mood scales for PA and NA, respectively, that are reliable and valid. The scales have high internal consistency and are largely uncorrelated with each other; they remain stable across a 2-month time period (Crawford & Henry, 2004; Depaoli & Sweeney, 2000; Leue & Lange, 2011). PA reflects the extent to which a person feels proud, strong, inspired, enthusiastic, excited, active, determined, interested, alert and attentive. NA reflects subjective distress and engagement that is not pleasurable. It is measured by adjectives such as afraid, guilty, scared, nervous, irritable, hostile, guilty, ashamed, upset and jittery. The participants were asked to

indicate the extent to which they felt each of the adjectives in the past 30 days. The response options range from one to five, where one = very slightly or not at all; two = a little; three = moderately; four = quite a bit; and five = extremely.

Personal Concerns Inventory (PCI; Cox & Klinger, 2011; Appendix 'J', p. 261). The PCI is a modified and abridged version of the Motivational Structure Questionnaire (MSQ), which is designed to be simpler and more user-friendly. The PCI has three parts: the Instruction Booklet, Rating Scales, and Answer Sheets. After introduction of the PCI to the respondents, they were given the instructions for completing each of the three steps: (1) to describe their concerns in different life areas, (2) to describe what they would like to do in order to resolve each concern, and (3) to rate each goal along 10 dimensions. Using both an idiographic and nomothetic method of assessment, the PCI has advantages over checklist measures of motivation. By asking respondents to identify and describe their goals and concerns, important information is gained about whether each goal is positive or negative. Quantitative information is also gathered by asking individuals to rate each of their goals on rating scales, such as importance, expected likelihood of attainment, and expected affective change if the goal is attained. Being a very versatile instrument, the PCI can be used in a variety of settings for measuring motivational structure, e.g., with offenders (Sellen, McMurran, Cox, Theodosi, & Klinger, 2006). Both the MSQ and the PCI are reliable, valid, and useful psychological assessment measures (Klinger & Cox, 2004, 2011).

In the short form of the PCI (PCI-SF) that was used, the respondents were asked to rate their responses in each life area. There are eight life areas with an option for the respondent to choose any four area in which they have a goal or a concern. The eight life areas are (a) Home and Household Matters, (b) Relationships (with Partner, Family, Relatives, Friends, Acquaintances), (c) Love, Intimacy and Sexual Matters, (d) Self-Changes, (e) Finances and Employment, (f)

Leisure and Recreation, (g) Health and Medical Matters, and (h) Education. They were asked to provide ratings between zero (the least amount) to 10 (the greatest amount) for each of the ratings scales for the chosen life areas (Table 4.2)

Table 4.2: Statements for Each of the Rating Scales for the PCI-SF

Index	Statement Beginning	Modifying word	Rating	End of Statement
Importance	This goal/ concern is	*not at all*	0	important for me to get/avoid
		not very	1 - 2	
		somewhat	3 - 4	
		moderately	5 - 6	
		very	7 - 8	
		strongly	9 - 10	
How likely	I feel that this is	*not at all*	0	likely to happen
		not very	1 - 2	
		somewhat	3 - 4	
		moderately	5 - 6	
		very	7 - 8	
		strongly	9 - 10	
Control	I feel that I have	*no*		control in making things happen
		hardly any	1 - 2	
		a little	3 - 4	
		moderate	5 - 6	
		a lot of	7 - 8	
		almost total	9 - 10	
What to do	I know	*not any*	0	steps to make it happen
		hardly any	1 - 2	
		a few	3 - 4	
		some	5 - 6	
		most	7 - 8	
		exactly what	9 - 10	
Achievement	If I try my best I am	*not*	0	likely to achieve it
		not very	1 - 2	
		somewhat	3 - 4	
		moderately	5 - 6	
		very	7 - 8	
		extremely	9 - 10	

How happy	I would feel	*no*	0	happiness if I am
		hardly any	1 - 2	able to achieve my
		a little	3 - 4	goal
		moderate	5 - 6	
		a lot of	7 - 8	
		great	9 - 10	
Commitment	I am	*not*	0	committed to make
		hardly	1 - 2	things turn out as I
		slightly	3 - 4	want
		moderately	5 - 6	
		very	7 - 8	
		strongly	9 - 10	
How long	It will take	*<1 month*	0	to achieve my goal
		1-3 months	1 - 2	
		3-12 months	3 - 4	
		1-5 years	5 - 6	
		5-10 years	7 - 8	
		>10 years	9 - 10	
How sad	I would feel	*no*	0	sadness if I am not
		hardly any	1 - 2	able to achieve my
		a little	3 - 4	goal
		moderate	5 - 6	
		a lot of	7 - 8	
		great	9 - 10	
Alcohol help	Alcohol will be	*unhelpful*	0	in reaching my goal
		somewhat unhelpful	1 - 2	
		not be helpful	3 - 4	
		make no difference	5 - 6	
		very helpful	7 - 8	
		extremely helpful	9 - 10	
Alcohol interfere	Alcohol will	*not interfere*	0	in reaching my goal
		hardly interfere	1 - 2	
		make no difference	3 - 4	
		somewhat interfere	5 - 6	
		probably interfere	7 - 8	
		totally interfere	9 - 10	

Intervention

Students were randomly assigned to one of the four groups: brief personalized feedback, motivational intervention, combination of brief personalized feedback and motivational intervention, and control (minimal intervention). At the time of baseline assessment, a date and time for the intervention session was arranged for each participant in each group. All the intervention sessions were conducted in a private, quiet room in the School of Psychology. Each student received feedback from the researcher in an individual session that lasted between 27 and 50 minutes (mean = 35.14, S.D. = 6.24). No monitoring was done to ensure the fidelity of the feedback sessions by having either an observer to note the proceedings or by way of audio-taping. It would have been ideal to do so, but such action would have led to discomfort to the participants and may have led to non-participation. Hence, the idea of monitoring of the sessions was not taken on board.

A non-judgemental and non-threatening atmosphere was created during the feedback session so that the participants were able to engage with the researcher freely and in a comfortable manner. As in the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999), it was important that a feeling of alliance between the researcher and the participant was developed by reviewing, absorbing and reflecting together on the information presented. To ensure that the participants could process the information properly, reflective questioning with a non-confrontational and non-judgmental approach was adopted as in motivational interviewing (Miller, 1995).

To begin the intervention session, each participant was greeted in a friendly manner in an attempt to put the participant at ease, and then was invited into the designated room to sit at a table

with the researcher. Every session started with following introduction: “During this session we will be going over some of the information which you provided while completing the baseline assessment. There will be no judgement or labelling of any sort about your behaviour or lifestyle, and no counselling or advice will be offered. I will be reading the information to you which you will be following in the copy of the information sheets that I am going to give you. Every so often, I might ask you a question about the information being read. Are you okay with all this?” After the participant conveyed his or her agreement, a copy of the information sheet was given to the participant and then read aloud while the participant followed what was being said on his/her own copy. This procedure made it possible to ensure that every participant read the information sheet at least once.

After reading out each page of the information sheet, the researcher asked a question to break the monotony and also to prompt the participant into considering the information being given. Questions such as “Do you have any comments about what you have heard so far?” or “Do you have anything to say about this?” prompted response from the participant. Either a participant would say “no comment” or would make a comment. In either case, the researcher responded by saying, “That’s all right. Shall we move on to the next page?” and continued reading the information which went on until the last sheet of paper was read.

At the end of the session, the participant completed the TLFB questionnaire regarding their alcohol consumption since their last visit for the baseline assessment. The purpose of this was to look at the effect of research participation and assessment completion on the participant’s drinking.

Content of Feedback Information and Procedure for Each Group

Brief Personalized Feedback (example of feedback sheets in Appendix 'K', p. 266). Participants in this group received feedback based on the information they provided about their drinking, drinking-related consequences, and drinking motives. The feedback session, following the greeting and introduction, proceeded as follows:

1. Sheet 1: This sheet contained information about alcohol facts in general (www.drinkaware.co.uk, www.alcoholconcern.org.uk) with information on drinking guidelines, effects of alcohol, some alcohol facts, and binge drinking and its effects. This information sheet consisted of three pages.

   A typical question asked after reading this sheet: "Did you already know this information about alcohol effects and limits?"

2. Sheet 2: This sheet contained information about the participant's drinking pattern, and a graphical representation of his/her TLFB data which were compared with the actual norms prescribed by the Department of Health, and data collected from other undergraduates during the recruitment survey were provided on a single page.

   A typical question asked after reading this sheet: "What do you think about this information?"

3. Sheet 3: This single page contained alcohol-related consequences as reported by the participant while completing the RAPI and which were read to the participant. The responses "6-10 times" were also read as "very frequently", and "3-5 times" were read as "quite frequently".

A typical question asked after reading this sheet: “Is what we have just read clear to you?”

4. Sheet 4: This single sheet contained drinking motives as endorsed by the student while completing the Modified DMQ-R. These were read aloud, and from the choices the participant filled in, they were told which type of drinking motive they most strongly endorsed.

   A typical question asked after reading this sheet: “Is the information that you just heard clear to you?”

The session was closed with this final question: “Looking back to the information drawn from these sheets, can you think of any particular situation that may have contributed to your drinking or of other people’s drinking, and which may also have led to some of the consequences that you have had?”

Motivational intervention (example of feedback sheets in Appendix ‘L’, p. 270). Participants in this group received feedback based on their PCI-SF profile scores in the life areas they chose in which they had a concern or a goal. The feedback session, following greeting and introduction, were as follows:

1. Sheet 1 (the same as for BPF above).
2. Sheet 2 (4 pages): This sheet contained graphical representation (bar graphs) of the goals or concerns in the four life areas followed by discussion with the participant about their scores related to goal attainments.

   Typical question: “What do you make of this information?” Or, “Do the scores represent what you really feel about this goal or concern?”

3. Sheet 3 (5 pages): Graphical representation (line graph) summarizing the four concerns that the participant named. Followed this was highlighting the common points in each concern that may help with or deter resolving the concern.

Here are examples of (a) an adaptive motivational profile (Fig. 5.2), and (b) a maladaptive motivational profile (Fig. 5.3), and how each was explained to the participant.

(a) Adaptive motivational profile

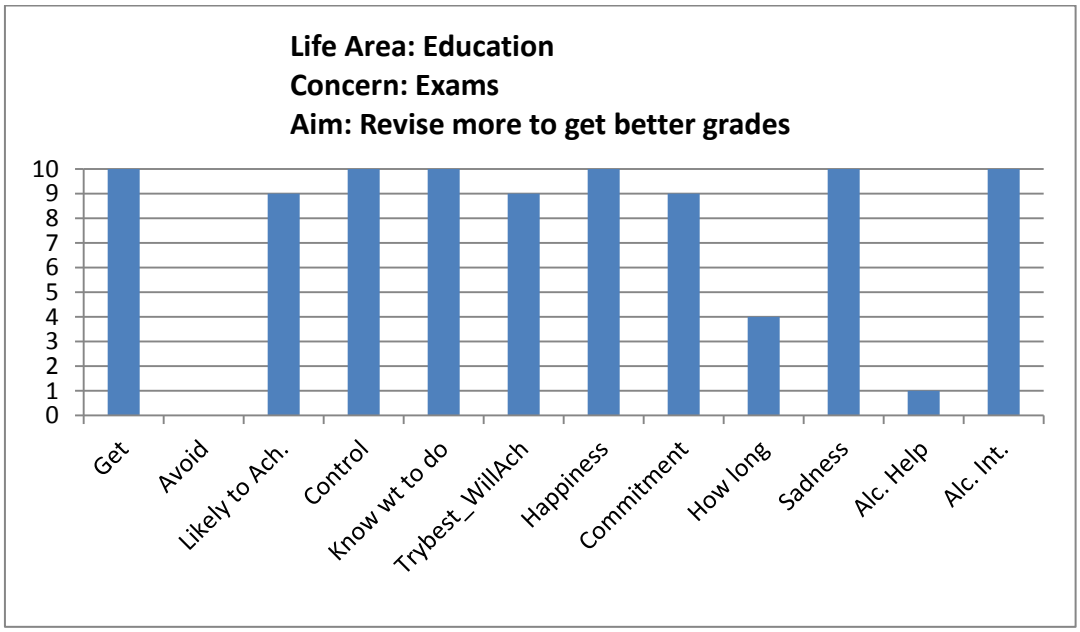


Figure 4.2: An example of Adaptive Motivational Profile

This profile was explained to the participant as follows:

This profile shows that you are *strongly* committed to this goal, and it is *extremely* important to you to get better grades. You expect *great* joy if you achieve this goal and *great*sadness if you do not achieve this goal. You feel that your use of alcohol *will be somewhat unhelpful* in reaching your goal and will *totally interfere* with reaching it. You perceive *almost*

total control over obtaining this goal, and have belief that it is *extremely* likely to happen. You *know exactly what* steps to take toachieve this goal, and you know that if you do your best, you are *extremely* likely to achieve it.

During the discussion, the participant was very positive and clear about the goal that he or she wanted to achieve. The participant acknowledged the commitment, the knowledge, the importance and the control required to achieve this goal. The participant was fully aware that alcohol would be a severe deterrent to goal achievement. This profile showed a highly adaptive motivational structure.

(b) Maladaptive motivational profile

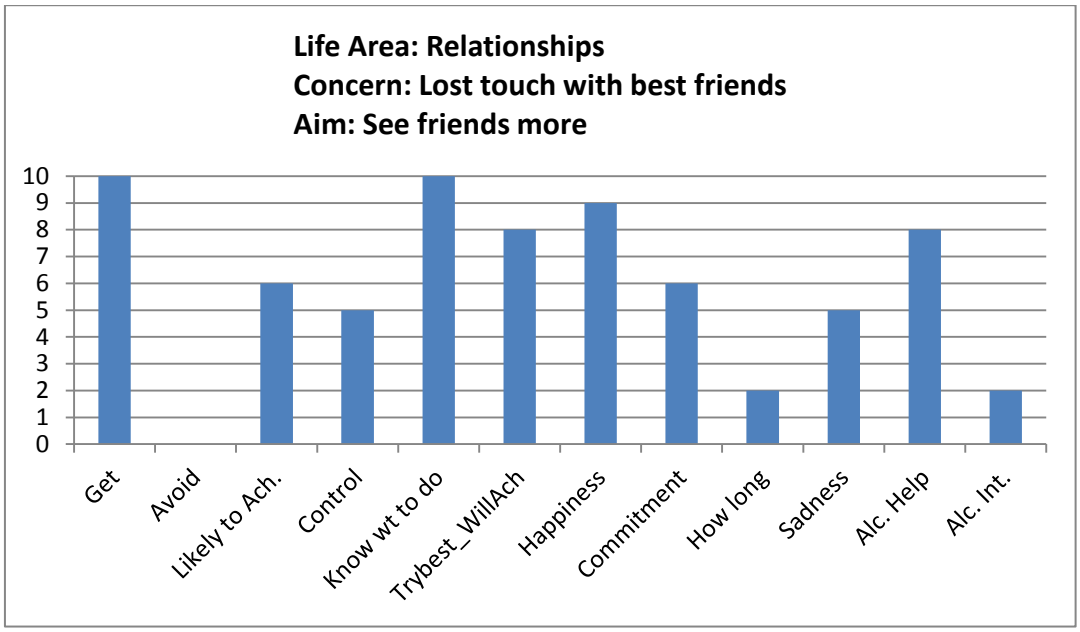


Figure 4.3: An example of Maladaptive Motivational Profile

This profile was explained to the participant as follows:

This profile shows that you are *moderately* committed to this goal, but it is *extremely* important to you to keep contact with your best friends. You expect *great* joy if you achieve this goal and *moderate* sadness if you do not achieve this goal. You believe that drinking alcohol will be *very helpful* and will *hardly interfere* in achieving this goal. You perceive *moderate* control over obtaining this goal, and believe that it is *moderately* likely to happen. You *know exactly what* steps to take to achieve this goal, and you know that if you do your best, you are *very* likely to achieve it.

This profile suggests a maladaptive motivational structure because there was only moderate commitment to a goal that was perceived as extremely important. Despite knowing how to achieve the goal and having a belief that this could be done with hard work, the participant perceived having only moderate control over it and moderate faith that it would happen. The participant perceived that alcohol would be particularly helpful to make this happen, which further showed the misperception of the effects of alcohol. These discrepancies and ways of increasing commitment were discussed with the participants. While considering other statements related to the goal pursuit, the participant was told to think about whether this goal was really important and whether disengagement from this goal would make a difference.

Control or Minimal Intervention (examples of feedback sheets in Appendix 'M', p. 275). Participants in this group received feedback in the form of information on health risk behaviours common among adolescents and young adults, general information on health and wellness, and a summary of data from the Morbidity and Mortality Report (MMWR), Youth Risk Behaviour Surveillance Survey (2009), and the Center for Disease Control and Prevention (CDC). They were also presented with their risk behaviour profiles from the data collected during the screening phase. They were read in following order and consisted of three sheets: (a) The first sheet was a

single page containing six common health risk behaviours and information on health and wellness. (b) The second sheet was a three-page summary of MMWR data. (c) The third sheet was the risk behaviour profile.

The session consisted of reading the information with no questions asked or answers solicited.

Follow-up

The follow-up sessions were conducted between the 8^{th} and 12^{th} week post-intervention (range = 51-81 days, mean = 62.65 days, S.D. = 6.24 days). All the participants were contacted by e-mail to arrange the follow-up session. The participants reported on the day and time of their convenience. Of 122 participants who had completed the intervention, 115 participated in a follow-up session that took place in a private, quiet room in the School of Psychology.

Each session consisted primarily of completion of the TLFB, RAPI, and PCI-SF. The TLFB and RAPI questionnaires instructed the participant to answer for the period since the intervention, whereas the PCI-SF instructed the participant to indicate the current status of their concerns and goals.

Participant Feedback Questionnaire (PFQ; See Appendix 'N', p. 276). At the end of the follow-up session, participants from all four groups were also asked to complete a short questionnaire consisting of nine items. The purpose of the questionnaire was to provide an opportunity for students to express their opinions about the research in which they participated. This kind of feedback also would tell us how these interventions were perceived by the participants and whether there was a need to make a change the approach or delivery of the interventions in future research.

The follow-up session was closed by giving the participant the Debriefing Sheet (Appendix 'O', p. 278). They were asked to read it, and they were given an opportunity to ask any questions they might have about the research. Finally, they were paid for their time and thanked for their participation in the research.

Chapter Five

Results of the Brief Interventions to Reduce Excessive Alcohol Consumption

Assignment of Participants into Groups

Randomization of the participants was done in the office room of the researcher where a colleague of the researcher helped in the procedure. All the participants were given a unique code and the code was written in small pieces of paper which was neatly folded so that the written code was not visible from outside. In a sheet of paper four rectangles were drawn on four corners. These four corners were named as 'A', 'B', 'C', and 'D'. One by one, each folded paper with the code inside was placed randomly on any of the four corners by the researcher's colleague so that each corner had equal number of participants. Those on the 'A' corner were assigned to Control group, 'B' corner was assigned to Brief Personalized Feedback group, 'C' corner was assigned to Motivational Intervention group, and 'D' corner was assigned to the combined intervention group.

Random assignment of participants to the four groups was successful with regard to a number of background variables. With a confidence level of $\alpha = .05$, participants in the four groups did not significantly differ in gender, χ^2 (3, n = 123) = 1.03, $p = .79$, or age, F (3, 122) = 2.51, $p = .06$. At baseline, there was also no statistically significant difference between the groups in frequency of drinking days in the past month, F (3,122) = .51, $p = .68$, total monthly alcohol consumption, F (3, 122) = .62, $p = .61$, monthly binge drinking, F (3, 122) = .87, $p = .46$, or drinking-related consequences, F (3,122) = 2.17, $p = .09$. Neither was significant differences found among groups on the motivational indices at baseline. For the appetitive motivation index, F (3,121) = .32, $p = .81$; for the index of aversive motivation, F (3,121) = .49, $p = .69$, and for the index of incommensurate commitment, F (3,121) = .98, $p = .41$.

Data Transformations

For the data to have an unprejudiced and valid outcome without any Type I or II errors, they should be normally distributed. There are a number of methods to determine whether the data are normally distributed, such as calculating skewness and kurtosis and *z*-scores or Kolmogorov-Smirnov (K-S) or Shapiro-Wilk (S-W) tests of significance, or by visual examination to determine whether there is a normal frequency distribution curve or by using *P-P* plots. Although the values of skewness and kurtosis are informative in both small and large samples, the relative degree of skewness and kurtosis is subject to interpretation, depending upon the sample size and type of measure used. By converting the values of skewness and kurtosis to *z*-scores that have a mean of zero and a standard deviation of one provides a useful means to compare skewness and kurtosis values in different samples that used different measures. The conversion also tells how likely the values of skewness and kurtosis are to occur. To derive a *z*-score, the mean of the distribution, i.e., zero, is subtracted from the value for skewness or kurtosis, and the result is divided by the standard deviation (standard error) of the distribution. Absolute *z*-score values greater than 1.96 are significant at $p < .05$; those greater than 2.58 are significant at $p < .01$; and those above 3.29 are significant at $p < .001$.

K-S and S-W tests are two commonly used measures of normality. These tests compare the scores in the sample with a normally distributed set of scores with the same mean and standard deviation. The null hypothesis of these tests is that samples are normally distributed but if the test is significant, the sample is not normally distributed. These tests have little power to reject null hypothesis in the case of small samples. In large samples, however, significant results would be derived even in the case of a small deviation from normality. Another way of assessing the normality of the data is by visual examination of the frequency distribution, probability and

quantile plots, a boxplot, and a stem-and-leaf plot, although this approach is usually unreliable and does not guarantee that the distribution is normal. Although no single measure of assessment is the best measure, the best approach to assess the normality would be to look at all these different approaches in order to make an informed decision.

Visual inspection of the frequency distribution plots and *P-P* plots, suggested that the data from most of the constructs in the present study were not normally distributed. A decision was made to look at the *z*-scores for skewness and kurtosis and K-S and S-W tests of normality for all the constructs. Because this sample of 123 participants could be considered as a medium-sized sample, significance for the *z*-scores for skewness and kurtosis were kept as $p < .001$, i.e. a value above 3.29 was considered as indicating significant skewness or kurtosis. Similarly, a significance of $p < .001$ was considered as indicating a non-normal distribution for the K-S and S-W tests. Data on those constructs were transformed when both *z*-scores and normality tests were significant and thus violated the assumptions of homogeneity of variance.

The three commonly used data transformations are square root, log, and inverse transformations. In this study, appropriate data transformations were applied depending on the level of skewness/kurtosis with significant *z*-scores of $p < .001$ and significant K-S and S-W tests at $p < .001$. If the deviation from normality was not very large and the data met the assumption of homogeneity of variance, i.e., a non-significant Levene's test, then the data was not transformed. If the data were transformed before doing the analysis, then the type of data transformation used are discussed before each analysis.

Changes in Drinking Parameters

The outcome variables used to measure changes in drinking were frequency of drinking days in a month, monthly total alcohol consumption, i.e., frequency x quantity usually drunk on a drinking day, and binge drinking, i.e., drinking more than eight units for men and more than six units for women on a single drinking occasion. The data for these variables were obtained and measured at three time-points, baseline or pre-intervention, immediately following the intervention (at intervention), and at the 3-month follow-up following the intervention. The interval between the baseline assessment and intervention was planned to be 7-14 days, but because of the non-availability of some participants within the arranged time period, the actual interval ranged from 6-21 days. However, groups tested at different intervals did not differ significantly from one another, F (3,122) = .14, p = .94.

Examination of the data using *z*-skewness and kurtosis, *P-P* plots and tests of normality revealed that some of the data seemed to violate the assumptions of normality. However, the non-normality was not severe enough to warrant a transformation. Moreover, comparison of square-root transformed data and the non-transformed data yielded similar results. Further, tests for homogeneity of variance using Levene's statistic were non-significant. Thus, it seemed safe to proceed with the data analyses because the *F*-statistic is robust when the assumption of homogeneity of variances has not been violated.

Table 5.1 displays the means and standard deviations of three alcohol use variables, namely monthly frequency of drinking, total monthly alcohol consumption, and monthly binge drinking for each of the four groups. A separate 4 (groups) X 3 (time: pre-intervention, intervention, and follow-up) repeated measures analysis of variance was carried out on each of the alcohol use

variables. As the assumptions for Mauchly's tests for sphericity were violated, the Greenhouse-Geisser correction was used to interpret and report the findings. There were highly significant main effects for Time for all three of the drinking variables. For monthly frequency of drinking, F (1.63, 180.87) = 32.45, $p < .001$, $r = .71$; for monthly total alcohol consumption, F (1.54, 170.72) = 15.68, $p < .001$, $r = .62$; and for monthly binge drinking, F (1.68, 186.10) = 15.61, $p < .001$, $r = .56$. These results indicate that there were statistically significant changes in the drinking parameters over time. There were no significant interaction effects for Group and Time on the changes in drinking parameters, which indicates that changes in drinking parameters over time were equivalent across the four groups. The tests for between-participant effects showed no significant differences among the groups over time, F (3, 111) = .21, $p = .89$. This result indicates that group differences in changes in the drinking parameters averaged across time were not significant.

Table 5.1: Mean Scores Over Time on Three Alcohol Variables for the Four Groups

Group	Pre-Intervention Mean (SD)	At-Intervention Mean (SD)	Follow-up Mean (SD)
Average Monthly Drinking Frequency			
Brief Personalized Feedback	7.23 (3.42)	6.87 (4.46)	4.85 (2.49)
Motivational Intervention	8.10 (4.32)	6.03 (5.12)	5.37 (3.88)
BPF + MI	8.65 (4.53)	6.30 (4.55)	5.45 (3.85)
Control	8.30 (3.38)	5.52 (3.57)	5.61 (2.59)
Average Monthly Total Consumption			
Brief Personalized Feedback	65.98 (44.70)	47.87 (57.77)	42.41 (38.74)
Motivational Intervention	57.79 (37.44)	57.53 (63.64)	39.07 (30.64)
BPF + MI	62.61 (47.16)	48.79 (54.03)	36.57 (29.02)
Control	70.73 (45.28)	47.87 (57.77)	48.76 (30.84)
Total Monthly Binge Drinking			
Brief Personalized Feedback	4.23 (2.70)	3.56 (3.25)	2.69 (1.84)
Motivational Intervention	3.67 (2.40)	3.09 (3.83)	2.54 (2.05)
BPF + MI	4.31 (4.00)	3.49 (4.28)	2.36 (2.12)
Control	4.60 (2.67)	2.99 (2.58)	3.10 (1.94)

Note: Mean scores are in units of alcohol for Monthly Total Consumption, and number of days for Monthly Drinking Frequency and Monthly Binge Drinking.

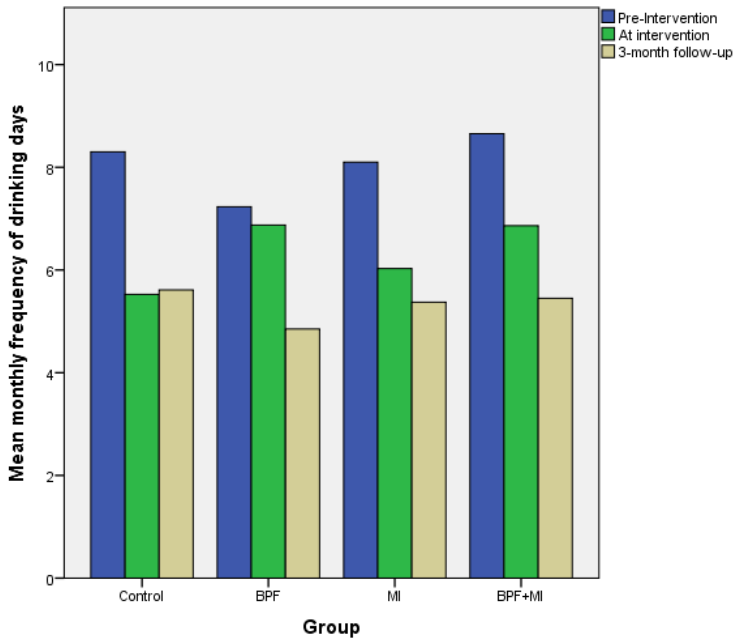


Figure 5.1: Changes in mean monthly frequency of drinking

Note: BPF = Brief Personalized Feedback; MI = Motivational Intervention

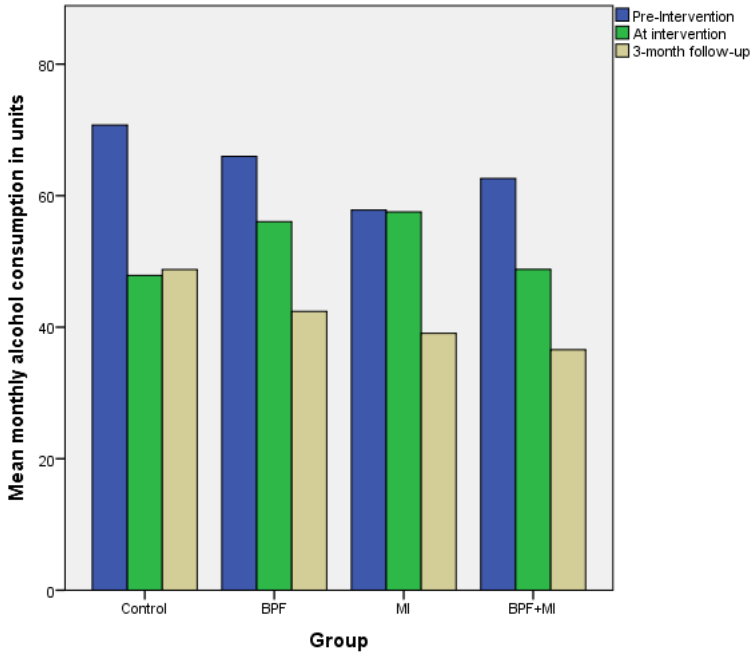


Figure 5.2: Changes in mean monthly alcohol consumption

Note: BPF = Brief Personalized Feedback; MI = Motivational Intervention

Figures 6.1, 6.2, and 6.3 show the graphical representation of changes in monthly frequency of drinking, monthly total consumption and monthly binge drinking across all four groups. It is apparent from the figures that there was a reduction in these parameters over time between pre-intervention and the 3-month follow-up. However, the trend shows a reduction between the pre-intervention and intervention time-points, suggesting an effect of assessment on the drinking parameters. This trend is more apparent in the control group, which showed a slight increase between the intervention and the 3-month follow-up.

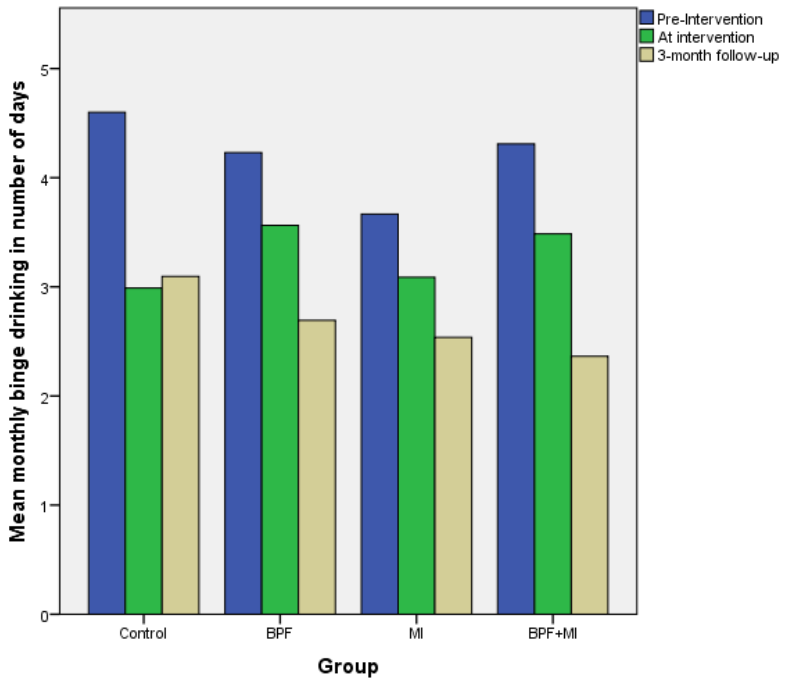


Figure 5.3: Changes in mean monthly binge drinking

Note: BPF = Brief Personalized Feedback; MI = Motivational Intervention

To examine whether the changes in drinking parameters over time were related to the baseline assessment or whether they were indeed due to the intervention, further analysis were carried out separately to tease out the differences between each of the three time points across all

the four groups. The changes in drinking from pre-intervention to intervention, and from the intervention to the 3-month follow-up were carried out separately using SPSS syntax.

The pairwise comparisons for changes in monthly drinking frequency showed the following: (a) in the *control* group, there was a significant change from pre-intervention to the intervention but no significant change from the intervention to the 3-month follow-up; however, the change from the pre-intervention to the 3-month follow-up was highly significant, which suggests that the change in drinking was due to an effect of the assessment in this group. (b) In the *brief personalized feedback* group, there was no significant change from pre-intervention to the intervention, but there was a significant change from the intervention to the 3-month follow-up, which indicates an effect of intervention on monthly drinking frequency. (c) In the *motivational intervention* group, there was a significant change from pre-intervention to the intervention but no significant change from the intervention to the 3-month follow-up. However, the overall change from the pre-intervention to the 3-month follow-up was highly significant, which indicates that the motivational intervention did not significantly change the monthly frequency of drinking and that the observed overall significant change can be attributed to the assessment effect rather than the intervention. Finally, (d) in the *combination (BPF + MI)* group, there was no significant change from pre-intervention to the intervention, nor from the intervention to the 3-month follow-up; however, the overall change in monthly drinking frequency from pre-intervention to the 3-month follow-up was highly significant, which indicates that the change can be attributed to both the assessment and the intervention. These results indicate that the overall changes in monthly drinking frequency attributed to the intervention were significant in the groups in which brief personalized feedback was a component of the intervention. Figure 5.4 shows the mean change in monthly drinking frequency (number of days) across the groups.

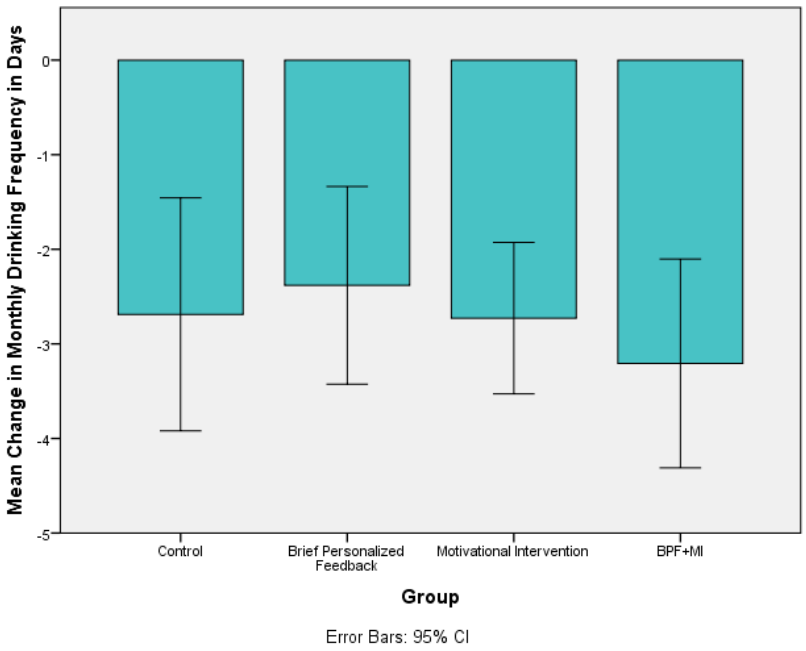


Figure 5.4: Mean change in monthly drinking frequency in days from pre-intervention to 3-month follow-up

The pairwise comparisons for changes in monthly total consumption showed the following: (a) In the *control* group, there was a significant change from pre-intervention to intervention but no significant change from the intervention to the 3-month follow-up; however, the change from pre-intervention to the 3-month follow-up was highly significant, which indicated that the change in drinking was related to the assessment effect in this group. (b) In the *brief personalized feedback* group, there was no significant change from pre-intervention to the intervention and no significant change from the intervention to the 3-month follow-up. However, there was a highly significant change from the pre-intervention to the 3-month follow-up, which indicated that both the assessment and the intervention contributed to the change in monthly drinking frequency. (c) In the *motivational intervention* group, there was no significant change from pre-intervention to the intervention and no significant change from the intervention to the 3-month follow-up. However, overall change from the pre-intervention to the 3-month follow-up was significant, which indicated

that both the assessment and the intervention contributed to the change in monthly total consumption. (d) Finally, in the *combination (BPF + MI)* group, there was no significant change from the pre-intervention to the intervention, nor from the intervention to the 3-month follow-up; however, overall change in monthly total consumption was highly significant from the pre-intervention to the 3-month follow-up, which indicated that the change could be attributed to both the assessment and the intervention. These results indicate that the overall changes in monthly total consumption can be attributed to both the assessment and intervention effect in the treatment groups, whereas in the control group the change can be attributed to an assessment effect because the total monthly consumption showed a slight increase from the intervention to the 3-month follow-up, despite showing an overall reduction. Figure 5.5 shows the mean changes in monthly total consumption in units across the groups.

The pairwise comparisons for changes in monthly binge drinking showed the following: (a) In the *control* group, there was a significant change from the pre-intervention to the intervention but no significant change from the intervention to the 3-month follow-up; however, the change from the pre-intervention to the 3-month follow-up was highly significant, which suggests that the change in drinking was related to the assessment effect in this group. (b) In the *brief personalized feedback* group, there was no significant change from pre-intervention to the intervention and no significant change from the intervention to the 3-month follow-up. However, there was a highly significant change from the pre-intervention to the 3-month follow-up, which indicates that both the assessment and the intervention contributed to the change in monthly binge drinking. (c) In the *motivational intervention* group, there was no significant change from pre-intervention to the intervention and no significant change from the intervention to the 3-month follow-up. However, the overall change from the pre-intervention to the 3-month follow-up was significant, which

indicated that both the assessment and the intervention contributed to the change in monthly binge drinking. (d) Finally, in the *combination (BPF + MI)* group, there was no significant change from the pre-intervention to the intervention, nor from the intervention to the 3-month follow-up; however, the overall change in monthly binge drinking from the pre-intervention to the 3-month follow-up was highly significant, which indicated that the change could be attributed to both assessment and intervention effects. These results indicate that the overall changes in monthly binge drinking can be attributed to both the assessment and the intervention effect in the treatment groups, whereas in the control group the change can be attributed only to assessment effect because the monthly binge drinking showed a slight increase from the intervention to the 3-month follow-up despite showing an overall reduction. Figure 5.6 shows the mean change in monthly binge drinking in number of days across the groups.

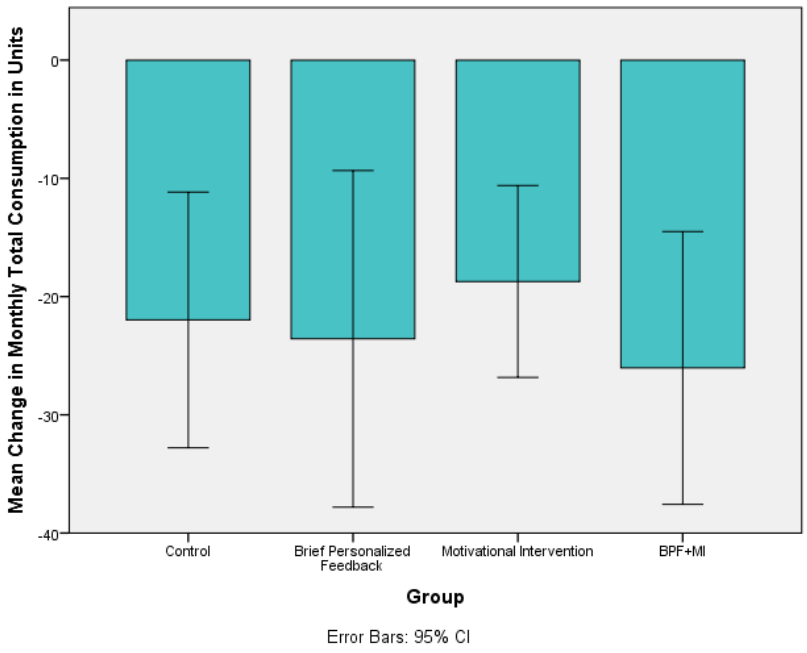


Figure 5.5:Mean change in monthly total consumption in units from pre-intervention to 3-month follow-up

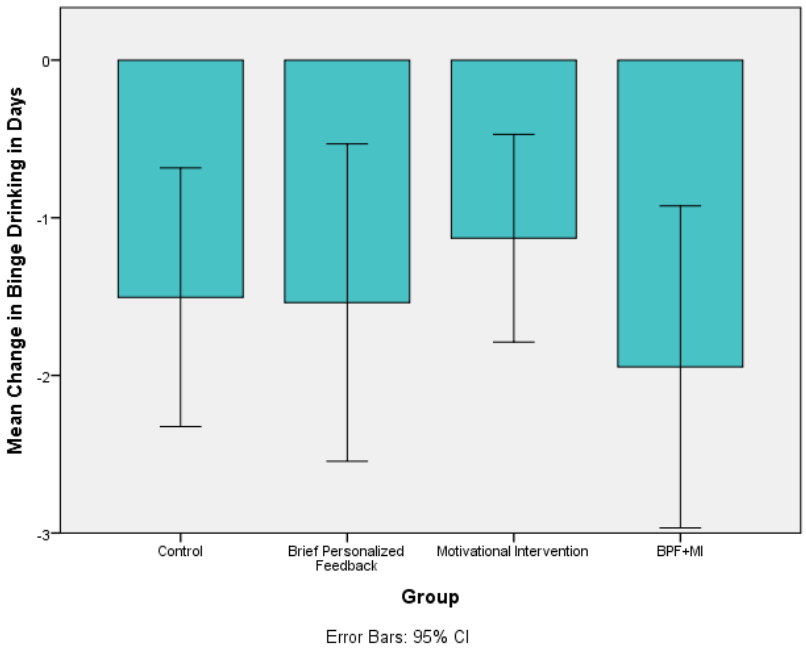


Figure 5.6: Mean change in monthly binge drinking in number of days from pre-intervention to 3-month follow-up

The 4 X 3 repeated-measures ANOVA and post-hoc pairwise comparisons of the changes in drinking parameters over time shows that there was a significant change from the pre-intervention assessment to the 3-month follow-up. However, except in the case of monthly drinking frequency, which showed a significant effect of the intervention on the group that received brief personalized feedback only, all other drinking parameters did not show significant effects of the intervention. Moreover, the control group, which showed a significant change from the pre-intervention to the 3-month follow-up on all three drinking parameters, showed a significant change between the pre-intervention and the intervention but no significant change following the intervention. Likewise, all the three intervention groups did not differ on the degree of change with regard to monthly total consumption and monthly binge drinking. These results indicate that merely assessing the participants did produce significant changes in the drinking parameters, which was further enhanced to some extent by the intervention.

Changes in Drinking By Gender

Further analyses using repeated-measures ANOVAs were carried out to see whether there were any group differences in drinking parameters in terms of gender. In the first analysis, a 3 (time points of measurement) X 2 (levels of gender) repeated-measures ANOVA was carried out. There was no significant between-group difference on monthly frequency of drinking, F (1, 113) = 3.23, p = .08, r = .003. Figure 5.7 illustrates the change in mean monthly frequency of drinking over time across gender; it shows that males and females had similar reductions in the drinking parameters.

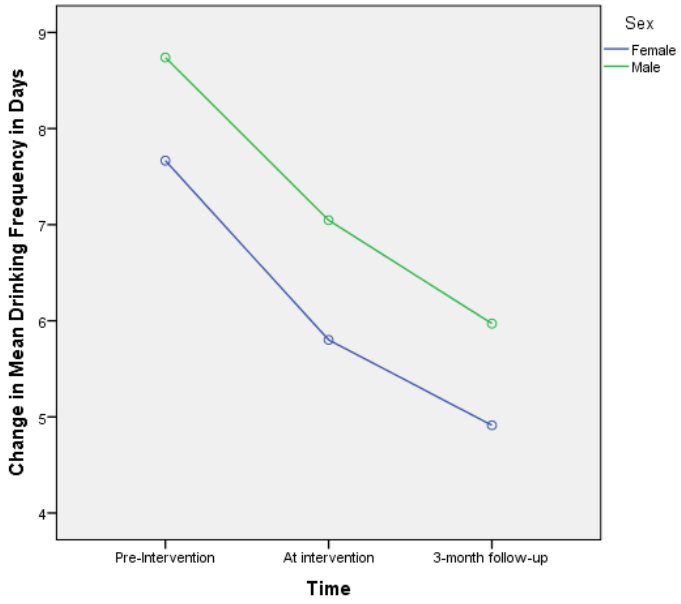


Figure 5.7: Change in mean monthly drinking frequency in number of days by gender

There was no significant between-group difference in monthly total consumption across gender, F (1, 113) = 3.24, p = .08, r = .17. Figure 5.8 displays the mean change in total alcohol consumption in number of units across gender. It shows that males, compared to females, tended to show greater reductions following the pre-intervention assessment, whereas females tended to

show greater reductions in monthly total consumption following the intervention. However, these differences were not statistically significant.

There was no significant difference between males' and females' monthly binge drinking, F (1, 113) = .001, p = .97, r = .02. Figure 5.9 represents the mean change in monthly binge drinking across gender; it shows that the reductions in monthly binge drinking were constant over time.

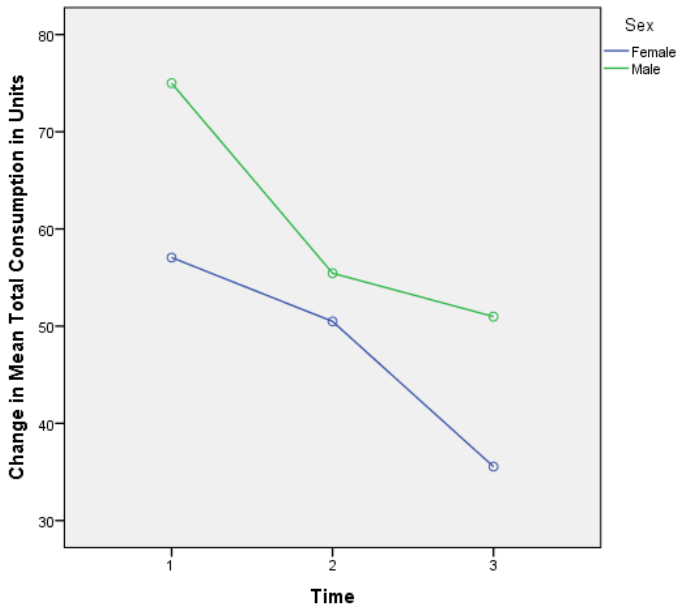


Figure 5.8: Change in mean monthly total consumption in units by gender

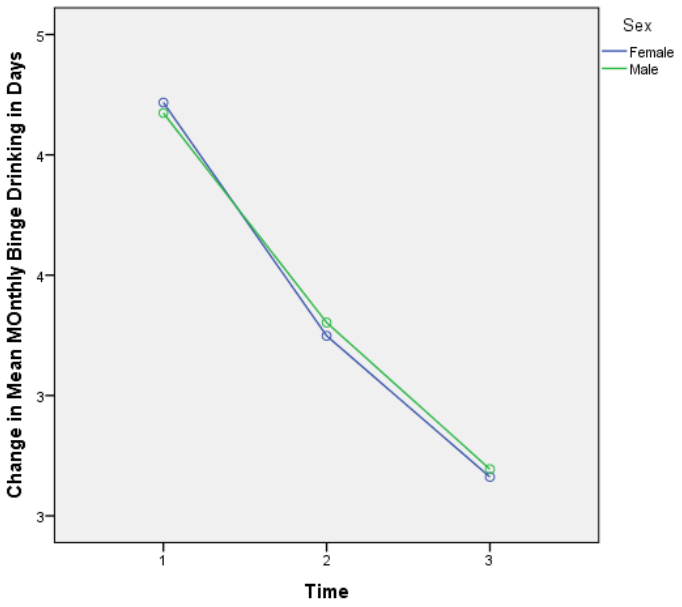


Figure 5.9: Change in mean monthly binge drinking in number of days by gender

These tests were followed up with post-hoc pairwise comparisons using SPSS syntax to look for significant changes in drinking parameters across both gender and groups. Although there were significant reductions in *monthly drinking frequency* across males and females from the pre-intervention to the 3-month follow-up, the pairwise comparisons of gender according to group did not show any significant change between any of the three time points, except that females in the control group showed a significant decrease from the pre-intervention to the intervention. Except that males in the motivational intervention group did not show a significant change, *monthly total consumption* showed significant reductions for both males and females from the pre-intervention to the 3-month follow-up. Males and females did not differ at any of the time points in any of the four groups. In the case of *monthly binge drinking*, males and females also did not differ at any of the time points in any of the groups. Among males, the changes from the pre-intervention to the 3-month showed a significant decrease only in the combined intervention group; there were no

significant reductions in the control group or in the other two intervention groups. Females showed a significant decrease from the pre-intervention to the 3-month follow-up in all of the groups except the motivational intervention group.

These results suggest that the combined intervention, i.e., brief personalized feedback plus motivational intervention, significantly reduced monthly frequency of drinking in both males and females. Brief personalized feedback resulted in significant reductions in drinking in females only. The decline in monthly drinking frequency in the control group, although not significant except for females between the pre-intervention and the intervention, suggests that participation in the assessment caused the reductions in drinking.

Changes in Drinking-Related Consequences

The Rutgers Alcohol Problem Index (RAPI) score was used to measure changes in drinking-related consequences from baseline assessment to the 3-month follow-up. RAPI is a 23-item, self-administered screening tool for assessing problem drinking and is appropriate for use in clinical and nonclinical samples of adolescents and young adults. Further details on the RAPI can be found in Chapter Five, p. 157, and in Appendix 'C'.

Examination of the RAPI data using *z*-skewness and kurtosis, *P-P* plots and tests of normality indicated that both the baseline and the follow-up data seemed to violate the assumptions of normality. As the data were severely positively skewed, logarithmic transformation was applied and the analysis of variance was carried out using the transformed data. The transformation also helped to correct the violation of the assumption of homogeneity of variance, which was significant in the untransformed data.

Table 5.2: Mean RAPI Scores over Time for the Four Groups

Group	Pre-Intervention Mean	Follow-up Mean
Brief Personalized Feedback	3.08	2.75
Motivational Intervention	2.86	2.68
BPF + MI	3.06	2.74
Control	2.89	2.91

Table 5.2 displays the mean RAPI scores from the pre-intervention and the follow-up assessments. A separate 4 (group) X 2 (time: pre-intervention, follow-up) repeated-measures analysis of variance was carried out. There was a significant main effect of time on the RAPI scores, F (1, 111) = 4.23, $p < .05$, r = .19. This indicated that there were statistically significant changes in the RAPI scores over time. There was no significant interaction between group and time on the changes in RAPI scores, which indicate that changes over time were equivalent in the four groups. There were no significant differences among the groups over time, F (3, 111) = .20, p = .89.

Although there were no statistically significant group differences, there was a trend toward decrease in RAPI scores among the intervention groups. Figure 5.10 shows that all three interventions resulted in a decrease in RAPI scores with the BPF and the combination group showing greater reductions than the MI group, whereas the control group showed a slight increase. The statistical tests and the graph altogether suggest that the interventions, especially the BPF, reduced RAPI scores over time, but the reductions were not statistically significant.

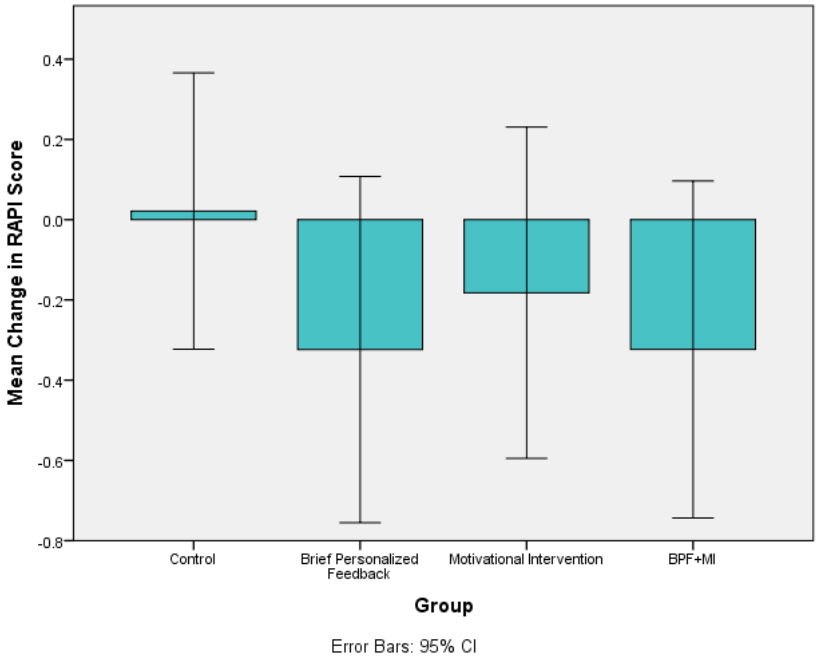


Figure 5.10: Mean change in RAPI score from pre-intervention to 3-month follow-up

Gender Differences in Changes in Drinking-Related Consequences

A repeated-measures analyses of variance was carried out to determine whether there were any group or gender differences in RAPI scores. The first analysis, a 3 (time points of measurement) X 2 (gender: males, females) repeated measures ANOVA, indicated no significant between-group difference in RAPI scores, F (1, 113) = .06, p = .80, r = .03. Figure 5.11 illustrates the mean change in RAPI score over time and across gender.

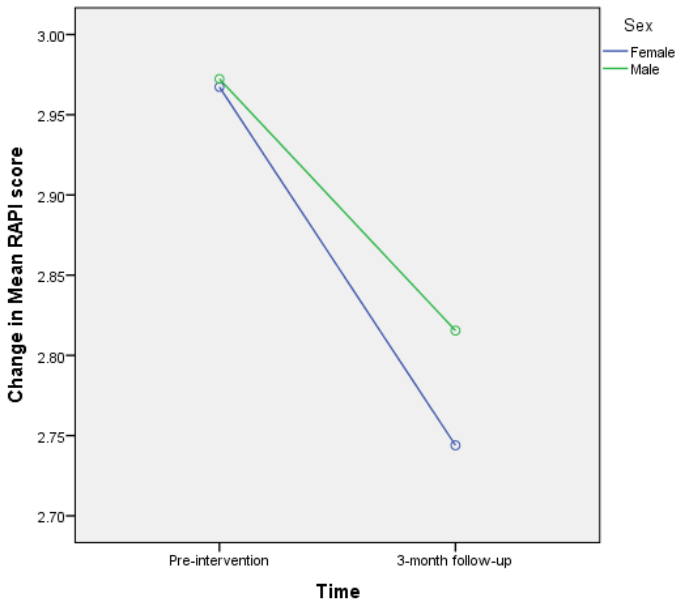


Figure 5.11: Change in mean RAPI scores by gender

Post-hoc pairwise comparisons using SPSS syntax were carried out to look for any significant changes in RAPI scores across both gender and groups. The only significant reduction in RAPI score was seen in females in the combined intervention group. Males in the brief personalized feedback group showed some decline in RAPI scores over time, but the change was not significant. Indeed, males in the combination intervention group showed a slight increase in their RAPI scores. This result indicates that although there was no significant change in overall RAPI scores from the pre-intervention to the 3-month follow-up, females were more likely to reduce their RAPI scores when the interventions were combined.

Changes in Motivational Structure Indices

In order to look for changes in participants' motivational structure, three variables were considered, namely: (1) Appetitive Motivation (2) Aversive Motivation, and (3) Incommensurate Commitment. *Appetitive motivation* concerns behaviour directed towards goals that are associated

with positive hedonic processes and the goal striving is appetitive aimed at obtaining a positive incentive. An increase in the index of appetitive motivation would indicate benefits of the intervention. *Aversive motivation* involves escaping from hedonically unpleasant condition; the person wants to get rid of, prevent, or avoid a negative incentive. A decrease in the index of aversive motivation would suggest a beneficial effect of the intervention. *Incommensurate commitment* is the person's readiness to commit to new goal pursuits. A positive value indicates over-commitment; a negative value indicates under-commitment, and a zero indicates commitment that is proportional to chances of success and expected joy from goal attainment. A positive effect of the intervention would bring the value closer to zero.

Examination of the data using *z*-skewness and kurtosis, *P*-*P* plots and tests of normality revealed that both the pre-intervention and the 3-month follow-up data for appetitive motivation were negatively skewed, whereas the data for aversive motivation were positively skewed. However, analysis using transformed data and the non-transformed data yielded similar results. Further, tests for homogeneity of variance using Levene's statistic were non-significant. Thus, it was assumed safe to proceed with the data analyses because the *F*-statistic is robust when the assumption of homogeneity of variances is not violated.

Table 5.3: Mean Scores over Time on Three Motivational Constructs for the Four Groups

Group	Pre-Intervention Mean (SD)	Follow-up Mean (SD)
Appetitive Motivation		
Brief Personalized Feedback	7.66 (2.20)	8.27 (1.40)
Motivational Intervention	8.09 (1.99)	8.31 (2.15)
BPF + MI	7.47 (2.30)	8.56 (1.86)
Control	7.68 (2.30)	8.08 (1.87)
Aversive Motivation		
Brief Personalized Feedback	1.76 (2.35)	0.92 (1.31)
Motivational Intervention	1.11 (1.53)	0.83 (1.81)
BPF + MI	1.70 (2.02)	0.99 (1.65)
Control	1.59 (2.36)	1.23 (1.67)
Incommensurate Commitment		
Brief Personalized Feedback	-.21 (0.98)	-.63 (1.21)
Motivational Intervention	-.45 (0.99)	-.11 (0.83)
BPF + MI	-.03 (0.96)	.08 (0.65)
Control	-.17 (1.00)	-.21 (1.05)

Table 5.3 displays the means and standard deviations of the motivational constructs, namely appetitive motivation, aversive motivation, and incommensurate commitment for each of the four groups. A separate 4 (groups) X 3 (time points: pre-intervention, at the time of the intervention, and at follow-up) repeated-measures analysis of variance was carried out on each of the motivational constructs. There were significant main effects for time on appetitive motivation,

F (1, 110) = 7.79, p< .01, r = .25, and aversive motivation, F (1, 110) = 7.17, p< .01, r = .25; however, the main effects of time on incommensurate commitment were not significant, F (1, 110) = .01, p = .92. There was no significant interaction between group and time on appetitive or aversive motivation, but there was a significant interaction between group and time on incommensurate commitment, F (3, 110) = 1.36, p < .01, r = .11. This interaction indicates that, in case of index of incommensurate commitment, the change in the values from pre-intervention to the 3-month follow-up was different among the groups.

Further analysis of appetitive motivation using pairwise comparisons of the group differences with SPSS syntax showed no significant changes over time in the control and individual intervention groups, but in the combined group there was a significant increase in appetitive motivation (Figure 5.12).

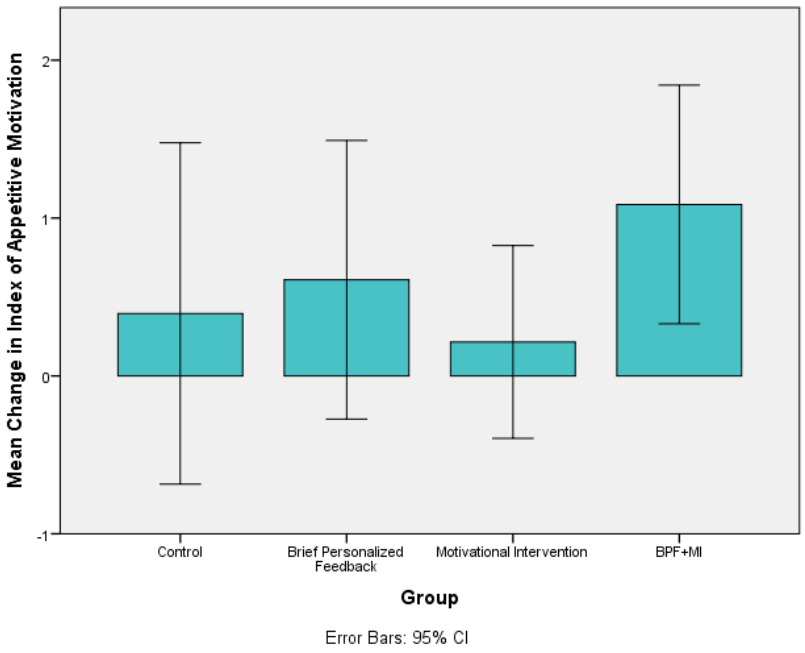


Figure 5.12: Mean change in index of Appetitive Motivation values from pre-intervention to 3-month follow-up

Similar pairwise comparisons of aversive motivation showed no significant changes in any of the groups (Figure 5.13).

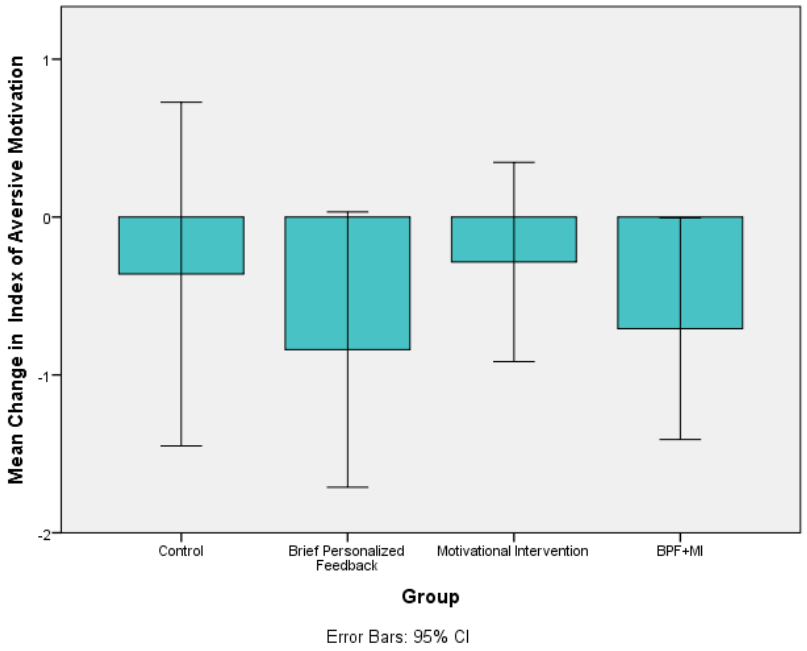


Figure 5.13: Mean change in Index of Aversive Motivation values from pre-intervention to 3-month follow-up

Pairwise comparisons of incommensurate commitment showed significant changes in the brief personalized feedback group. The change in the BPF group, although significant, was negative thus indicating undercommitment. The desirable change in incommensurate commitment is for it to become closer to zero, but only the motivational intervention group showed such a non-significant trend (Figure 5.14).

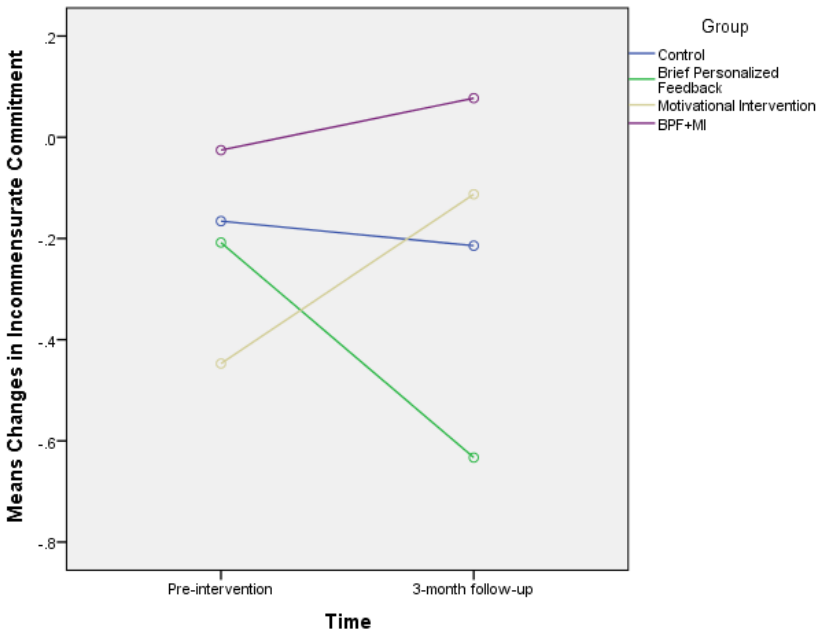


Figure 5.14: Mean change in Incommensurate Commitment values from pre-intervention to 3-month follow-up

Gender Differences in the Change in Motivational Structure Indices

Analyses to determine whether there were any group differences in the motivational structure indices according to gender were carried out using repeated-measures analysis of variance. In the first analysis, a 2 (time points of measurement) X 2 (gender) repeated-measures ANOVA was carried out. There was a significant change in appetitive motivation across gender over time, F (1, 112) = 8.97, $p < .01$, $r = .27$, but there was no significant interaction between time and gender. There was no significant between-group difference in appetitive motivation, F (1, 112) = 1.40, $p = .24$. Figure 5.15 illustrates the mean changes in appetitive motivation over time between males and females. It shows an overall increase in values over time, and that males had a greater increase compared to females, although this difference was not significant. Post-hoc pairwise comparisons showed that only males in the combined intervention group showed a significant increase.

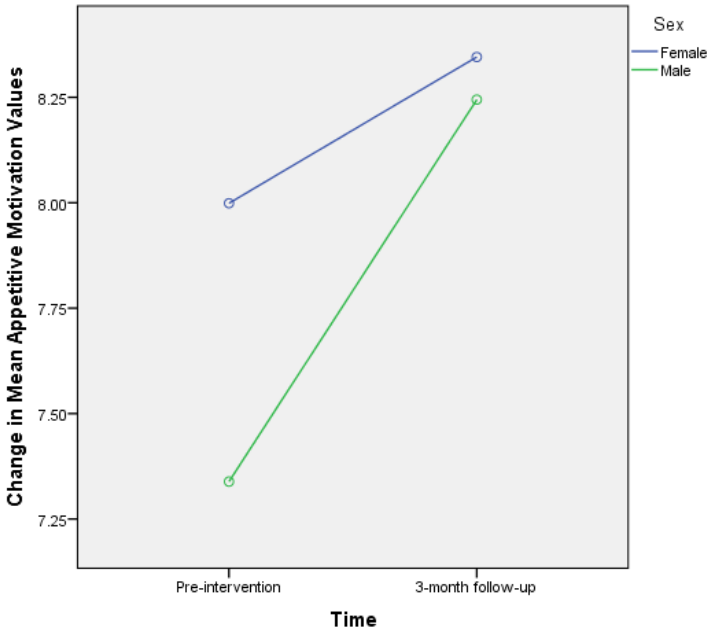


Figure 5.15: Change in mean Index of Appetitive Motivation by gender

There was a significant change in aversive motivation across gender over time, F (1, 112) = 9.12, $p < .01$, $r = .27$, and there was a significant interaction between gender and time, F (1, 112) = 3.95, $p < .05$, $r = .18$. The interaction indicates that the change in aversive motivation was different for males and females. There was no significant between-group difference in aversive motivation, F (1, 112) = .02, $p = .88$. Figure 5.16 illustrates the mean change in aversive motivation over time and across gender. It shows an overall decrease in values over time, and that males had a steeper decrease compared to females. This difference was significant as indicated by the significant interaction effect. Post-hoc pairwise comparisons showed no significant changes across gender in any of the four groups, although post-hoc analysis confirmed that males in all four groups showed non-significant reduction, whereas females in only the BPF and the combined intervention groups showed a non-significant reduction.

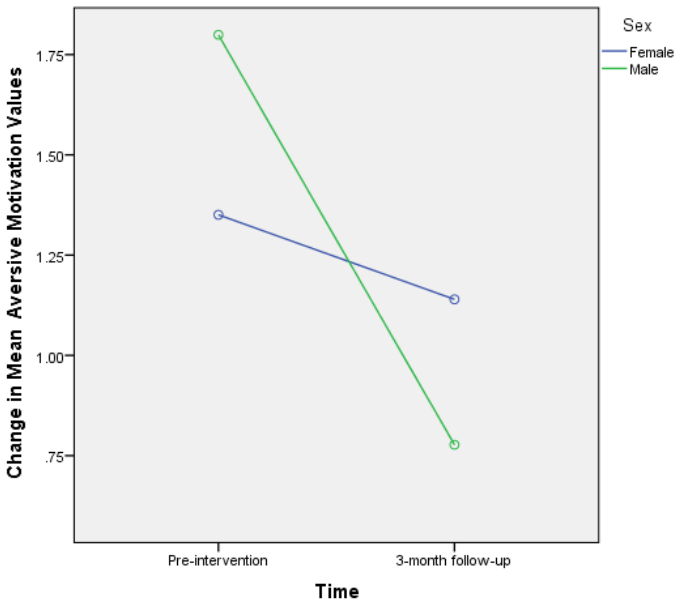


Figure 5.16: Change in mean Index of Aversive Motivation by gender

There was no significant change in incommensurate commitment (IC) across gender over time, F (1, 112) = .09, p = .77, and there was no significant interaction between gender and time, F (1, 112) = 3.23, p = .08. There was a significant between-group difference in IC, F (1, 112) = 4.30, p < .05. Figure 5.17 illustrates the mean change in IC over time and across males and females. It shows that females' values became less negative over time, whereas males' values became more negative. Post-hoc pairwise comparisons, however, showed no significant changes across gender in any of the four groups. Figures 6.18 and 6.19 show that only in the MI group both males' and females' IC values showed a trend in effecting IC values towards zero, i.e., to become more positive.

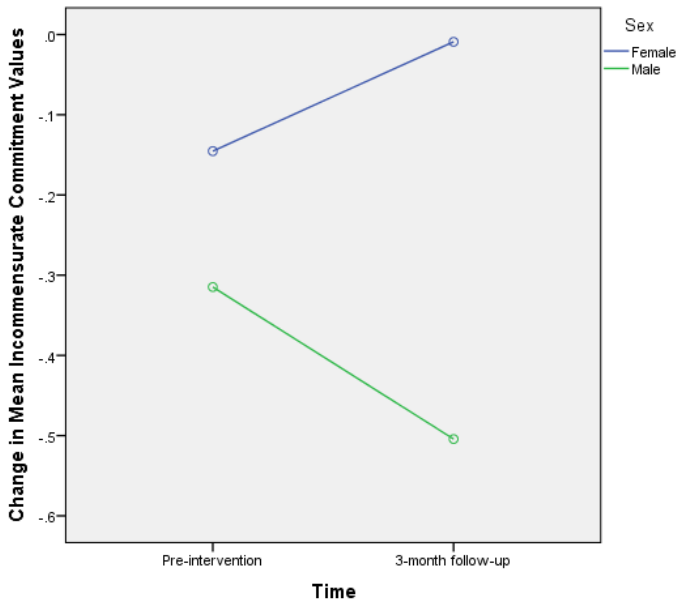


Figure 5.17: Changes in mean Incommensurate Commitment by gender

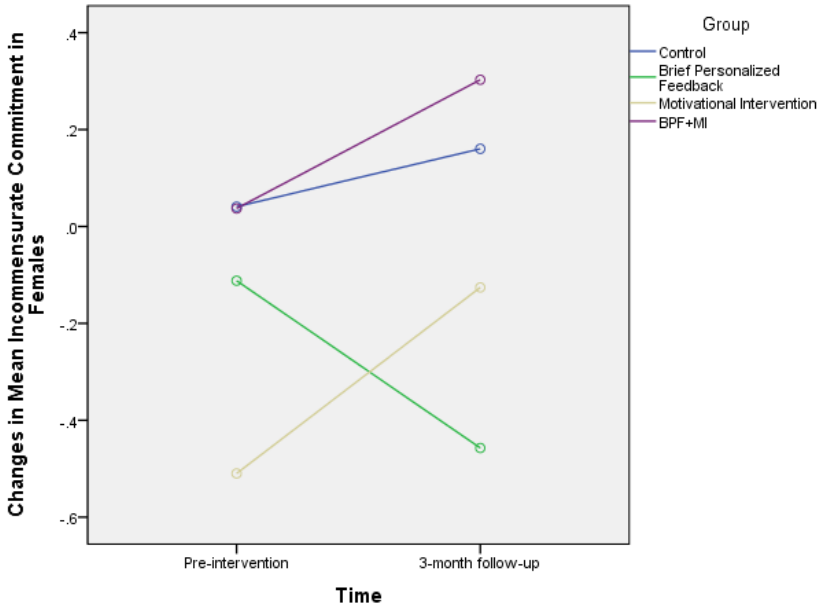


Figure 5.18: Changes in mean Incommensurate Commitment across all four groups in females

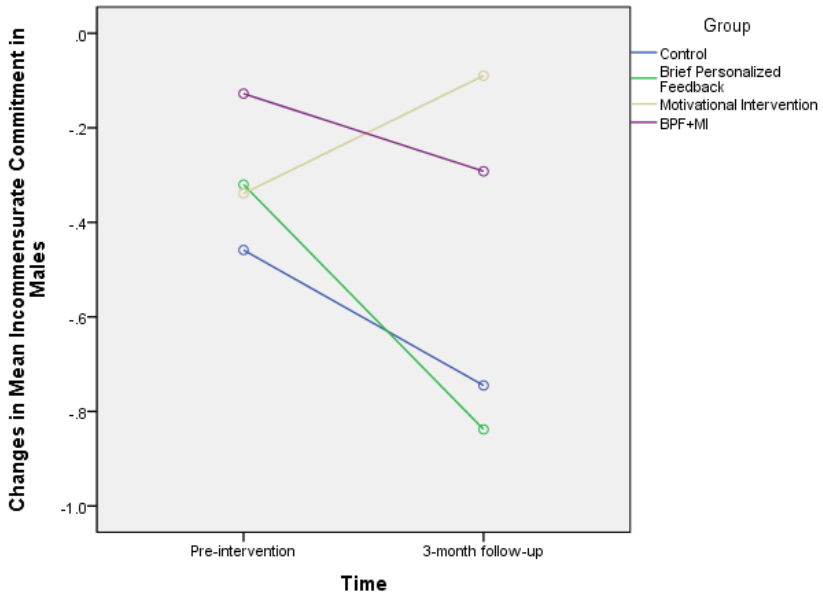


Figure 5.19: Changes in mean Incommensurate Commitment across all four groups in males

Correlational Analysis

In order to judge whether the self-report data were reliable, the variables that were measured at both baseline (pre-intervention) and at the follow-up (3-month post-intervention) were correlated with each other. Bivariate Pearson's correlations were run. The results showed that all three drinking variables were significantly correlated with each other: monthly frequency of drinking (r = .72, p <.001, n = 115); monthly total consumption (r = .74, p <.001, n = 115); and binge drinking (r = .64, p <.01, n = 115). Similarly, RAPI scores for drinking-related consequences were significantly correlated with each other (r = .52, p <.01, n = 115). Likewise, the motivational structure indices were significantly correlated with each other: appetitive motivation (r = .41, p <.01, n = 114); aversive motivation (r = .33, p <.01, n = 114); and incommensurate commitment (r = .52, p <.01, n = 114).

Correlations were also run to identify relationships among the baseline variables and to evaluate the ability of these variables to predict the drinking parameters, drinking-related consequences and motivational constructs. The correlations were run on the baseline data for the following measures: drinking parameters, RAPI scores, motivational constructs, drinking motives, and positive and negative affect. The correlations are displayed in Tables 6.4, 6.5, and 6.6. Additional analysis to identify mediation and moderation effects could be guided by these correlational analyses.

Table 5.4: Intercorrelations between Baseline Measures of Alcohol Use Parameters, Drinking Related Consequences, and Motivational Constructs

Variables	1	2	3	4	5	6	7
Alcohol Use Parameters							
1. Frequency	-						
2. Total Con.	.67***	-					
3. Binge	.63***	.87***	-				
Drinking-related Consequences							
4. RAPI	.29**	.42***	.38***	-			
Motivational Constructs							
5. Appetitive	-.10	-.11	-.08	-.21*	-		
6. Aversive	.05	.06	.03	.20*	-.93***	-	
7. IC	-.07	-.03	-.03	-.01	-.02	.09	-

Note: Frequency = Number of days drinking at least one drink in the past 30 days; Total Con. = Frequency X Number of units of alcohol usually drunk in a drinking day in the past 30 days; Binge = Number of days having six or more units (women) or eight or more units (men) in the past 30 days; RAPI = Rutgers Alcohol Problem Index; Appetitive = Index of Appetitive Motivation; Aversive = Index of Aversive Motivation; IC = Incommensurate Commitment.

*p<.05; **p<.01; ***p<.001.

Table 5.4 displays the correlations among the alcohol use variables, RAPI scores, and the motivational constructs measured at baseline. The results show highly significant correlations among the alcohol use variables, and all three of the alcohol use variables were significant related to the RAPI scores. The RAPI scores were significantly negatively related to appetitive motivation and significantly positively related to aversive motivation. In other words, the more alcohol-related problems that participants had experienced, the more maladaptive was their motivational structure.

Table 5.5 displays the correlations among the baseline alcohol use variables, baseline RAPI scores and drinking motives. The results show that monthly frequency of drinking was significantly and positively related to coping with anxiety and coping with depression motives. Monthly total consumption was significantly and positively related to social, enhancement and coping with depression motives. Monthly binge drinking was significantly and positively related to four of the drinking motives, except for the conformity motive. RAPI scores were significantly and positively related to all the five drinking motives.

Table 5.5: Intercorrelations between Baseline Measures of Alcohol Use Parameters, Drinking Related Consequences, and Drinking Motives

Variables	1	2	3	4	5	6	7	8	9
Alcohol Use Parameters									
1. Frequency	-								
2. Total Con.	.67***	-							
3. Binge	.63***	.87***	-						
Drinking-related Consequences									
4. RAPI	.29**	42***	.38***	-					
Drinking Motives									
5. Social	.10	.27**	.34***	.33***	-				
6. Enhancement	.14	.35***	.39***	.20*	.29**	-			
7. Cop. Anx.	.19*	.15	.18*	.40***	.18*	.28**	-		
8. Cop. Dep.	.43***	.35***	.35***	.55***	.09	.08	.61***	-	
9. Conformity	-.03	.03	.04	.32***	.48***	.05	.04	-.01	-

Note: Frequency = Number of days drinking at least one drink in the past 30 days; Total Con. = Frequency X Number of units of alcohol usually drunk in a drinking day in the past 30 days; Binge = Number of days having six or more units (women) or eight or more units (men) in the past 30 days; RAPI = Rutgers Alcohol Problem Index; Cop. Anx. = Coping with anxiety; Cop. Dep. = Coping with depression.

*p<.05; **p<.01; ***p<.001.

Table 5.6: Intercorrelations Between Baseline Measures of Alcohol Use Parameters, Drinking Related Consequences, and Affective State

Variables	1	2	3	4	5	6
Alcohol Use Parameters						
1. Frequency	-					
2. Total Con.	.67***	-				
3. Binge	.63***	.87***	-			
Drinking-related Consequences						
4. RAPI	.29**	.42***	.38***	-		
Affective State						
5. Negative Affect	.03	.06	.07	.40**	-	
6. Positive Affect	.01	.01	-.10	-.14	-.14	-

Note: Frequency = Number of days drinking at least one drink in the past 30 days; Total Con. = Frequency X Number of units of alcohol usually drunk in a drinking day in the past 30 days; Binge = Number of days having six or more units (women) or eight or more units (men) in the past 30 days; RAPI = Rutgers Alcohol Problem Index.

*p<.05; **p<.01; ***p<.001.

Table 5.6 shows the correlations among the drinking variables, RAPI scores and affective states. The results show that the only significant relationship was that between negative affect and drinking-related consequences.

Further examination of the correlations among the motivational structure indices and drinking motives shows that there was a significant negative relationship between appetitive motivation and both coping with anxiety and coping with depression motives. Aversive motivation showed a significant relationship with coping with anxiety motives. There were no significant relationship between the motivation indices and the affective states.

Predictors of Alcohol Use at Baseline

The correlations displayed in the tables show the other variables that were significantly related to the alcohol use variables. These relationships were explored in greater detail by conducting a regression analysis. Because monthly frequency of drinking was significantly related to coping with anxiety and coping with depression motives, these two variables were entered into the regression model. Tolerance statistics showed that there was no issue with multicollinearity. The scatterplot displaying the standardised residuals against the standardised predicted values showed no heteroscedasticity and non-linearity. These suggested that the assumptions of regression analysis were met and that the analysis could proceed with confidence.

The regression model was based on the theoretical rationale and available literature that coping drinking motives have influence on the drinking parameters. The results of the correlation analysis identified both types of coping variables having a relationship with monthly frequency of drinking. As coping with depression motive showed a highly significant correlation, this variable was entered first in a hierarchical multiple regression.

The results of the regression analysis, displayed in Table 5.7, indicate the relative contributions of the two types of coping drinking motives to monthly frequency of drinking. The regression model significantly predicted monthly drinking frequency, accounting for 19.5 percent of the variance, F (2, 118) = 14.33, p< .001. Coping with depression motives, which was entered in the first model, accounted for 18.5 percent of the variance, F (1, 119) = 27.04, p< .001; while coping with anxiety motive accounted for only 1.0 percent of the variance. This result indicates that coping with depression motives is a significant predictor of monthly drinking frequency.

The correlations among total monthly consumption and the other variables indicate that three of the drinking motives, i.e., social, enhancement, and coping with depression, were significantly related to total monthly consumption. Using the rationale that drinking motives and alcohol use are invariably related, it was decided to test the predictive ability that the drinking motives have on total monthly consumption. In the initial analysis, these three variables were entered together to determine the amount of variance that they together explained. In the subsequent analysis, the drinking motives were entered in succession in a hierarchical multiple regression analysis to determine the contribution that each kind of motive had in the prediction of outcome. Tolerance statistics showed that there was no issue with multicollinearity. The scatterplot of standardised residuals against standardised predicted values showed no heteroscedasticity and non-linearity. These results suggested that the assumptions of regression analysis were met and that the analysis could proceed with confidence.

The results of the regression analysis, displayed in Table 5.7, indicate the relative contribution of these three types of drinking motives on total monthly alcohol consumption. It can be seen that when all three variables were entered together in the regression model, it significantly predicted total monthly consumption and accounted for 16.5 percent of the variance, F (3, 116) = 8.82, $p < .001$. Coping with depression motives, which was entered in the first model, accounted for 6.5 percent of the variance, F (1, 118) = 8.25, $p < .01$; the second variable entered into the model, enhancement motives, accounted for 9.2 percent of the variance, F (1, 117) = 12.72, $p < .001$; and social motives, which was entered last in the model, accounted for 2.9% of the variance, F (1, 116) = 4.08, $p < .05$. These results indicate that each of the three drinking motives were significant predictors of total monthly alcohol consumption.

Table 5.7: Hierarchical Multiple Regression Analysis of the Ability of Alcohol Use, Drinking Motives, Negative Affect and Aversive Motivational Index to Predict Alcohol Use and Drinking-Related Consequences

Dependent variable	Independent variables in order of entry	R^2	β in final equation
Monthly frequency of drinking	1. Coping with depression	17.8	.51***
	2. Coping with anxiety	1.0	-.13
Total monthly consumption	1. Coping with depression	6.5	.24**
	2. Enhancement	9.2	.25**
	3. Social	4.9	.18*
Monthly binge drinking	1. Enhancement	12.6	.33***
	2. Coping with depression	5.7	.34***
	3. Social	4.9	.24**
	4. Coping with anxiety	2.5	-.21
RAPI	1. Monthly drinking frequency	12.8	-.10
	Monthly total consumption		.29*
	Monthly binge drinking		-.04
	2. Social	32.5	.11
	Enhancement		.02
	Coping with anxiety		.04
	Coping with depression		.39***
	Conformity		.26**
	3. Negative affect	0.4	.06
	4. Aversive motivational index	1.1	.11

Note: RAPI = Rutgers Alcohol Problem Index.

*p<.05; **p<.01; ***p<.001.

Binge drinking and motives for drinking have been frequently associated with each other. As the correlational analysis indicates, four of the drinking motives, i.e., social, enhancement, and coping with depression showed a highly significant relationship with binge drinking, and the relationship between coping with anxiety and binge drinking was also significant. The amount of variance in monthly binge drinking that each of these drinking motives explained was tested. In the initial analysis, the four drinking motives were entered together. In the subsequent analysis, the drinking motives were entered one after another in a hierarchical multiple regression to see the contribution of each motive to the prediction of outcome. Tolerance statistics showed that there was no issue with multicollinearity. The scatterplot of standardised residuals against standardised predicted values showed no heteroscedasticity and non-linearity. These results suggested that the assumptions of regression were met and that the analysis could proceed with confidence.

The results of the regression analysis, displayed in Table 5.7, indicates the relative contributions of the four types of drinking motives to monthly binge drinking. It can be seen that the regression model with all four variables entered together significantly predicted monthly binge drinking, accounting for 25.7 percent of the variance, F (4, 115) = 9.95, p< .001. Considering the specific predictor variables, enhancement motives, entered first in the model, accounted for 12.6 percent of the variance, F (1, 118) = 17.07, p< .001; coping with depression motives, the second variable entered into the model, accounted for 5.7 percent of the variance, F (1, 117) = 8.13, p< .01; social motives that was entered third in the model accounted for 4.9% of the variance, F (1, 116) = 7.43, p< .01. The coping with anxiety motive explained only 2.5 percent of variance, which was not significant. These results indicate that three of the drinking motives, enhancement, coping with depression and social, are significant predictors of monthly binge drinking.

The regression model for the drinking-related consequences or RAPI scores was based on the rationale that measures of alcohol use, drinking motives, negative affect and aversive motivation all influence the occurrence of alcohol-related consequences. The results of the correlational analysis indicated the variables that were related significantly to the RAPI scores at baseline, and these domains should constitute the model. Therefore, all three alcohol use measures, i.e., monthly frequency of drinking, total monthly consumption and binge drinking, all five drinking motives, negative affect and the index of aversive motivation comprised the regression model for predicting RAPI scores. Hierarchical multiple regression was conducted to test the model. Measures of alcohol use were entered first in the model as the most proximal predictor. The next variables entered were the drinking motives. In the third step, negative affect was entered, followed by the aversive motivation index. Tolerance statistics showed that there was no issue with multicollinearity. The scatterplot of standardised residuals against standardised predicted values showed no heteroscedasticity and non-linearity. These results suggested that the assumptions of regression were met and that the analysis could proceed with confidence.

The hierarchical regression analysis, displayed in Table 5.7 indicated the relative contributions of measures of drinking, drinking motives, negative affect, and the aversive motivation index to the prediction of drinking-related consequences. To begin with, this regression model was a significant predictor of drinking-related consequences, accounting for 46.8 percent of the variance, F (10, 107) = 9.40, p< .001. Next, considering the specific predictor variables, measures of drinking were entered as one block and accounted for 12.8 percent of the variance and significantly predicted RAPI scores, F (3, 114) = 5.56, p< .01. Drinking motives, entered together in one block, significantly predicted RAPI scores and accounted for 32.5 percent of the variance, F (5, 109) = 12.95, p< .001. Negative affect, entered in Block Three did not significantly increase the

amount of variance explained in the RAPI scores. Similarly, the aversive motivation index was also not a significant predictor of the RAPI scores. Further examination of the regression coefficients suggested that among the alcohol use measures, only monthly total consumption was a significant predictor with a significant β weight ($p < .05$). Among the drinking motives, coping with depression ($p< .001$) and conformity motives ($p< .01$) showed significant β weights. The other drinking motives were not significant.

The regression analysis indicated that the alcohol use measures were significant predictors of drinking-related consequences, although monthly total consumption was the single largest contributor. In case of drinking motives, all five motives together significantly predicted drinking-related consequences; the largest contributors to a significant change in variance were coping with depression and conformity motives.

Discussion

The main hypothesis of the study was that the intervention groups would significantly reduce their drinking compared to the control group and that the combined intervention group would do significantly better than the individual intervention groups. This hypothesis was not supported by the results of the present study. Although reductions in drinking over time were significant, there were no significant differences between the groups. The three parameters of drinking that were measured were monthly frequency of drinking, monthly total consumption and monthly binge drinking. All three of the parameters of drinking showed similar reductions across the groups. The assessment of drinking parameters at the intervention time point showed a decrease in all the three drinking measures between the baseline assessment and the intervention assessment. The downward trend was continued across the intervention groups following the

intervention, whereas in the control group there was no such trend. These results strongly suggest that there was a nearly significant effect of the baseline alcohol assessment.

Analysis by gender suggested that the combined group, i.e., brief personalized feedback plus motivational intervention, significantly reduced monthly frequency of drinking in both males and females. However, brief personalized feedback delivered alone showed significant reductions in females only. The decline in monthly drinking frequency in the control group, although not significant except for females between the pre-intervention and the intervention assessments, suggested that participation in the assessment could have contributed to the overall reductions.

Another hypothesis of the study was that the interventions would also significantly reduce drinking-related consequences as measured by the RAPI, but there were no significant group differences in the RAPI scores. However, there was a slight downward trend in RAPI scores among the intervention groups, whereas the control group showed a slight increase. The results also indicated no gender differences in the RAPI scores across the intervention and control groups.

Although there were non-significant trends towards reductions in monthly drinking frequency, total consumption and binge drinking, these trends overall do not provide support for the effectiveness of brief interventions for university students. However, there was a downward trend seen in all the groups following baseline assessment, and this trend continued after the intervention session in both the individual and the combined intervention groups. Why the changes did not differ between the control and intervention groups needs further exploration.

There are a number of possible reasons why the study failed to find significant reductions in drinking measures among intervention groups. *First*, the interventions were delivered in just one session, which may not have had a sufficient impact to produce significant changes. *Second*, the

interventions were delivered by a researcher rather than a trained healthcare professional; the mere presence of a professional may have lent more weight to the intervention. *Third*, the age of the participants could have had an impact. The participants were young students, most of them in their first year of university, and this group of people are liable to be more dismissive of the guidelines on alcohol use and its associated problems.

The continued reductions in the drinking measures of monthly frequency, total consumption and binge drinking following the interventions suggest that the interventions had some effect in the continuation of the reduction process. Although it was expected that the combination of brief personalized feedback and motivational intervention would produce a greater effect compared to individual interventions, the combination fared no better than the brief personalized feedback delivered alone, which showed superiority over the others. Considering the overall reduction in drinking from baseline to follow-up among all the groups, the effect of the alcohol assessment itself in drinking reductions cannot be overlooked (Hogan, 2005).

For any type of behavioural intervention to succeed, four functions are necessary. The intervention must: (1) increase knowledge, (2) increase awareness, (3) increase capability, and (4) enhancing motivation. The first function, increasing knowledge about the effects of alcohol, was addressed in the brief personalized feedback and the combined intervention. Second, increasing students' awareness of personal risks was addressed in the personalized feedback and combined interventions. The third function of increasing capability to reduce drinking was not explicitly addressed, but the guidelines that were presented contained information about sensible drinking. Finally, the fourth function, enhancing motivation, was addressed in an implicit way in the form of feedback on participants' goals and concerns and the role of alcohol in helping or interfering with

their reaching their goals or addressing their concerns. The motivational and the combined interventions explicitly addressed this function.

Possibly, then, neither the individual nor the combined interventions were successful in significantly reducing drinking measures because active counselling techniques designed to enhance students' motivation to change were not employed. Another reason could be the students' perceptions about the importance of feedback information provided by a non-professional. However, abundant research on brief interventions has suggested that interventions delivered by non-professionals such as research psychologists have had successful outcomes.

Although significant reductions in alcohol consumption were not found, the observed non-significant differences between the groups warrant more intensive future study with a larger sample size. Also, the effect of the baseline alcohol assessment needs to be considered in future studies. This study, with an additional alcohol assessment at the time of the intervention, suggests that the mere assessment of alcohol use does have an effect on reducing drinking measures. If the study were conducted with a larger sample, significant results might be obtained.

The correlational and regression analyses showed drinking motives to be the most influential factors related to alcohol use measures and drinking-related consequences. Among the drinking motives, coping motives, especially coping with depression motives, were significantly related to all three alcohol use measures and RAPI scores. Unsurprisingly, coping with depression motive was also the single most significant predictor of all three drinking measures and alcohol-related consequences (Carey & Correia, 1997; Fossos, Kaysen, Neighbors, Lindgren, & Hove, 2011; Hosier & Cox, 2011; Read, Wood, Kahler, Maddock, & Palfai, 2003). Social, enhancement, and coping with anxiety motives did not significantly predict RAPI scores, but the conformity

motive was another significant predictor. Appetitive motivation was significantly negatively related to RAPI scores, whereas aversive motivation was positively and significantly related. However, neither of these kinds of motivation significantly predicted RAPI scores.

These findings are in agreement with the existing literature that drinking motives significantly influences drinking parameters and drinking-related consequences (Comasco, Berglund, Oreland, & Nilsson, 2010; Cooper, 1994; Crutzen, Kuntsche, & Schelleman-Offermans, 2012; Kuntsche, Knibbe, Gmel, & Engels, 2006; Martens, Pedersen, Smith, Stewart, & O'Brien, 2011; Read et al., 2003) . In the present study, coping motives, especially coping with depression, was significantly related to drinking parameters and drinking-related problems, and was a significant predictor of these variables. However, coping with anxiety was not related. This shows that these two kinds of coping motives are separate entities.

Chapter Six

General Discussion

The present study had three main objectives: (1) to conduct a non-systematic, but a comprehensive and descriptive review, on brief interventions for alcohol use, (2) to evaluate the psychometric properties of five-factor Modified Drinking Motives Questionnaire – Revised in British University undergraduates, and (3) to comparatively evaluate the effectiveness of a brief personalized feedback intervention, a motivational intervention, and their combination compared to a minimal intervention in reducing alcohol use and among university undergraduates.

The present study began with a survey of health risk behaviours of university students that included questions on alcohol use. The data collected during the survey served to screen and identify students defined as excessive consumers of alcohol. Those students who identified themselves as heavy drinkers were invited to participate in the research. Those who responded to the invitation completed a number of assessment questionnaires related to motivation, reasons for drinking, alcohol-related problems, positive and negative affect, and alcohol consumption. Following the baseline assessment, the students were randomly assigned to either one of three intervention groups or to a minimal intervention control group. The three interventions consisted of a personalized feedback, a motivational intervention, and a combination of both. All students in the study were followed-up 8-12 weeks later when they completed part of the same set of baseline questionnaire measures.

The main hypothesis of the study was that the participants in the intervention groups would significantly reduce their drinking compared to the control (minimal Intervention) group and that the combined intervention group would do significantly better than the individual intervention

groups. This hypothesis was not supported by the results of the present study. Although reductions in drinking over time were significant, there were no significant differences between the groups. The three parameters of drinking that were measured were monthly frequency of drinking, monthly total consumption and monthly binge drinking. All three of the parameters of drinking showed similar reductions across the groups. The assessment of drinking parameters at the intervention time point showed a decrease in all the three drinking measures between the baseline assessment and the intervention assessment. The downward trend continued across the intervention groups following the intervention, whereas in the control group there was no such trend. These results strongly suggest that there was a nearly significant effect of the baseline alcohol assessment.

Analysis by gender suggested that the combined group, i.e., brief personalized feedback plus motivational intervention, significantly reduced monthly frequency of drinking in both males and females. However, brief personalized feedback delivered alone showed significant reductions in females only. The decline in monthly drinking frequency in the control group, although not significant except for females between the pre-intervention and the intervention assessments, suggested that participation in the assessment itself could have contributed to the overall reductions.

Another hypothesis of the study was that the interventions would also significantly reduce drinking-related consequences as measured by the RAPI, but there were no significant group differences in the RAPI scores. However, there was a slight downward trend in RAPI scores among the intervention groups, whereas the control group showed a slight increase. The results also indicated no gender differences in the RAPI scores across the intervention and control groups.

Although there were non-significant trends towards reductions in monthly drinking frequency, total consumption and binge drinking, these trends overall do not provide support for the effectiveness of brief interventions for university students. However, there was a downward trend seen in all the groups following baseline assessment, and this trend continued after the intervention session in both the individual and the combined intervention groups. Why the changes did not differ between the control and intervention groups needs further exploration.

A number of reasons could be attributed as to why the study failed to find significant reductions in drinking measures among intervention groups. *First*, the interventions were delivered in just one session, which may not have had a sufficient impact to produce significant changes. *Second*, the interventions were delivered by a researcher rather than a trained healthcare professional. *Third*, the participants were young students, most of them in their first year of university, and this group of people is liable to be more dismissive of the guidelines on alcohol use and its associated problems.

It is possible that neither the individual nor the combined interventions were successful in significantly reducing drinking measures because active counselling techniques designed to enhance students' motivation to change were not employed. Another reason could be the students' perceptions about the importance of feedback information provided by a non-professional. However, abundant research on brief interventions has suggested that interventions delivered by non-professionals such as research psychologists have had successful outcomes.

Although significant reductions in alcohol consumption were not found, the observed non-significant differences between the groups warrant more intensive future study with a larger sample size. Also, the effect of the baseline alcohol assessment needs to be considered in future

studies. This study, with an additional alcohol assessment at the time of the intervention, suggests that the mere assessment of alcohol use does have an effect on reducing drinking measures. If the study were conducted with a larger sample, significant results might be obtained.

Another part of the study was the screening survey of undergraduate students that provided a picture of the alcohol use behaviours related to the frequency and quantity of alcohol use, as well as binge drinking, i.e., having five or more drinks in a row on a single occasion. The students were also surveyed on other health risk behaviours that students normally engage in and which are usually found to be associated with alcohol use. Driving under the influence of alcohol, cigarette use, and sexual risk behaviours, such as having multiple sex partners, using alcohol or drugs before or during sexual intercourse, and non-use of condoms are common risk behaviours that are frequently associated with alcohol use.

The current survey found that almost nine out of ten (91.4%) students had drunk alcohol at least once in the past month, and almost three-quarters (74.1%) of them had at least one episode of binge drinking in the past month. This confirms the results of the studies in the drinking literature that alcohol use is very prevalent among undergraduate university students and that a significant proportion of them drink in a hazardous way (e.g. Craigs, Bewick, Gill, O'May, & Radley, 2012; Davoren et al., 2015; Gill, 2002; Hallett et al., 2012). Males compared to females drank more frequently, usually drank a greater number of drinks on the days they drank, and they had more binge days. Although binge drinking for one or two days in a month was more common with female students, male students were more likely to binge drink for three or more days a month (e.g. Harrell & Karim, 2008; LaBrie, Lac, Kenney, & Mirza, 2011; O'Malley & Johnston, 2002; Pedersen, 2013).

Students in the first year of university were significantly more like to have a greater frequency of drinking and binge drinking compared to more advanced students. This corroborates the findings of previous studies in this area (e.g. Bishop, Weisgram, Holleque, Lund, & Wheeler-Anderson, 2005; Boekeloo, Novik, & Bush, 2011; Grekin & Sher, 2006; Werner & Greene, 1992; White, Kraus, & Swartzwelder, 2006). From a developmental perspective, students in the first year of university are in a period of transition from a relatively secure family or home environment to a totally different environment that is free from day-to-day parental control and which is characterized by developing new friendships and associations. Alcohol use often plays an important part in the process of establishing a psychological identity and social network (Scheier & Botvin, 1997).

There are several factors that could be possibly linked to heavier drinking among first-year students. Transitioning to a new environment may be stressful for some students, and alcohol use may be a way for some of them to cope with negative emotions experienced (O'Connor & Colder, 2005). Studies have shown, in fact, that a relationship exists between stress and alcohol use among first-year students (e.g. Rutledge & Sher, 2001). Expectancies, both positive and negative, that alcohol will bring about the cognitive, affective or behavioural changes have found to be significant predictors of alcohol use among first-year students (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Greenbaum, Del Boca, Darkes, Wang, & Goldman, 2005; Reifman & Watson, 2003). Students who endorse drinking motives such as 'fitting-in' or to conform to get socially accepted and to facilitate socialization tend to drink heavily during their first year (Hartzler & Fromme, 2003; Johnson, Rodger, Aitken Harris, Edmunds, & Wakabayashi, 2005; Reifman &Watson, 2003). Other factors generally associated with heavy alcohol use among first-year students are perceived norms (Hartzler & Fromme, 2003; Turrisi, Padilla, & Wiersma, 2000),

affiliation with fraternities or sororities, which is prevalent in American universities (Martin, Hevel, Asel, & Pascarella, 2011; McCabe et al., 2005), and pre-partying or participation in drinking games (Borsari, Bergen-Cico, & Carey, 2003; Borsari, 2004).

The present study also examined the psychometric properties of drinking motives on UK university undergraduates, particularly, the five-factor DMQ-R (Grant et al., 2007), which has been developed and evaluated using US university undergraduates. The psychometric properties were examined using EFA by exploring the factor structure, CFA by testing the model fit and comparing the model fit with those of DMQ-R and DMQ. Further examination was done to test the predictive validity of the hypothesized drinking motives of the Modified DMQ-R on alcohol use parameters and alcohol-related problems.

In the first stage of the analysis, EFA was carried out on the five-factor Modified DMQ-R to explore its factor structure. The EFA did not show consistent item loadings on the hypothesized factor. The five-factor model could not be established as there was cross loading of some items and many items did not load on the corresponding factor that they were expected to. The evidence presented in factor analysis literature has shown that parallel analysis (Horn, 1965) is one of the most accurate methods for making a decision on the number of factors to retain (Hayton, Allen, & Scarpello, 2004; Zwick & Velicer, 1982). The overestimation of matrix rank due to sampling error in the Kaiser criterion is overcome in parallel analysis by adjusting the effect of sampling error (Hayton et al., 2004). Parallel analysis is, therefore, a sample-based alternative to the population-based Kaiser criterion (Zwick & Velicer, 1982). By constructing a number of correlation matrices of random variables based on the same sample size and number of variables in the real data set, parallel analysis compares the average eigenvalues from these random correlation matrices with eigenvalues from the real data correlation matrix. Factors corresponding to actual eigenvalues that

are greater than the parallel average random eigenvalues are retained (Hayton et al., 2004). In this study, the first three factors had eigenvalues greater in the real data compared to randomly generated data. Therefore, parallel analysis indicated that three factors in this sample of participants should be retained. However, the purpose of the study was to psychometrically evaluate the five-factor drinking motives. Thus, further analysis, i.e., CFA and regression analyses were carried out on the five-factor model.

The CFA of the Modified DMQ-R yielded a poor fit to the data with the values of the χ^2 statistic and descriptive fit indices, such as SRMR, CFI, IFI and RMSEA, not falling within acceptable limits (e.g., Hu & Bentler, 1998). Although the χ^2 statistic is very sensitive to conceptually unrelated technical conditions, such as sample size (e.g., Bandalos, 1993) or a violation of the multivariate normality assumption (e.g., Curran, West, & Finch, 1996; Hu, Bentler, & Kano, 1992), the descriptive fit indices are much less sensitive to these conditions. However, calculation of these indices also suggested that the hypothesized five-factor model was a poor fit to the data. To assess whether other models would show a better fit to the data, the fit of the five-factor (28 item) model was compared with a four-factor (20 item, i.e., coping-with-anxiety and coping-with-depression as a single coping motive) model, and a three-factor (15 item, i.e., minus conformity motives) model. The descriptive fit indices of these alternative models also yielded poor model fit with no improvement from that of the five-factor model.

The poor fit of the data to the three CFA models was contrary to similar studies that examined and evaluated model fit in drinking motives among college students. Grant et al. (2007), while evaluating psychometric properties, found that the five-factor model provided a good fit to the 28-item Modified DMQ-R used with undergraduate student drinkers, and provided superior fit to the data when compared to the four-factor DMQ-R. For the four-factor model, the studies by

Cooper (1994) and Martens et al. (2008) found acceptable fit to the data, although the study by Cooper (1994) evaluated the model among adolescents who were younger than university students. Stewart et al. (1996) found that the three-factor model had an acceptably good fit to the data in a sample of university students. Interestingly, Martens et al. (2003) found the three-factor model to have a better fit to the data compared to the four-factor model in a study among intercollegiate athletes.

The poor fit of the model to the data in the current study for all three models, i.e., the five-factor Modified DMQ-R, the four-factor DMQ-R, and the three-factor DMQ models, might have occurred for several reasons, namely: (a) The *sample size* of 123 could have been inadequate a factor analytic model to obtain adequately stable factor solutions. The current study had 28 variables giving a variable sample ratio of 1:4.4, which according to some authors may not be an adequate sample size (e.g., Gorsuch, 1983; Hair, Anderson, Tatham & Black, 1995). However, according to Guadagnoli and Velicer (1988), samples size as a function of the number of variables is not an important factor in determining stability of factors. (b) *Low communality* values associated with several variables particularly those related to social motives, e.g., the motives 'as a way to celebrate' had a communality of .27, and 'because it is customary on certain occasions' had a communality of .39, respectively. According to Costello and Osborne (2005), common magnitudes are low to moderate communalities of .40 to .70. If the communality of an item is less than .40, it may either be not related to other items, or it may suggest an additional factor. Interestingly, these two social motive items constituted the fifth factor and the other three social motive items corresponded with conformity and enhancement motives items.

Despite these limitations, further analysis to evaluate the predictive validity of drinking motives on the drinking variables was unequivocal. For example, drinking frequency was

significantly associated with *coping with depression* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; Kuntsche et al., 2008; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003). Quantity of drinking, i.e., the amount of alcohol consumed per drinking occasion was highly significantly associated with *social* and *enhancement* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003), although *enhancement* motives was a more powerful predictor. Binge or heavy episodic drinking was significantly associated with *social*, *enhancement*, *coping-with-anxiety* and *coping-with-depression* motives (e.g., Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; MacLean & Lecci, 2000; Martens et al., 2008; Read et al., 2003), but *social* and *coping-with-anxiety* motives were less powerful predictors. Drinking related consequences as measured with the RAPI was highly significantly associated with coping-with-depression and conformity motives (e.g., Carey & Correia, 1997; Cooper, 1994; Hosier & Cox, 2011; Kuntsche et al., 2005; Merrill, Wardell, & Read, 2014; Read et al., 2003).

The correlational and regression analyses showed drinking motives to be the most influential factors related to alcohol use measures and drinking-related consequences. Among the drinking motives, coping motives, especially coping with depression motives, were significantly related to all three alcohol use measures and RAPI scores. Unsurprisingly, coping with depression motive was also the single most significant predictor of all three drinking measures and alcohol-related consequences. Social, enhancement, and coping with anxiety motives did not significantly predict RAPI scores, but the conformity motive was another significant predictor. Although negative affect was significantly related to RAPI scores, it did not significantly predict alcohol-related consequences. Appetitive motivation was significantly negatively related to RAPI scores,

whereas aversive motivation was positively and significantly related. However, neither of these kinds of motivation significantly predicted RAPI scores.

However, similar study of five-factor drinking motives on alcohol use parameters (Grant et al., 2007) has found social and enhancement motives as significant predictor of drinking frequency, and enhancement, conformity and coping-with-depression motives as significant predictors of drinking quantity, i.e., amount of alcohol consumed per drinking occasion. In the current study, coping-with-depression was the single most significant predictor of alcohol problems. The inconsistency between the two studies on predictive abilities of drinking motives could have resulted because of the differences in sample size, the current study having a much smaller sample size. Another reason could be that Grant et al. conducted their studies in two waves with different alcohol use parameters examined in different waves, i.e., frequency and quantity of drinking were measured at Time 1, and alcohol problems were measured at Time 2. Moreover, the differences in drinking patterns and situations and legal drinking age between the university students in the United Kingdom and North America might have resulted in different outcomes.

The correlational and regression analyses showed drinking motives to be the most influential factors related to alcohol use measures and drinking-related consequences. Among the drinking motives, coping motives, especially coping with depression motives, were significantly related to all three alcohol use measures and RAPI scores. Unsurprisingly, coping with depression motive was also the single most significant predictor of all three drinking measures and alcohol-related consequences. Social, enhancement, and coping with anxiety motives did not significantly predict RAPI scores, but the conformity motive was another significant predictor. Although negative affect was significantly related to RAPI scores, it did not significantly predict alcohol-related consequences. Appetitive motivation was significantly negatively related to RAPI scores,

whereas aversive motivation was positively and significantly related. However, neither of these kinds of motivation significantly predicted RAPI scores.

These findings are in agreement with the existing literature that drinking motives significantly influences drinking parameters and drinking-related consequences. In the present study, coping motives, especially coping with depression, was significantly related to all the variables of interest and was a significant predictor of these variables. However, coping with anxiety were not related. This shows that these two kinds of coping motives are separate entities.

A note on the brief interventions is necessary here. As it has been increasingly recognized that brief alcohol interventions has a significant role to play in reducing the public health burden as a result of alcohol misuse and related consequences by addressing these issues in a cost-effective way. And there is strong evidence from the research conducted internationally for the effectiveness of brief interventions to reduce harmful and hazardous alcohol use in different settings and population groups (Bien et al., 1993; Carey et al., 2007; Fachini et al., 2012; Kaner et al., 2007; Miller et al., 2013; Moyer et al., 2002). From a public health perspective, brief interventions have been quite a success in that it fills the gap that is apparent between primary prevention and intensive treatment approaches (Babor & Higgins-Biddle, 2001). Indeed, Heather (1996) remarked that brief interventions at the primary healthcare level could be integrated as "shared care" with specialist agencies where it will play a role as a form of early intervention, or could be used as the first step in a "stepped care" approach. But the difficulty of integration with primary healthcare as a public health model lies with the issue of delivering brief interventions to a large enough group of problem alcohol users in order to have a measurable impact on alcohol consumption at the population level (Cunningham, Neighbors, Wild, & Humphreys, 2008). Another problem is the lack of treatment seeking behaviour among alcohol users or to receive a preventive alcohol

intervention in the context of primary health care (Cunningham & Breslin, 2004; Denny, Serdula, Holtzman, & Nelson, 2003).

Although brief alcohol intervention can be applied in various settings and various population groups, and at varied levels of alcohol use, the context in which the intervention is administered influences its efficacy (Bertholet et al., 2005). For example, brief intervention administered in an emergency department or in a specialized treatment centre may have a different outcome compared to administration in routine care or when delivered in an opportunistic setting. In the same vein, there might be differential effects of the intervention in heavy or high-risk drinkers and less hazardous drinkers, or when interventions are delivered to individuals rather than in groups (Carey et al., 2007). Regarding alcohol dependence, a review (Moyer et al., 2002) did not find brief intervention to be effective in people seeking treatment for alcohol dependence; however, Al et al. (2008) found that a brief intervention had an equal effect on both alcohol-dependent and non-dependent population. Thus, there exists ambiguity in the literature regarding efficacy of brief interventions for dependent drinkers. Nonetheless, the consensus is that brief interventions should be restricted to hazardous and harmful alcohol users.

Although the present study failed to detect any significant effect of the active interventions compared to minimal intervention, an intervention package based on MI and/or personalized feedback delivered in the style of FRAMES model (Bien et al., 1993; Miller & Sanchez, 1994) seems to be the ideal form of brief intervention for efficaciousness or effectiveness. FRAMES do not require the delivery of a formal psychological intervention, nor does it necessitate a qualified and well-trained therapist. The essential elements incorporated in the FRAMES style of engagement with an alcohol misuser cover areas that motivate changes in alcohol use. Making a person feel responsible for the problems, encouraging him or her to be self-efficacious and to face

the problems confidently, and providing evidence that change can happen could all be strong motivators for an individual to make a change. Further, offering a menu of options that will suggest how to go about making the desired change can lend to a sense of control and suggest achievable alternatives to enable the individual to proceed. The empathetic style of the person delivering the intervention will help in facilitating the process of change.

Screening for alcohol use and problems is an essential part of a brief intervention because many hazardous and harmful drinkers do not appreciate or recognize the negative health consequences of excessive drinking because they usually do not experience immediate ill-effects of their alcohol use. Furthermore, they are not actively seeking treatment for their alcohol use and problems and are not served by regular health-care services. Moreover, they have a tendency to deny the presence of any alcohol-related problems because these problems may not be apparent to themselves but that could be recognized by health professionals. Also, the denial could be because of the stigma attached to having them. Even if they acknowledge that there could be a relation between their alcohol consumption and their problems, they may not appreciate the strength of the relationship. Thus, screening people who consume alcohol in a problematic way and who are not actively seeking treatment is necessary to identify this group of drinkers who are ideal for the desired outcome of brief interventions (Boland, Drummond, & Kaner, 2008).

Thus, early identification through screening procedures and followed by brief interventions has been increasingly supported by the vast literature to address problem drinking among hazardous and harmful drinkers (Institute of Medicine, 1990; NIAAA, 2005; WHO, 2003). There is a strong evidence for the effectiveness of brief interventions to reduce alcohol use and alcohol-related problems administered in primary and secondary care settings (Bertholet et al., 2005; Cayley, 2009; Kaner et al., 2007; O'Donnell et al., 2014), as well as in general population settings

as a public health approach (Moyer et al., 2002; Raistrick et al., 2006), and among college or university settings (Carey et al., 2012; Fachini et al., 2012; Miller et al., 2013; Scott-Sheldon et al., 2014; White, 2006). Indeed, the Mesa Grande project (Miller & Wilbourne, 2002), over a decade ago, methodologically analysed clinical trials of treatments for alcohol use disorders that looked at over 80 different types of intervention and assessed the quality of their evidence for efficacy from the extant literature on alcohol interventions. Among the psychosocial interventions, the strongest evidence of effectiveness as a result of the large number of studies with positive findings and of high-quality design was found for brief interventions, which were rated *Number One* in the league table. However, no distinctions between the opportunistic interventions and less intensive specialist interventions were made (Miller & Wilbourne, 2002).

Limitations

In interpreting the current results, some issues warrant consideration. First, all of this study's data are based on self-report. Social desirability biases might have influenced the results. Although the questionnaires were kept strictly confidential duly following the Data Protection Rules, respondents may have underreported some sensitive behaviours. This would make the relationships observed more difficult to detect. The validity of self-reported alcohol use has been the subject of much discussion because of the possibility that over- or under-estimation, as well as lack of truthfulness might distort the results. However, a number of studies have provided support for the validity of self-report data in alcohol research (Maisto, McKay, & Connors, 1990; Sobell & Sobell, 1990; Sobell, Toneatto, & Sobell, 1994). Moreover, if the participants are not intoxicated, confidentiality is assured, and the wording of questions is clear and comprehensible, then the self-report data are relatively accurate (Babor, Brown, & del Boca, 1990). All these points were adequately addressed in the current study.

Second, the response rate in this research was quite low. Although the sample is large enough to be confident about the representativeness of the population surveyed, it is possible that those who did not respond were more likely to be heavier users of alcohol. However, the data indicated that heavier drinkers and those who indulged in heavy episodic drinking did participate in the study.

Third, the analysis was conducted taking into consideration only one demographic variable, i.e., gender. More useful information could have been derived if the age and ethnicity of the participants had also been taken into account in the analysis. However, because of small sample size with varying ages from 18 to 25 years, and the participation of a very small percentage of respondents from ethnic groups other than Caucasian, it was difficult to consider these variables for inclusion in the analysis. Future studies should take these variables into consideration and procedures should be explored to get more participants from diverse backgrounds into the study.

Conclusion

The present study, despite several limitations, was successful in terms of psychometrically evaluating Five-Factor Modified Drinking Motives Questionnaire – Revised among British undergraduates, and in evaluating the effectiveness of Personalized Feedback intervention against Motivational Intervention. Although the results of brief interventions were not conclusive, this study evaluated the combination of brief personalized feedback and the motivational intervention. The combined intervention was a novel concept that can be refined further. The psychometric evaluation of Modified DMQ-R also did not provide conclusive evidence of good model fit. However, as per the existing literature, this is the first study to psychometrically evaluate the Modified DMQ-R outside of North America. Moreover, the outcome of drinking motives analysis

provided a distinction between two types of coping motives, i.e., coping with anxiety and coping with depression.

The present study provides a comprehensive picture of alcohol-use patterns among university students in North Wales. As a result of evaluating two types of brief interventions aimed at reducing students' heavy drinking, different drinking patterns serving different functions were identified. Patterns of drinking were best understood within a motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004, 2011), because each pattern had a unique set of antecedents and consequences. On this basis, matching opportunistic brief interventions with the particular motivational pattern of drinking was recommended as the best way to continue this area of research. In other words, different motivational patterns for drinking alcohol imply different interventions aimed at reducing problematic alcohol use. This drinking pattern appears to require a more intensive intervention aimed at addressing the underlying motivation to drink than does a drinking pattern arising from the motivation to enhance positive affect. As Cox and Klinger (1988, p. 178) asserted, viewing the use of alcohol from the perspective of emotional and motivational principles increases our understanding of the decision a person makes to drink alcohol, or not to do so. Understanding these processes promises to contribute to the development of more effective intervention strategies for heavy-drinking university students.

Although significant differences were not observed in the different intervention groups, there were some differences that were non-significant. With a much larger sample size, these non-significant differences could have assumed statistical significance. The novelty of the present study is that one of the interventions was a combination of two different approaches, i.e., a brief personalized feedback that do not have a motivational component, and an intervention focused purely on motivational approach. The implications of this study warrants more in-depth

exploration of similar interventions, not only among student population, but other population groups as well, with larger sample sizes and more resources which was beyond the scope of this study. Another novelty of this study is that this is the first study, as far as my knowledge goes, to do a psychometric evaluation of a Five-factor Modified Drinking Motives (Revised) outside of North America. This study further lent weight to the fact that coping motives is bi-dimensional, i.e., coping with anxiety and coping with depression are two distinct dimensions and should be examined separately while examining the role of motives for alcohol use.

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APPENDIX 'A'

Modified Drinking Motives Questionnaire – Revised

INSTRUCTIONS:

People drink alcohol due to some reason. The reason may vary according to time, situation, mood, occasion, and the company one is in at that particular time. The following questionnaire contains 28 reasons why people might be motivated to drink alcoholic beverages. In the 5-point scale below (1- almost never/never to 5- almost always/always), you have to rate how frequently each of the 28 listed reasons motivate you to drink.

Almost never/ never	**Some of the time**	**Half of the time**	**Most of the time**	**Almost always/ always**
1	**2**	**3**	**4**	**5**

1. As a way to celebrate
2. To relax
3. Because I like the feeling
4. Because it is what most of my friends do when we get together
5. To forget my worries
6. Because it is exciting
7. To be sociable
8. Because I feel more self-confident or sure of myself
9. To get a high
10. Because it is customary on certain occasions
11. Because it helps me when I am feeling nervous
12. Because it is fun
13. Because it makes a social gathering more enjoyable
14. To clear me up when I'm in a bad mood
15. To be liked
16. To numb my pain

17. Because it helps me when I’m feeling depressed
18. So that others won’t kid me about not using
19. To reduce my anxiety
20. To stop me from dwelling on things
21. To turn off negative thoughts about myself
22. To help me feel more positive about things in my life
23. To stop me from feeling so hopeless about the future
24. Because my friends pressure me to use
25. To fit in with a group I like
26. Because it makes me feel good
27. To forget painful memories
28. So I won’t feel left out

APPENDIX 'B'

Name/ID#: _____ Date: _____

TIMELINE FOLLOWBACK CALENDAR: 2012

Complete the Following

Start Date (Day 1): _____ **End Date** (yesterday): _____

2012	SUN	MON	TUES	WED	THURS	FRI	SAT
	1 New Year's	2	3	4	5	6	7
J	8	9	10	11	12	13	14
A	15	16 M. L. King	17	18	19	20	21
N	22	23	24	25	26	27	28
	29	30	31	1	2	3	4
F	5	6	7	8	9	10	11
E	12	13	14 Valentine's Day	15	16	17	18
B	19	20 Presidents' Day	21	22	23	24	25
	26	27	28	29	1 Ash Wednesday	2	3
M	4	5	6	7	8	9	10
A	11	12	13	14	15	16	17 St. Patrick's Day
R	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
A	1	2	3	4	5	6 Good Friday	7 Passover
P	8 Easter	9	10	11	12	13	14
R	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	1	2	3	4	5
M	6	7	8	9	10	11	12
A	13 Mother's Day	14	15	16	17	18	19
Y	20	21	22	23	24	25	26
	27	28 Memorial Day	29	30	31		
2012	SUN	MON	TUES	WED	THURS	FRI	SAT

						1	2
JUN	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17 Father's Day	18	19	20	21	22	23
	24	25	26	27	28	29	30
JUL	1	2	3	4 Independence Day	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	1	2	3	4
AUG	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	1
SEP	2	3 Labor Day	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17 Rosh Hashanah	18	19	20	21	22
	23	24	25	26	27	28	29
OCT	30	1	2	3	4	5	6
	7	8 Columbus Day	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31 Halloween	1	2	3
NOV	4	5	6 Election Day	7	8	9	10
	11 Veterans' Day	12	13	14	15	16	17
	18	19	20	21	22 Thanksgiving	23	24
	25	26	27	28	29	30	1
DE	2	3	4	5	6	7	8
	9 Hanukkah	10	11	12	13	14	15
	16	17	18	19	20	21	22

APPENDIX 'C'

Rutgers Alcohol Problem Index

INSTRUCTIONS:

Different things happen to people while 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 three years while you were drinking alcohol or as the result of your alcohol use.

How many times did the following things happen to you while you were drinking alcohol or because of your alcohol use during the last three years?

1.Not able to do your homework or study for a test.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

2. Got into fights, acted badly, or did mean things.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

3. Missed out on other things because you spent too much money on alcohol.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

4. Went to work or school high or drunk

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

5. Caused shame or embarrassment to someone.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

6. Neglected your responsibilities.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

7. Relatives avoided you.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

8. Felt that you needed more alcohol than you used to use in order to get the same effect.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

9. Tried to control your drinking by trying to drink only at certain times of the day at certain places.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

10. Had withdrawal symptoms, that is, felt sick because you stopped or cut down on drinking.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

11. Noticed a change in your personality

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

12. Felt that you had a problem with alcohol

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

13. Missed a day (or part of a day) of school or work.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

14. Tried to cut down or quit drinking

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

15. Suddenly found yourself in a place that you could not remember getting to.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

16. Passed out or fainted suddenly

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

17. Had a fight, argument or bad feelings with a friend.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

18. Had a fight, argument or a bad feeling with a family member.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

19. Kept drinking when you promised yourself not to

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

20. Felt you were going crazy.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

21. Had a bad time

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

22. Felt physically or psychologically dependent on alcohol.

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

23. Was told by a friend or a neighbor to stop or cut down on drinking

0	1	2	3	4
Never	1-2 times	3-5 times	6-10 times	More than 10 times

APPENDIX 'D'

Information sheet

This research is designed to study the effects of a drinking-related and motivational intervention on university students' drinking motives and alcohol consumption. First of all, you will be asked to complete a set of questionnaires that will ask about your alcohol consumption, drinking motives, drinking consequences, about your feelings and emotions, and your current concerns and goals in your life. Completing these questionnaires will take you about an hour or a little more. Following this, you will be assigned to one of the four groups, and shortly thereafter you will be called again where you will receive some form of intervention that may take about 45 minutes. During intervention, you will be meeting the researcher or a member of the research team who will both go through your assessment and discuss the issues with you or you may be given some brochures or pamphlets to read. Finally, you will be called again after 12 weeks to complete another set of questionnaires.

Your personal information will not be disclosed to third parties. Only numbers averaged across all participants will be included in any publications. You will be paid £20.00 at the completion of the study for your time.

We will keep the data of this research confidential. Only the researcher and his supervisor, Professor Miles Cox, will have access to the data.

If you have any questions about this study, please feel free to ask the researcher or his supervisor, Professor Miles Cox.

APPENDIX ‘E’

Consent Form

I, in signing this form, confirm that I have read the Information Sheet provided and understood its contents, and that I agree to participate in this study.

I understand that I am free not to answer specific questions on the questionnaire.

I understand that I am free to withdraw my consent and terminate my participation at any time without giving a reason, and without penalty.

I understand that I may request a summary of the results of this study.

In case there are any complaints concerning the conduct of research, these should be addressed to Professor Oliver Turnbull, Head, School of Psychology, Bangor University, Bangor, LL57 2AS.

Date.....

Participant's Signature.....

I, the undersigned, have fully explained the study to the above individual.

Date .....

Experimenter's signature.....

APPENDIX 'F'

Parallel Analysis Programme.

```
set mxloops=9000 printback=off width=80  seed = 1953125.
matrix.
compute ncases   = 123.
compute nvars    = 28.
compute ndatsets = 100.
compute percent  = 95.
* Specify the desired kind of parallel analysis, where:
  1 = principal components analysis
  2 = principal axis/common factor analysis.
compute kind = 1 .
****************** End of user specifications. ******************
* principal components analysis.
do if (kind = 1).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute evals(:,#nds) = eval(d * vcv * d).
end loop.
end if.
```

```
* principal axis / common factor analysis with SMCs on the diagonal.
do if (kind = 2).
compute evals = make(nvars,ndatsets,-9999).
compute nm1 = 1 / (ncases-1).
loop #nds = 1 to ndatsets.
compute x = sqrt(2 * (ln(uniform(ncases,nvars)) * -1) ) &*
cos(6.283185 * uniform(ncases,nvars) ).
compute vcv = nm1 * (sscp(x) - ((t(csum(x))*csum(x))/ncases)).
compute d = inv(mdiag(sqrt(diag(vcv)))).
compute r = d * vcv * d.
compute smc = 1 - (1 &/ diag(inv(r)) ).
call setdiag(r,smc).
compute evals(:,#nds) = eval(r).
end loop.
end if.
* identifying the eigenvalues corresponding to the desired percentile.
compute num = rnd((percent*ndatsets)/100).
compute results = { t(1:nvars), t(1:nvars), t(1:nvars) }.
loop #root = 1 to nvars.
compute ranks = rnkorder(evals(#root,:)).
loop #col = 1 to ndatsets.
do if (ranks(1,#col) = num).
compute results(#root,3) = evals(#root,#col).
break.
end if.
```

```
end loop.
end loop.
compute results(:,2) = rsum(evals) / ndatsets.
print /title="PARALLEL ANALYSIS:".
do if   (kind = 1).
print /title="Principal Components".
else if (kind = 2).
print /title="Principal Axis / Common Factor Analysis".
end if.
compute specifs = {ncases; nvars; ndatsets; percent}.
print specifs /title="Specifications for this Run:"
 /rlabels="Ncases" "Nvars" "Ndatsets" "Percent".
print results /title="Random Data Eigenvalues"
 /clabels="Root" "Means" "Prcntyle"  /format "f12.6".
do if   (kind = 2).
print / space = 1.
print /title="Compare the random data eigenvalues to the".
print /title="real-data eigenvalues that are obtained from a".
print /title="Common Factor Analysis in which the # of factors".
print /title="extracted equals the # of variables/items, and the".
print /title="number of iterations is fixed at zero;".
print /title="To obtain these real-data values using SPSS, see the".
print /title="sample commands at the end of the parallel.sps program,".
print /title="or use the rawpar.sps program.".
print / space = 1.
```

```
print /title="Warning: Parallel analyses of adjusted correlation matrices".
print /title="eg, with SMCs on the diagonal, tend to indicate more factors".
print /title="than warranted (Buja, A., & Eyuboglu, N., 1992, Remarks on parallel".
print /title="analysis. Multivariate Behavioral Research, 27, 509-540.).".
print /title="The eigenvalues for trivial, negligible factors in the real".
print /title="data commonly surpass corresponding random data eigenvalues".
print /title="for the same roots. The eigenvalues from parallel analyses".
print /title="can be used to determine the real data eigenvalues that are".
print /title="beyond chance, but additional procedures should then be used".
print /title="to trim trivial factors.".
print / space = 1.
print /title="Principal components eigenvalues are often used to determine".
print /title="the number of common factors. This is the default in most".
print /title="statistical software packages, and it is the primary practice".
print /title="in the literature. It is also the method used by many factor".
print /title="analysis experts, including Cattell, who often examined".
print /title="principal components eigenvalues in his scree plots to determine".
print /title="the number of common factors. But others believe this common".
print /title="practice is wrong. Principal components eigenvalues are based".
print /title="on all of the variance in correlation matrices, including both".
print /title="the variance that is shared among variables and the variances".
print /title="that are unique to the variables. In contrast, principal".
print /title="axis eigenvalues are based solely on the shared variance".
print /title="among the variables. The two procedures are qualitatively".
print /title="different. Some therefore claim that the eigenvalues from one".
```

```
print /title="extraction method should not be used to determine".
print /title="the number of factors for the other extraction method.".
print /title="The issue remains neglected and unsettled.".
end if.
end matrix.

* Commands for obtaining the necessary real-data eigenvalues for
principal axis / common factor analysis using SPSS;
make sure to insert valid filenames/locations, and
remove the '*' from the first columns.
* corr var1 to var20 / matrix out ('filename') / missing = listwise.
* matrix.
* MGET /type= corr /file='filename' .
* compute smc = 1 - (1 &/ diag(inv(cr)) ).
* call setdiag(cr,smc).
* compute evals = eval(cr).
* print { t(1:nrow(cr)) , evals }
 /title="Raw Data Eigenvalues"
 /clabels="Root" "Eigen."  /format "f12.6".
* end matrix.
```

APPENDIX 'G'

Health Risk Behaviour Survey

INSTRUCTIONS:

This survey is about health behaviour. It is being administered to the undergraduate students at Bangor University as part of a PhD project in the School of Psychology. We want to know about the risk behaviours the students at this University particularly engage in.

The survey is totally confidential and no one else except the lead researcher will know about your identity. The answers that you give will be kept private. The questions that ask about your background will be used only to describe the type of students completing the survey. No names or any form of identification will be reported.

Filling up this survey is easy. Mark only **ONE** of the most appropriate responses that fit you.

The first four questions ask about some demographic characteristics.

1. How old are you?

   …….. years

2. What is your gender?

   - M
   - F

3. In what undergraduate year are you?

   - Year 1
   - Year 2
   - Year 3

4. What is your race?

   - Caucasian
   - Asian
   - Black
   - Others

5. **When you rode a bicycle/motorbike/scooter** during the past 12 months, how often did you wear a helmet?

   - I did not ride a bicycle/motorbike/scooter during the past 12 months
   - Never wore a helmet

- Rarely wore a helmet
- Sometimes wore a helmet
- Most of the time wore a helmet
- Always wore a helmet

6. During the past 30 days, how many times did you **drive** a car or other vehicle **when you had been drinking alcohol**?

    - 0 times
    - 1 time
    - 2 or 3 times
    - 4 or 5 times
    - 6 or more times

7. During the past 30 days, how many times did you **ride** in a car or other vehicle **driven by someone who had been drinking alcohol**?

    - 0 times
    - 1 time
    - 2 or 3 times
    - 4 or 5 times
    - 6 or more times

8. During the past 12 months, how many times were you in a physical fight?

    - 0 times
    - 1 time
    - 2 or 3 times
    - 4 or 5 times
    - 6 or 7 times
    - 8 or 9 times
    - 10 or 11 times
    - 12 or more times

9. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?

    - 0 times
    - 1 time
    - 2 or 3 times
    - 4 or 5 times
    - 6 or more times

10. During the past 12 months, did you ever feel so sad or hopeless almost every day for **two weeks or more in a row** that you stopped doing some usual activities?

- Yes
- No

11. How old were you when you smoked a whole cigarette for the first time?

    - I have never smoked a cigarette
    - 10 years old or younger
    - 11 or 12 years old
    - 13 or 14 years old
    - 15 or 16 years old
    - 17 or 18 years old
    - 19 years old or older

12. During the past 30 days, on how many days did you smoke cigarettes?

    - 0 days
    - 1 or 2 days
    - 3 to 5 days
    - 6 to 9 days
    - 10 to 19 days
    - 20 to 29 days
    - All 30 days

13. During the past 30 days, on the days you smoked, how many cigarettes did you smoke **per day**?

    - I did not smoke cigarettes during the past 30 days
    - Less than 1 cigarette per day
    - 1 cigarette per day
    - 2 to 5 cigarettes per day
    - 6 to 10 cigarettes per day
    - 11 to 20 cigarettes per day
    - More than 20 cigarettes per day

The next 3 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, alcopops, and liquor such as rum, gin, vodka, or whisky. For these questions, one drink means one unit of alcohol equivalent to half pint of ordinary strength beer, cider, or lager, ¼ pint of high strength beer or lager, a small (4 oz.) glass of wine containing 11 or 12% alcohol, or one pub measure of spirits containing ~40% alcohol.

14. How old were you when you had a first drink of alcohol other than a few sips?

    - I have never had a drink of alcohol other than a few sips
    - 10 years old or younger
    - 11 or 12 years old
    - 13 or 14 years old

- 15 or 16 years old
- 17 or 18 years old
- 19 years old or older

15. During the past 30 days, on how many days did you have **at least one drink** of alcohol?

    - 0 days
    - 1 or 2 days
    - 3 to 5 days
    - 6 to 9 days
    - 10 to 19 days
    - 20 to 29 days
    - All 30 days

16. During the past 30 days, on the occasions you drank alcohol, how many drinks did you usually drink in a day?

    - 0 drink (I never drink)
    - 1 or 2 drinks
    - 3 or 4 drinks
    - 5 or 6 drinks
    - 7 or 8 drinks
    - 9 or 10 drinks
    - 11 or more drinks

17. During the past 30 days, on how many days did you have **5 or more drinks of alcohol in a row**, that is, within a couple of hours?

    - 0 days
    - 1 day
    - 2 days
    - 3 to 5 days
    - 6 to 9 days
    - 10 to 19 days
    - 20 or more days

The next 2 questions ask about other drug use. The other drug includes both legal and illegal drugs. The legal drugs are the prescription medications, the illegal drugs are the likes of marijuana, ecstasy, cocaine, heroine, LSD, methamphetamines, etc.

18. During your life, how many times have you used other drugs?

    - 0 times
    - 1 or 2 times
    - 3 to 9 times
    - 10 to 19 times

- 20 to 39 times
- 40 or more times

19. During the past 30 days, how many times have you used other drugs?

- 0 times
- 1 or 2 times
- 3 to 9 times
- 10 to 19 times
- 20 to 39 times
- 40 or more times

20. How old were you when you had sexual intercourse for the first time?

- I have never had sexual intercourse
- 13 years old or younger
- 14 years old
- 15 years old
- 16 years old
- 17 years old or older

21. During your life, with how many people have you had sexual intercourse?

- I have never had sexual intercourse
- 1 person
- 2 people
- 3 people
- 4 people
- 5 people
- 6 people

22. During the past 3 months, with how many people did you have sexual intercourse?

- I have never had sexual intercourse
- I have had sexual intercourse, but not during the past 3 months
- 1 person
- 2 people
- 3 people
- 4 people
- 5 people
- 6 or more people

23. Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?

- Yes
- No

24. The **last time** you had sexual intercourse, did you or your partner use a condom?

- Yes
- No

APPENDIX 'H'

Copy of E-mail Inviting Participants

Hi XXX,

Thank you for participating in health risk behaviour survey last semester. The next phase of the study has started this week. The study will examine the alcohol use, motives, and alcohol-related consequences among undergrads and evaluate a couple of behavioural interventions. The study will be done in 3 sessions:

Session 1 will be baseline assessment that consists of completing 6 different questionnaires that will take less than an hour. In Session 2 you will be intervened with one or a couple of interventions that will take between 30 -50 minutes. This session will be held after a week or couple of weeks following baseline assessment about which you will be informed during Session 1. Session 3 will be the evaluation and follow-up session where you have to fill out few more similar or different questionnaires that will take about 45 minutes to an hour. This session will take place about 8-10 weeks following Session 2.

You will be paid £20.00 if you complete all the three sessions and also be eligible for a prize draw. Two of the participants who complete all three sessions will be chosen by a draw of lots and will be paid £50.00 each.

If you are interested to participate in the study, please send me the return mail at the earliest giving tentative dates of your availability.

The days and times will be as follows:
Mondays to Fridays: 10 am to 6 pm
Weekends: If you could make it on weekends, you are welcome.

Feel free to ask me about the study if you have any doubts.

Best wishes,
Tekendra

Tekendra K. Rai, PhD student
School of Psychology
Brigantia Building, Penrallt Road
Bangor, Gwynedd LL57 2AS
Ph: 01248 383639

APPENDIX 'I'

Positive and Negative Affect Schedule

INSTRUCTIONS: This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate **to what extent you have felt this way during the past few weeks**. Use the following scale to record your answers.

Very slightly or not at all	**a little**	**moderately**	**quite a bit**	**extremely**
1	**2**	**3**	**4**	**5**

cheerful	Sad	Active	angry at self
disgusted	Calm	Guilty	Enthusiastic
attentive	Afraid	Joyful	Downhearted
bashful	Tired	Nervous	Sheepish
sluggish	Amazed	Lonely	Distressed
daring	Shaky	Sleepy	Blameworthy
surprised	Happy	Excited	Determined
strong	Timid	Hostile	Frightened
scornful	Alone	Proud	astonished
relaxed	Alert	Jittery	Interested
irritable	Upset	Lively	Loathing
delighted	Angry	Ashamed	Confident
inspired	Bold	at ease	Energetic
fearless	Blue	Scared	concentrating
disgusted with self	Shy	Drowsy	dissatisfied with self

APPENDIX 'J'

Personal Concerns Inventory

(Short form)

Instructions

DO NOT ANSWER HERE

Undoubtedly, you have concerns, wishes, or aspirations about different areas of your life. You may also have in mind things that you would like to change in order to resolve these **goals**. You might have goals about unpleasant things that you want to "get rid of," "prevent," or "avoid." Or you might have goals about pleasant things that you want to "get," "obtain," or "accomplish."

The following are examples of areas of life in which many people might have important concerns:

- Home and Household Matters **- Finances and Employment**

- Relationships (with Partner, Family, Relatives, Friends, Acquaintances) **- Leisure and Recreation**

- Love, Intimacy and Sexual Matters **- Health and Medical Matters**

- Self-changes **- Education**

Before going to the ANSWER SHEETS, I want you to **CHOOSE and TICK 4 (FOUR) OF THE LIFE AREAS RELATED TO YOUR MOST IMPORTANT GOALS/CONCERNS**. Think carefully about each of these areas**. What is the goal in each area that seems most important to you?** (You might have more than one goal in a particular area, but for the purposes of this questionnaire, just think about YOUR MOST IMPORTANT GOAL **IN EACH OF YOUR CHOSENAREA**.) **What would you like to do about this goal?** (That is, how would you like things to turn out?)

Now READ THE EXAMPLE ANSWER SHEET CAREFULLY. Then, on the Answer Sheets, rate how you feel about resolving your MOST IMPORTANT GOAL in your chosen area of life.

W. Miles Cox & Eric Klinger, m.cox@bangor.ac.uk

DO NOT ANSWER HERE

EXAMPLE ANSWER SHEET IN MORE DETAIL

FOR HOME AND HOUSEHOLD LIFE AREA

Please answer the following questions for each Area of Concern (A, B, C, etc.). Please write a number from **0 to 10** in each box below. 0 is for the 'least amount'; 10 is for the 'greatest amount'. If you have a concern in an Area of Life, be sure to fill in all the boxes for that area (e.g., Home and Household) before going on to the next Area of life (e.g., Relationships).

General Rule:	**The least amount 0 1 2 3 4 5 6 7 8 9 10 The greatest amount**

(A) Home & Household Matters

Start

a) Select the Area of Life decided previously where you have a concern/goal.

b) Name and describe your concern _____

(1) *Only one question*

Is my most important goal for *Home and Household Matters* something that I want **to get, obtain, or accomplish?**

Definitely no 0 1 2 3 4 5 6 7 8 9 10 Definitely yes → 10

Is my most important goal for *Home and Household Matters* something that I want **to get rid of, prevent, or avoid**?

Definitely no 0 1 2 3 4 5 6 7 8 9 10 Definitely yes

(2) **How likely** is it that I will achieve my most important goal for *Home and Household Matters*?

Not likely 0 1 2 3 4 5 6 7 8 9 10 Very likely → 7

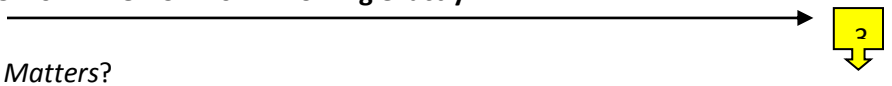
(3) **How Much control** do I have in achieving my most important goal for *Home and Household Matters*?

No control 0 1 2 3 4 5 6 7 8 9 10 Much control → 6

continued

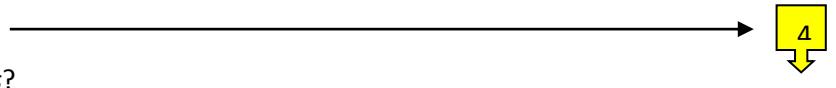
(4) Do **I know what to do** to achieve my goal for *Home and Household Matters*?

Not knowing at all 0 1 2 3 4 5 6 7 8 9 10 Knowing exactly



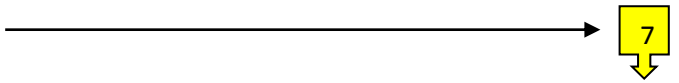
(5) If I try **to do my best,** will I achieve my goal for *Home and Household Matters*?

Not at all 0 1 2 3 4 5 6 7 8 9 10 Completely



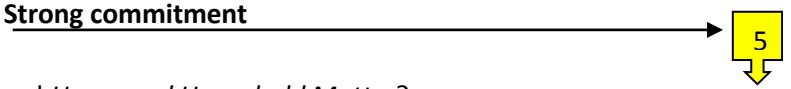
(6) **How happy** will I be if I achieve my goal for *Home and Household Matters*?

No happiness at all 0 1 2 3 4 5 6 7 8 9 10 Great happiness



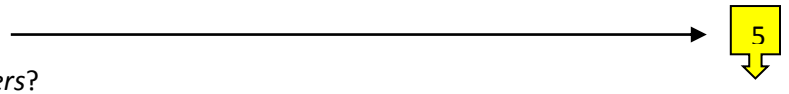
(7) **How committed** do I feel to achieve my goal for *Home and Household Matters*?

No commitment at all 0 1 2 3 4 5 6 7 8 9 10 Strong commitment



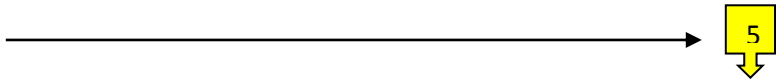
(8) **How long** do I feel that it will be before I make real progress on reaching my goal *Home and Household Matter*?

Very short 0 1 2 3 4 5 6 7 8 9 10 Very long



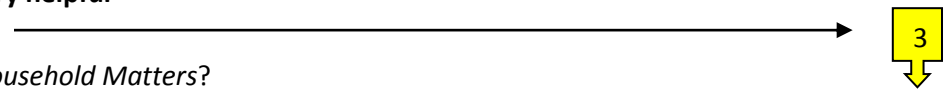
(9) **How sad** willl be if I CANNOT achieve my goal for *Home and Household Matters*?

Not sad at all 0 1 2 3 4 5 6 7 8 9 10 Great sadness



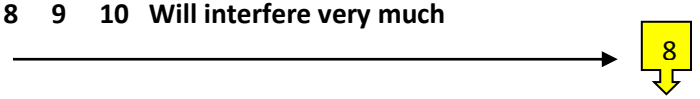
(10) **Will alcohol help** me in achieving my goal for *Home and Household Matters*?

Not helpful at all 0 1 2 3 4 5 6 7 8 9 10 Very helpful



(11) **Will alcohol interfere** with achieving my goal for *Home and Household Matters*?

Will not interfere at all 0 1 2 3 4 5 6 7 8 9 10 Will interfere very much



Now, on the ANSWER SHEETS, write a number from **0 to 10** in each box. 0 is for the 'least amount'; 10 is for the 'greatest amount'.

Please, feel free to refer to this EXAPMLE SHEET.

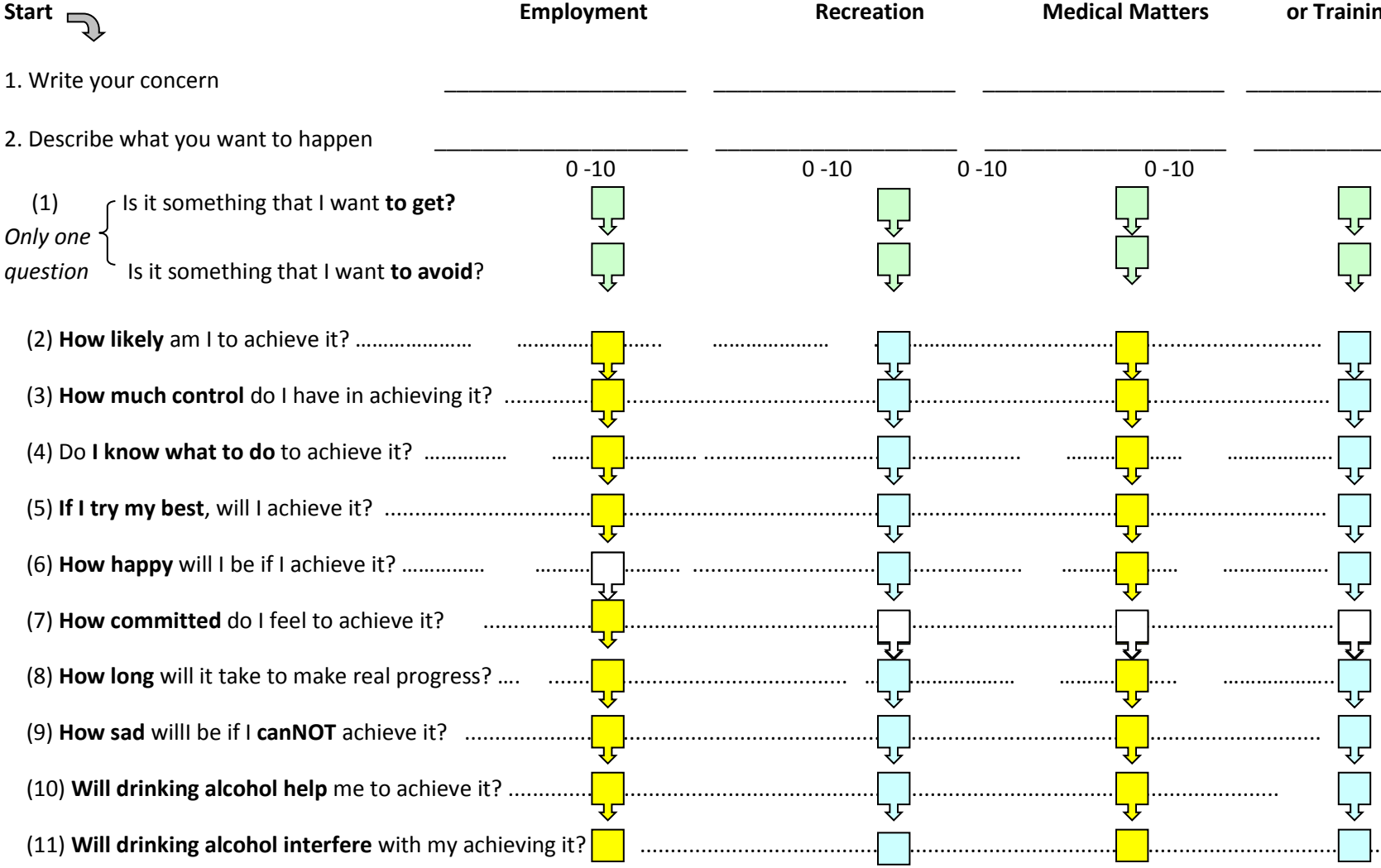
ANSWER SHEET(page 1)

Please rate your answers to the following questions about the Area of life that you selected(A, B, C, etc.), in which you have concerns, goals, wishes or aspirations. You should write a number from **0 to 10** in each box below. 0 is for the least amount; 10 is for the greatest amount. When you have a concern in your chosenLife Area, be sure to fill in all the boxes for that area before going on to the next chosenArea of life.

	(A)	**(B)**	**(C)**	**(D)**
Start	**Home & Household Matters**	**Relationships**	**Love, Intimacy, Sexual Matters**	**Self-changes**
1. Write your concern	_____	_____	_____	_____
2. Describe what you want to happen	_____	_____	_____	_____
	0 -10	0 -10	0 -10	0 -10
(1) *Only one question* — Is it something that I want **to get?**				
(1) *Only one question* — Is it something that I want **to avoid**?				
(2) **How likely** am I to achieve it?				
(3) **How much control** do I have in achieving it?				
(4) Do **I know what to do** to achieve it?				
(5) **If I try my best**, will I achieve it?				
(6) **How happy** will I be if I achieve it. ?				
(7) **How committed** do I feel to achieve it?				
(8) **How long** will it take to make real progress?				
(9) **How sad** willl be if I **canNOT** achieve it?				
(10) **Will drinking alcohol help** me to achieve it?				
(11) **Will drinking alcohol interfere** with my achieving it?				

ANSWER SHEET(page 2)

	(E) Finances and Employment	(F) Leisure and Recreation	(G) Health and Medical Matters	(H) Education or Training
Start				
1. Write your concern	_____	_____	_____	_____
2. Describe what you want to happen	_____	_____	_____	_____
	0 -10	0 -10	0 -10	0 -10
(1) *Only one question* — Is it something that I want **to get?**				
(1) *Only one question* — Is it something that I want **to avoid**?				
(2) **How likely** am I to achieve it?				
(3) **How much control** do I have in achieving it?				
(4) Do **I know what to do** to achieve it?				
(5) **If I try my best**, will I achieve it?				
(6) **How happy** will I be if I achieve it?				
(7) **How committed** do I feel to achieve it?				
(8) **How long** will it take to make real progress?				
(9) **How sad** willI be if I **canNOT** achieve it?				
(10) **Will drinking alcohol help** me to achieve it?				
(11) **Will drinking alcohol interfere** with my achieving it?				



APPENDIX 'K'

Personalized Feedback (Example)

Your Drinking Pattern

According to the information you provided during the Assessment (1st session), **the number of occasions you drank (frequency) was 11 occasions in a month, i.e., 2-3 times a week**. The **average amount you drank on each occasion (quantity) was 4 units**. The **number of days you drank above the recommended limits on a single occasion (binge drinking) was 4 days**, and the **highest drinking occasion in the 30-day period was when you drank 15 units**.

Your **percentile rank** (comparing you to other undergraduate students) is:

For the number of days having at least one drink of alcohol in a 30-day period is	72%
For the number of drinks per day on drinking days in a 30-day period	50%
For the number of days having more than 5 drinks in a row in a 30-day period is	70%

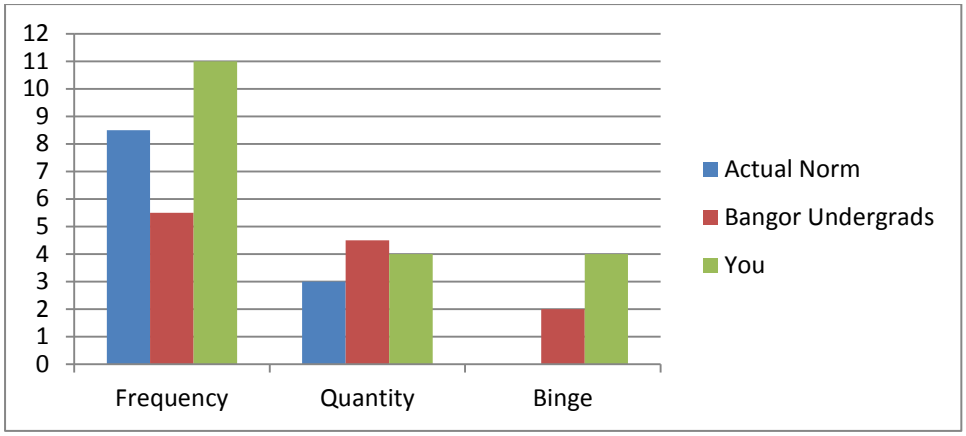
Some Drinking Norms

The actual drinking norm for adults your age (18-25 years) is twice a week, drinking about four units on each occasion (men) and about three units on each occasion (women).

The government advises that people should not regularly drink more than the daily unit guidelines of 3-4 units of alcohol for men (equivalent to a pint and a half of 4% beer) and 2-3 units of alcohol for women (equivalent to a 175 ml glass of wine). 'Regularly' means drinking every day or most days of the week.

Summary

	Frequency	Quantity (single occasion)	Binge (5 or more units on a single occasion)
Actual Norm	8-9 days a month	4 units (M); 3unitsW)	-
Bangor Undergraduates	5-6 days a month	4-5 units	2 days a month
Your assessment	11 days a month	4 units	4 days a month



Alcohol Related Consequences

From the information we gathered from the Assessment, you indicated that the following alcohol-related consequences had occurred in the following ways in the last three years:

At least 6-10 times

- Got into fights, acted badly, or did mean things
- Felt that you needed more alcohol than you used to use in order to get the same effect
- Tried to control your drinking by trying to drink only at certain times of the day at certain places
- Felt you were going crazy

At least 3-5 times

- Missed out on other things because you spent too much money on alcohol
- Went to work or school high or drunk
- Neglected your responsibilities
- Missed a day (or part of a day) of school or work
- Passed out or fainted suddenly

Motives for Drinking

From the information you provided during the Assessment, you indicated that your motives (reasons) for drinking are:

Most of the time:

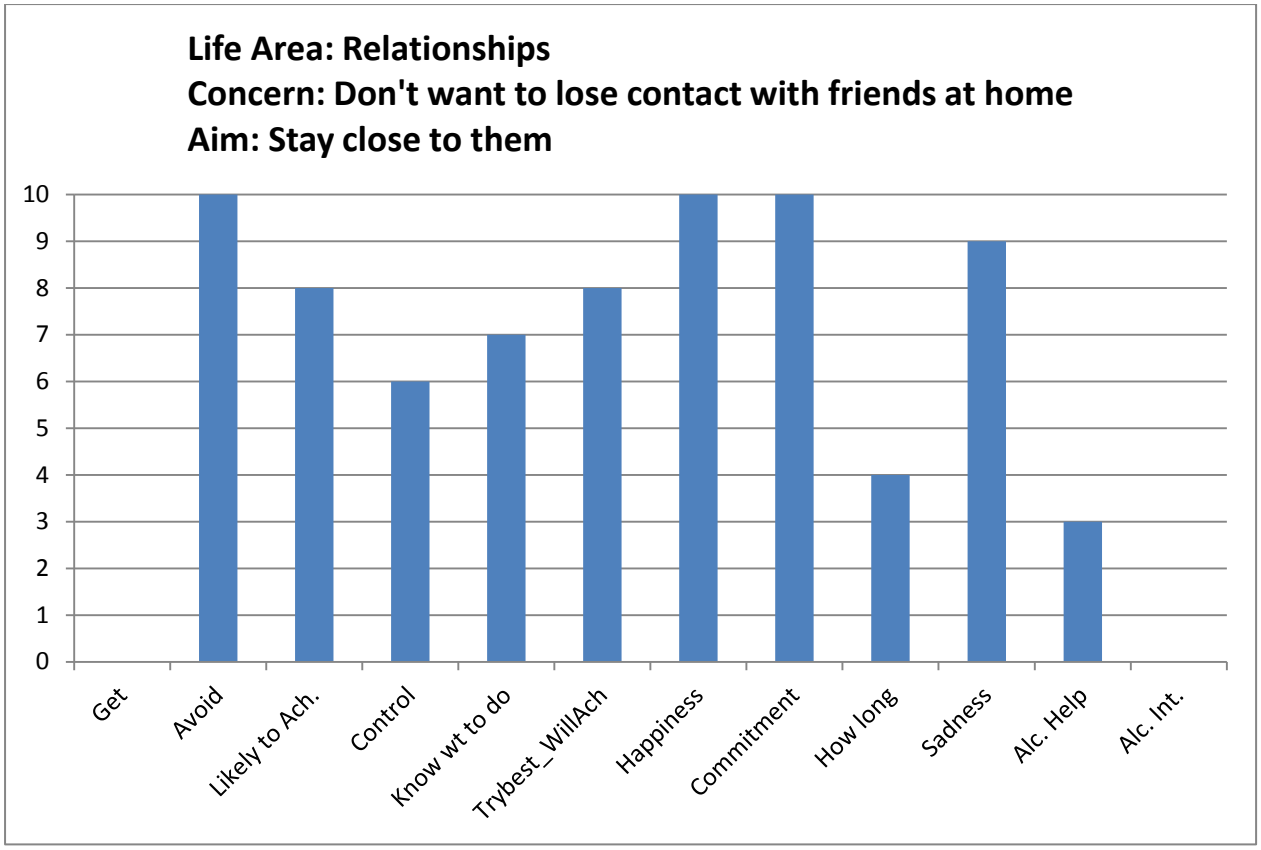
1. As a way to celebrate
2. Because it is what you and most of the friends do when you all get together
3. Because it seems fun
4. To stop you from dwelling on things

Half of the time:

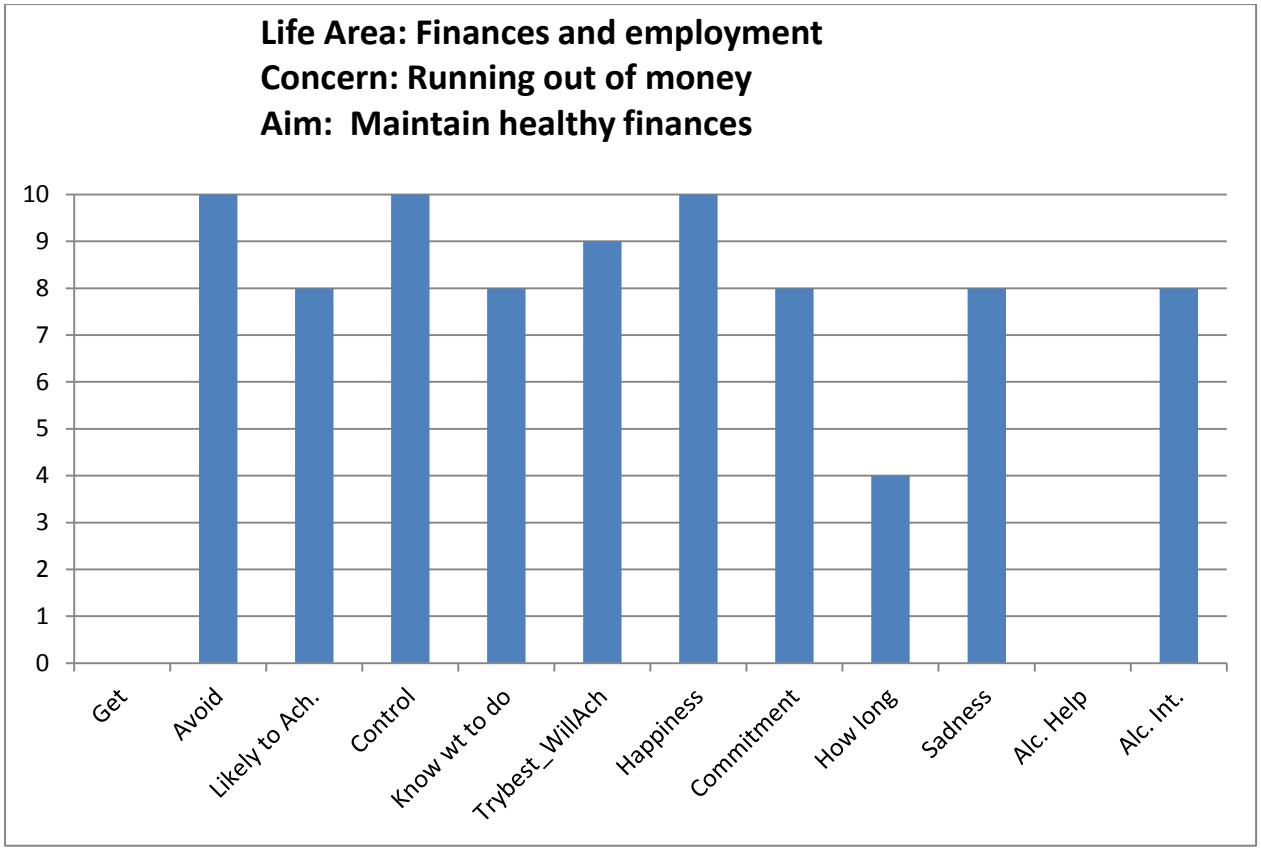
1. To be sociable
2. Because you feel more self-confident or sure of yourself
3. Because it makes a social gathering more enjoyable
4. To be liked
5. So you won't feel left out

APPENDIX 'L'

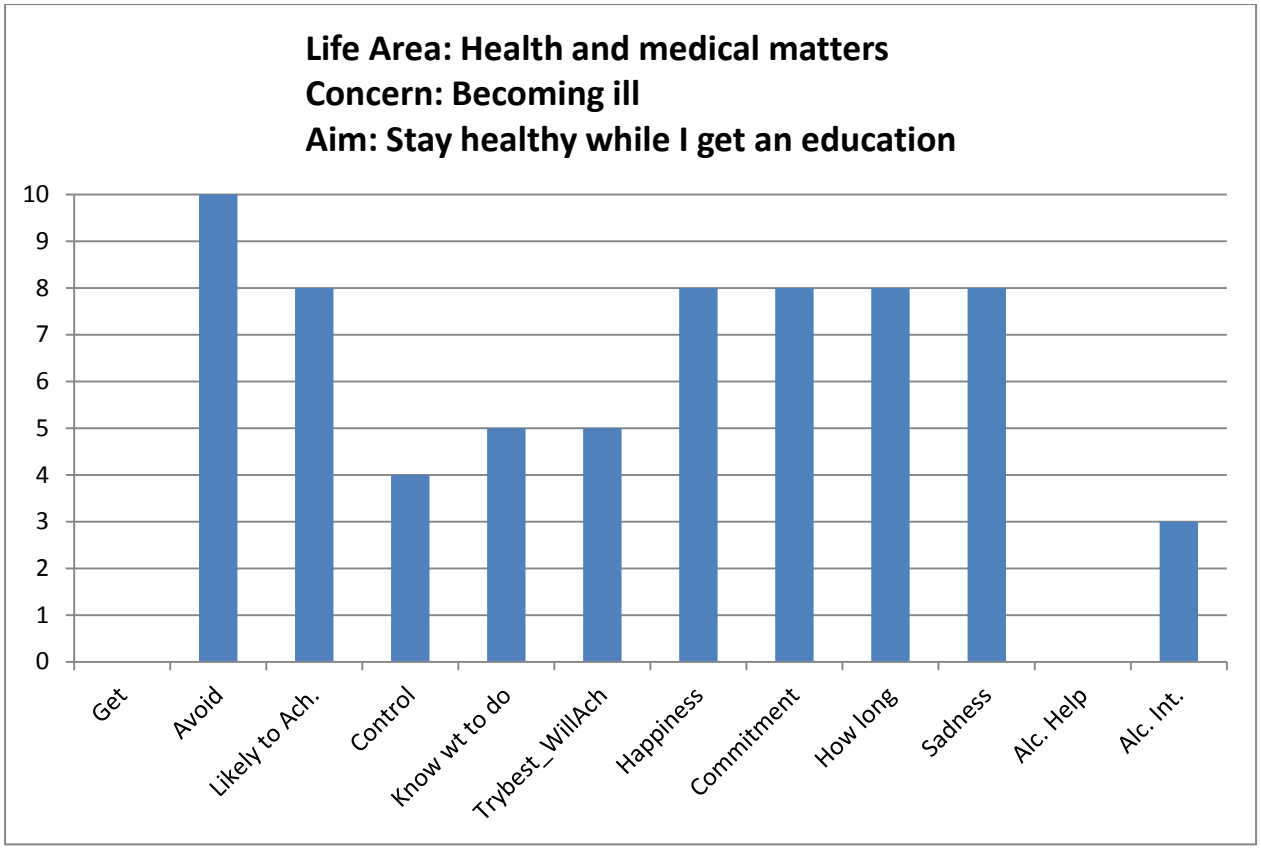
Motivational Profile Sheet (Example)



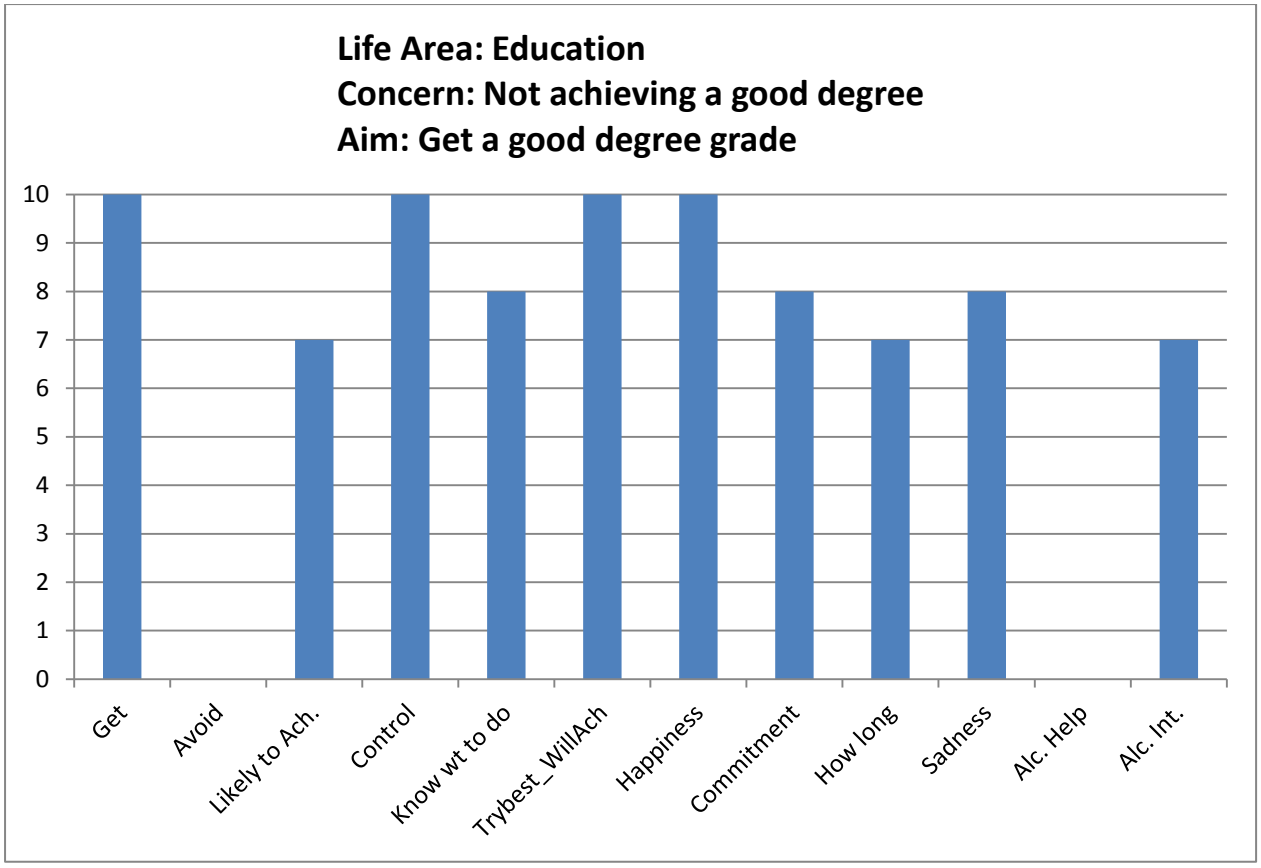
This profile shows that you are *strongly* committed to this goal, and it is *extremely* important to you to avoid losing contact with friends at home. You expect *great* joy if you achieve this goal and *great* sadness if you do not achieve this goal. You feel that your use of alcohol *will not be helpful* in reaching your goal and will *not interfere* with reaching it. You perceive *moderate* control over obtaining this goal, and have belief that it is *very* likely to happen. You *know most of the* steps to take toachieve this goal, and know that if you give your best, you are *very* likely to achieve it.



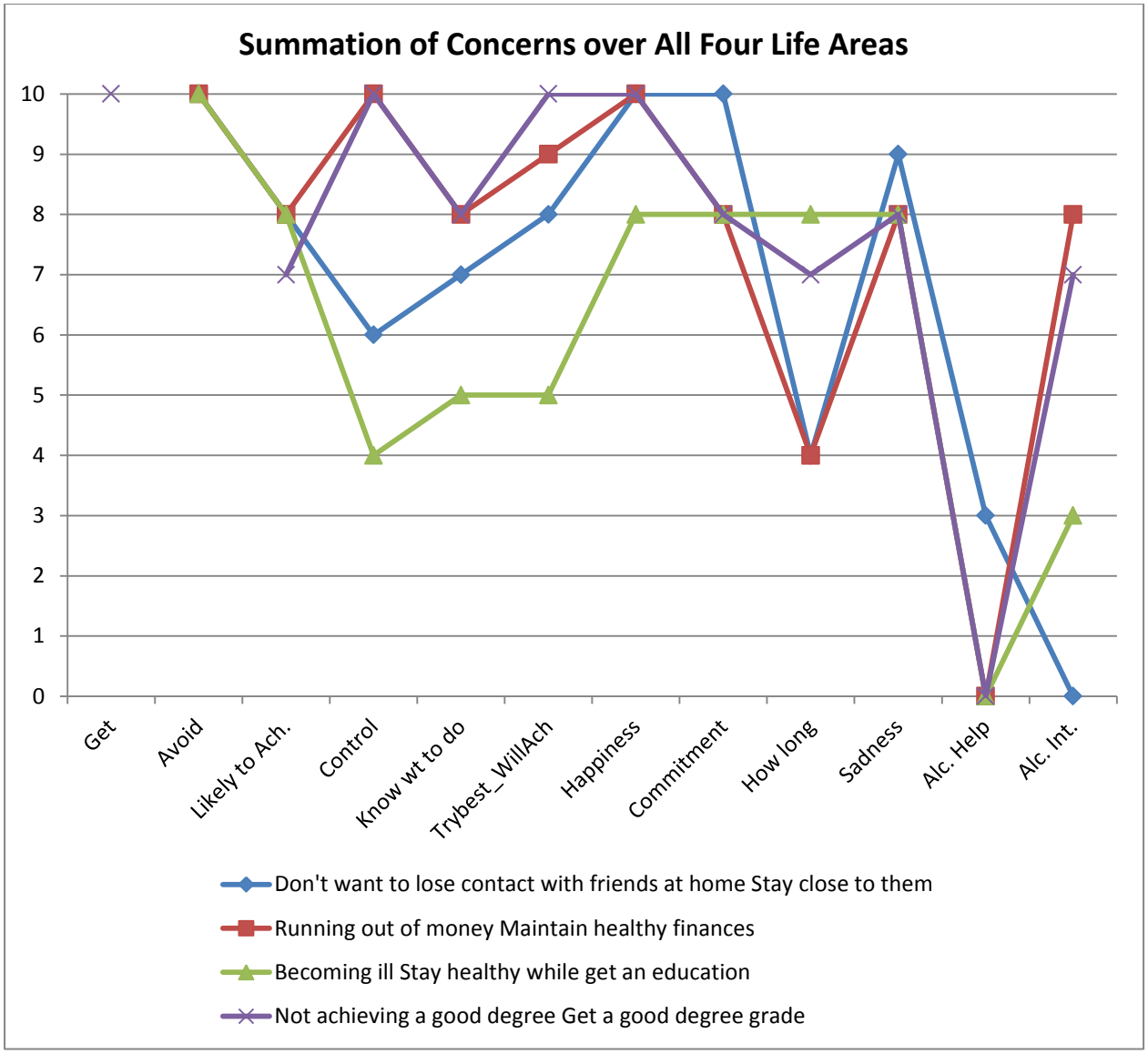
This profile shows that you are *very* committed to this goal, and it is *extremely* important to you to avoid running out of money. You expect *great* joy if you achieve this goal and *a lot of* sadness if you do not achieve this goal. You feel that your use of alcohol *will be unhelpful* in reaching your goal and will *probably interfere* with reaching it. You perceive *almost total* control over obtaining this goal, and have belief that it is *very* likely to happen. You *know most of the* steps to take toachieve this goal, and know that if you give your best, you are *extremely* likely to achieve it.



This profile shows that you are *very* committed to this goal, and it is *extremely* important to you to avoid illness. You expect *a lot of* joy if you achieve this goal and *a lot of* sadness if you do not achieve this goal. You feel that your use of alcohol *will be unhelpful* in reaching your goal and will *make no difference in interfering with* reaching it. You perceive *a little* control over obtaining this goal, and have belief that it is *very* likely to happen. You *know some of the* steps to take to achieve this goal, and know that even if you give your best, you are *moderately* likely to achieve it.



This profile shows that you are *very* committed to this goal, and it is *extremely* important to you to achieve this goal of getting a good degree. You expect *great* joy if you achieve this goal and *a lot of* sadness if you do not achieve this goal. You feel that your use of alcohol *will be unhelpful* in reaching your goal and will *probably interfere* with reaching it. You perceive *almost total* control over obtaining this goal, and have belief that it is *very* likely to happen. You *know most of the* steps to take to achieve this goal, and know that if you give your best, you are *extremely* likely to achieve it.



APPENDIX 'M'

Risk behaviour profile (Example)

Unintentional Injuries:

1. You most of the times wore a helmet when you rode a bicycle/two-wheeler during last 12 months
2. You did not drive while drinking during the last 30 days
3. You did not ride in a car with a driver who had been drinking in the past 30 days

Violence:

1. You have never been in a physical fight during the past 12 months
2. You have never been in a physical fight that resulted in an injury that required intervention by a doctor or a nurse during the past 12 months

Depression:

1. You did not feel sad or hopeless almost every day for two weeks or more in a row that stopped you from doing usual activities

Tobacco Use:

1. You smoked your first cigarette when you were 17-18 years old
2. You did not smoke any cigarettes or used tobacco in the last 30 days

Alcohol Use:

1. You were 13-14 years old when you had your first alcoholic drink
2. You drank at least one drink of alcohol for 10-19 days during the past 30 days
3. You drank 5-6 drinks in a day on the days you had been drinking in the past 30 days
4. You drank 5 or more drinks in a row for 3-5 days in the past 30 days

Other Drug Use:

1. During your life, you have used other drugs more than 40 times
2. You have used other drugs 3-9 times in the past 30 days

Sexual Behaviour:

1. You were 17 years old or older when you had first sexual intercourse
2. During your life, you have had sexual intercourse with 6 or more people
3. During the past 3 months, you have had sexual intercourse with 1 person
4. You used alcohol or drugs the last time you had sexual intercourse
5. You did not use a condom the last time you had sexual intercourse

APPENDIX 'N'

Participant Feedback Questionnaire

1. Did you read the Feedback Sheet again? YES/NO

If YES, how many times? 1 2 3 4 5 6 7 8 9 10+

2. What can you remember of the Feedback Sheet? _____

_____

3. At the Feedback Session, to what extent did you feel that you were being informed that you had a problem with drinking?

Not at all 0 1 2 3 4 5 6 7 Very much so

4. What type of information do you think would make someone change their drinking habits?

1. _____

2. _____

3. _____

5. What would you say was the major reason why people have drinking problems?

1. _____

2. _____

3. _____

6. To what extent has your drinking changed since participating in this research from the day you turned up to fill in the set of questionnaires?

Increased About the Same Decreased

7. In case of any positive change, to what do you attribute this change?

_____

8. What did you like least about your participation in this research?

_____

9. What did you like most about your participation in this research?

_____

APPENDIX ‘O’

Debriefing Form

You participated in a study on the effects of a drinking-related and motivational intervention on alcohol consumption and drinking motives. We are interested in determining whether the brief personalized feedback and motivational intervention addressing your current goals and concerns are effective interventions for reducing alcohol consumption and

changing drinking behaviour. Also, we would like to compare the effectiveness of these two interventions in different situations. Finally, we would like to assess whether the cumulative efficacy of these two interventions are better than the individual intervention. The set of questionnaires that you completed will be used to assess your drinking profiles, your drinking motives, and your overall motivational structure.

You were assigned to one of the four intervention groups, one group received only basic health information about risk behaviours and healthy living; another received a brief personalized feedback based upon the profiles drawn up from your responses to the questionnaires; the third group of participants received motivational intervention addressing their current goals and concerns and making a decision to choose the best; and the last group received both of the above interventions. We expect to find that drinkers who received the personalized feedback will show greater reductions in alcohol consumption and related consequences; those who received motivational intervention will show greater eagerness to change their drinking behaviour; and those who received both the intervention will show greater reductions in both their alcohol consumption and a greater change in their drinking behaviour.

If you have experienced any distress while taking part in this research, below is a list of services that you can contact, should you need to.

Student Counselling Service – Second Floor, Neuadd Rathbone, College Road

Lynda Shaw, Head of Counselling
Lynda.shaw@bangor.ac.uk
Tel; 01248 383541
Julie Evans, Counsellor
aosa1b@bangor.ac.uk
Tel; 01248 383658

Nightline
8:00 p.m. - 8:00 a.m.
Tel; 01248 362121
(Staffed by students)