DOCTOR OF PHILOSOPHY

Self-Regulation and Alcohol Consumption: Understanding University Students' Motivation for Drinking

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Award date:
2017

Awarding institution:
Bangor University

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Thesis Submitted for the Degree of Doctor of Philosophy

School of Psychology
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United Kingdom

2017

ABSTRACT

This thesis examined self-regulation and motivational structure as two important psychological constructs related to alcohol consumption. Three studies were conducted for this thesis. Study One was designed to assess relationships among self-regulation, motivational structure, and alcohol use. Participants were student drinkers (N = 105, females = 77.7%, mean age = 19.82 years). They were asked to complete four questionnaires, including a brief demographic characteristics questionnaire, the Personal Concern Inventory, Alcohol Use Questionnaire, and Short Self-Regulation Questionnaire. The results partially supported one of the hypotheses of the study. Total SSRQ scores were negatively correlated with the amount of alcohol that students drank on atypical occasions, as was predicted. That is, as participants' degree of self-regulation increased, the amount of alcohol that they consumed decreased. In Study Two, a manipulation technique was used to examine individuals' self-regulation and to clarify whether a manipulation for changing their self-regulation caused their motivational structure to become more adaptive and thereby reduce their alcohol consumption. Participants were 80 students (males = 26.6 %, males, mean age = 21.19 years). The main purpose of Study Two was to examine the effects of a task that used Concept Identification Cards on participants' self-regulation. The task aimed to enhance individuals' self-regulation and clarify whether manipulations aimed at triggering changes in their motivational structure to become more adaptive would reduce their alcohol drinking. Two types of instruments were employed. The first type included those that were administered to identify changes in participants' self-regulation, motivational structure, self-efficacy, procrastination and urges to drink. The second type included those that the experimenter used to manipulate self-regulation in the experimental group. The results partially supported one of the hypotheses of the study. Total SSRQ scores were

negatively correlated with students 'atypical drinking, as was predicted. That is, as participants' degree of self-regulation increased, the amount of alcohol that they consumed decreased. However, the results only partially supported the fourth hypothesis of the study, viz. that motivational structure would partly mediate the relationship between self-regulation and amount of alcohol consumed. This outcome was not consistent with the results of previous studies. Study Three was designed to explore whether relationships among a withholding response, impulsivity, self-regulation, and memory capacity were related to one another and to drinking behaviour. The hypotheses tested in Study Three were as follows: (a) Participants who were heavy drinkers and low in self-regulation, high in impulsivity, and low in working memory capacity would perform more poorly than others on a Go/No Go task. (b) More errors would be made when the stimuli on Go/No Go trials were alcohol-related than when they were alcohol-unrelated. Participants were students (N = 108, male = 41.8%, males' mean age = 19.86 years). Measures used in the study were a measure of (a) alcohol consumption, (b) impulsivity, and (c) self-regulation. In addition, two computerised tasks were used to measure participants' behavioural impulsivity and memory capacity. The results of Study Three supported both of the hypotheses. In conclusion, this thesis demonstrates that self-regulation and related psychological constructs play an important role in university students' alcohol consumption.

ACKNOWLEDGEMENTS

Firstly, I would like to thank God for always being with me. I am ever grateful to God who never lets me down when I feel down.

I would like to express my sincere gratitude to Professor William Miles Cox, my First Supervisor, whose continuous support during my PhD studies was beyond my expectations. I learned a lot from his patience, motivation, and immense knowledge. His guidance and being always supportive helped me at all times in the research for and writing of this thesis and even in my personal and family concerns. I could not have imagined having a better supervisor for my PhD studies.

I would like to thank Professor James Intriligator, my Second Supervisor, who helped me a lot particularly in Study Three of this thesis when I needed to develop an alcohol-related Go/No Go task. I appreciate his comments and suggestions. I also would like to thank Dr Paloma Mari-Beffa, Chair of my PhD Committee, for her comments and encouragement.

My sincere thanks also go to Dr Zohreh Shamloo, who kindly gave permission for me to use the computerized version of the Concept-Identification Cards, which she developed for her PhD thesis. I would also thank Dr Javad Salehi Fadardi for sending LEAP files to me and for his helpful suggestions and emotional supports. Thanks to Dr Chris Saville for his advice on the Backwards Digit Span memory task. Thanks also go to Dr Simon Viktor for his suggestions. I would also thank Dr Jenny Byast for her support during the last few years of my studies here in Bangor.

Finally, yet importantly, I would like to send my deepest love to my son Mahan who after God gave me the strength to pass through dark moments and keep me

hopeful for accomplishing my goals. This would not have happened without my thanking Leyla, my wife, who has done her best during all these years of postponing her own dreams in order to allow me the opportunity to complete my PhD thesis.

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DECLARATIONS

This work has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed ……

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Statement 1
This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A list of references is appended.

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CHAPTER ONE

Alcohol Consumption as a Public and University Health Concerns

Introduction

Studies have shown that drug addiction is a multifactorial problem (Cox & Klinger, 2011). As a global concern, it can not be expected that removal of one factor alone will solve all of societies' addiction problems. No country or even one person is immune to this global problem. Drug problem can be found among all social classes, so anyone who is illiterate or literate and educated could be at risk of getting involved with this problem. Furthermore, not only unemployed people but also wealthy individuals could be at risk of taking drugs. In short, drug problems to be beyond of this kind of classification.

Alcohol consumption among other drugs is a major concern because of multiple effects on not only individuals but also societies. Tobacco and alcohol are considered as a gateway, which may lead to consuming other drugs. Alcohol consumption is also one of the main public health concerns in many countries. According to WHO (2014), 38.3% of the people in the world are current drinkers. This percentage in Europe is 66.4, and in North America, it is 61.5.

A Glance at the History of Alcohol Consumption Around the World

According to Hanson (1995 as cited in Viktor, 2009), wine was produced by the early Egyptians in 4000 B.C., and beer and wine were used for symbolic and functional reasons as early as 2000 B.C. (e.g., for religious and medical concern). The early Chinese civilisation, in 7000 B.C., was fermenting a type of wine from rice, honey, and

fruit; the early Indian civilisation was fermenting Sura from rice meal between 3000 and 2000 B.C. Around 2700 B.C. beer consumption was common among the ancient Babylonians and mead consumption was popular in 2000 B.C. among the ancient Greeks. In 1700 B.C., wine fermenting was a common practice in ancient Greece. Processes for distilling spirits were invented by the ancient Persian alchemists in the 8th and 9th centuries. The modern term 'alcohol' is generally said to have entered into the English language around 1543 from the Arabic (Hanson, 1995).

Throughout antiquity, alcohol has served ceremonial, spiritual, religious, symbolic, functional, and cultural functions. It was consumed as a source of nutrition, or for analgesic reasons, or for enjoyment reasons (Hanson, 1995, Viktor, 2009). One pattern of human behaviour that appears to have stayed fairly consistent since these early civilisations, and that is still prevalent in today's modern society, is the tendency for some people to drink safely and responsibly, and unfortunately for others to drink unsafely and irresponsibly. Hence, drunkenness, inebriety, or alcoholism is not a modern societal problem, but one that is as old as human civilisation. For example, the early Egyptian, Chinese, and Persian civilisations either advocated some form of moderation (except during religious and ceremonial festivals) or condoned drunkenness to some degree (Hanson, 1995). In fact, around 1116 B.C. a Chinese Imperial Edict proclaimed that moderation was prescribed by heaven; this is probably one of the oldest alcohol-related laws.

Excessive Alcohol Consumption: An Ongoing Health Issue

There are several health, social and economic issues associated with harmful use of alcohol. Alcohol consumption can not only affect the rate of diseases, injuries and other health conditions, but also on the development of disorders and their consequences for individuals. For example, alcohol consumption has been recognised as a component cause for more than 200 diseases, injuries and other health conditions.

Alcohol-use disorders are the most serious neuropsychiatric conditions caused by alcohol consumption. Epilepsy is another disease impacted by alcohol. Alcohol consumption is associated with many other neuropsychiatric conditions, such as depression or anxiety disorders (WHO, 2014).

Alcohol and health problems. As stated earlier, alcohol use is associated with significant health problems. In 2009, an estimated 3.8% of all global deaths and 4.6% of global disability adjusted life years were attributable to alcohol (Rehm et al., 2009). In 2012, 5.9% of all deaths were attributable to alcohol (WHO, 2014). Overall, about 3.3 million deaths in 2012 were estimated to have been caused by alcohol consumption. This corresponds to 5.9% of all deaths, or one in every twenty deaths in the world (7.6% for men, 4.0% for women). The main causes of deaths are from cardiovascular diseases, followed by injuries (especially unintentional injuries), gastrointestinal diseases (mainly liver cirrhosis) and cancers. Harmful use of alcohol kills or disables people at a relatively young age, resulting in the loss of many years of life to death and disability. In the UK alongside these changes in adolescent drinking patterns, there has been a 20% increase in alcohol-related hospital admissions among youth, the equivalent of 20 per day (Hospital Episode Statistics, 2007), and a 57%

increase in alcohol-related deaths among young people aged 15-34 between 1991 and 2007 (Department for Children Schools and Families, 2008). These drinking trends among young people cause concern given the evidence that regular recreational consumption in adolescence is a strong predictor of alcohol dependence in adulthood (Bonomo et al., 2004). Binge drinking by young people is also a strong predictor of alcohol dependency in later life (Jefferis et al., 2005), and is associated with a range of longer term health harms, including coronary heart disease, liver cirrhosis and stroke (Britton & McPherson, 2001,Gutjahr et al., 2001; Leon et al., 2013). Excessive binge drinking among adolescents can also have an adverse neuro-developmental effect (Medina et al., 2008).

Alcohol consumption: social and economic costs. Harmful use of alcohol may also bring significant social and economic costs on society. For example, alcohol-attributable costs have been estimated at about 125 billion euros in the European Union for 2003, 21 billion pounds in 2009 in the United Kingdom of Great Britain and Northern Ireland, and 233.5 billion dollars in 2006 in the United States of America. Such social costs attributable to alcohol represent from 1.3% to 3.3% of the gross domestic product of these countries. Even when intangible costs are omitted, these costs are substantial, not only in comparison to gross domestic product, but also in relation to the costs associated with other risk factors. In the Republic of South Africa, estimates made of the combined tangible and intangible costs of harmful use of alcohol to the economy reached nearly 300 billion rand or 10–12% of the 2009 gross domestic product (Rehm & Shield, 2013).

Social problems related to young people's drinking are also substantial. Approximately half of all 10-to-17 year olds who drink regularly have admitted to some sort of criminal activity or disorderly behaviour (Home Office, 2004). It is also estimated that alcohol is involved in half of all crimes (Centre for Crime and Justice Studies, 2004). In fact, the UK reports the third highest rate of youngsters aged 11-15years experiencing problems related to alcohol use in Europe, such as personal problems, relationship problems, sexual problems and delinquency (Danielsson et al., 2012). Youthful drinking is also implicated in violence and criminal injury (Forsyth & Lennox, 2016).

Europe's Drinking Patterns

Research shows alcohol-related deaths are a major tragedy for the European Union[1] as each year 120,000 individuals average 15-64 year olds are dying from alcohol-related causes (Rehm et al., 2013). This is an important age, as people this old need to be planning their future. One hundred and twenty thousand is one in eight of all deaths. These deaths are simply because people in Europe drink too much. The figure includes females and males aged 15 years or older who drink annually on average about 12.5 litres of pure alcohol, almost 30g, or three drinks a day, which is more than double the world's average (Rehm et al., 2013). One in eight is the figure for the European Union as a whole.

The rate in the Netherlands is less than in Europe as a whole. The figure is about 1 in 16. However, going further to the east, one can find unbelievable tragedies. In Russia, which is outside of the European Union, more than half of all deaths

[1] The UK is included in this category. However, statistics are also provided in this chapter for the UK and England separately.

amongst 15-54 year olds are due to alcohol (Zaridze et al., 2013). Thus, this is a crisis of human welfare, which needs to be addressed.

Alcohol and the Economy of Europe

Europe produces alcohol usually from the materials, which were locally available one thousand years ago (Anderson & Baumberg, 2010). Alcohol has been drunk in Europe often as a medicine. Europe produces a quarter of the world's alcohol and over half of the world's wine, so it plays a crucial role in the global alcohol market. Also, the European Union (EU) is a major trade region with 70% of alcohol exports and also just under half of the world's imports involving alcohol. It is noteworthy, however, that most of this trade is between EU countries; the trade in alcohol contributes around nine billion euros to the goods-account balance for the EU as a whole. It is apart from what smuggling in the EU, the extent of which is not easy to estimate, although the European High Level Group on Fraud estimated that €1.5 billion was lost to alcohol fraud in 1996.

Alcohol and tourism. It has been estimated that at least one in six tourists visited countries where alcohol is cheaper than their home countries; they legally bring back alcohol with them from trips abroad, carrying an average of over two litres of pure alcohol per person from several countries (Anderson & Baumberg, 2008). The alcoholic drinks industry is playing a considerable role in many European countries.

Alcohol-related jobs. Many jobs are related to the production of more than three-quarters of a million in drinks, especially wine. Also, people who are involved

in the supply chain, such as pubs, shops, hotels, restaurants, and so on need to be considered too.

The European Union: the heaviest drinking region of the world. Recent results show an amount of 11 litres of pure alcohol drunk per adult, which compares with 15 litres in the mid-1970s and is a remarkable downward trend. Nevertheless, the EU is still the heaviest drinking region of the world. 44% this alcohol is consumed in the form of beer**,** wine with 34%, the rest amount belongs to spirits with 22%. In most of the EU countries approximately 40% of drinking occasions involve consuming alcohol with the afternoon/evening meal, even though those in southern Europe are much more likely to drink with lunch than elsewhere. While the level of daily drinking also shows a north—south gradient, non-daily frequent consumption (i.e. drinking several times a week but not every day) seems to be more common in central Europe (Anderson & Baumberg, 2007).

Drunkenness. Drinking to drunkenness varies across Europe, with fewer southern Europeans than others reporting getting drunk each month. It has been estimated, although 266 million adults drink alcohol up to 20g, which is for women's drinking, or 40g for men's drinking per day, over 58 million adults (15%) consume above this level, with 20 million of these (6%) drinking at over 40g (women) or 60g per day (men). Regarding addiction rather than drinking levels, it has been estimated that 23 million Europeans (5% of men, 1% of women) are dependent on alcohol in any one year.

Gender differences, alcohol use, and socio-economic status. In every culture ever studied, men are more likely than women to drink and to drink more when they do, with the gap greater for riskier behaviour. Although many women give up

drinking alcohol when pregnant, a significant number (25%-50%) continue to drink, and some continue to drink to harmful levels. Patterns of drinking behaviour can also be seen for Socio-Economic Status (SES), where those with low SES are less likely to drink alcohol at all. Despite a complex picture for some aspects of drinking (with some measures showing opposite trends for men and women), getting drunk and becoming dependent on alcohol are both more likely among drinkers of lower SES.

A Health Prospective: the Impact of Alcohol Consumption on Europe

From a health perspective, alcohol is responsible for about 195,000 deaths each year in the EU, although it is also estimated to delay 160,000 deaths in older people mainly through its cardio protective effect for women who die after the age of 70 years (although due to methodological problems, this is likely to be an overestimate of the number of deaths delayed). A more accurate estimate is likely to be the 115,000 net deaths caused in people up to the age of 70, which avoids most of the likely overestimate of alcohol's preventive effect. These figures are also relative to a situation of no alcohol use, and the net effect would be much greater, looking at the lowest-risk level of drinking. Measuring the impact of alcohol through Disability-Adjusted Life Years (DALYs) lessens this problem, and shows that alcohol is responsible for 12% of male and 2% of female premature death and disability (Anderson & Baumberg, 2010).

According to Crawford (2016), in the European Union (EU) alcohol use is the third highest ill-health risk factor after tobacco use and high blood pressure. Seventeen thousand deaths per year are due to road traffic accidents (1 in 3 of all road traffic fatalities). Students (15-16 year old) in the EU report fights, and 4% of them report unprotected sex due to their own drinking. Alcohol plays a

considerable role in lowered life expectancy. In the EU, this includes 60,000 underweight births, as well as 16% of cases of child abuse and neglect, and 5-to-9 million children in families are adversely affected by alcohol. Alcohol also affects other adults, including an estimated 10,000 deaths in drink-driving accidents for people other than the driver, with a substantial proportion of alcohol-attributable crime that is also likely to affect other people. Other people or institutions also incur costs resulting from excessive drinking. This includes an estimated €33 billion due to crime, €17 billion in costs to healthcare systems, and €9-€19 billion as a result of absenteeism from work (Crawford, 2016).

The Status of Alcohol Use in the United Kingdom

As mentioned earlier, alcohol consumption is associated with various celebrations and with business, social and sport functions, and it plays an important role as an individual and social regulator in many countries, including the UK, and is consumed in religious and cultural ceremonies, as well as festive and transitional formalities (Madden et al., 1995; Agrawal et al., 2009). Alcohol is widely used as a social-interaction facilitator, and serving alcohol is an expression of friendship and solidarity (Haber et al., 2012). In the UK, alcohol is a major part of the culture, and forms part of the social traditions of British society, with the majority of adults consuming alcohol on occasion (Hendry & Kloep, 2006). However, it should be remembered that alcohol as a toxic, addictive, and cancer-causing drug has a remarkable effect on society (House of Commons, Health Committee, 2010).

Beer became popular in England during the Middle Ages (5th to 16th centuries). Ales, stouts, beers, and meads or ciders were generally consumed by the lower classes of Elizabethan and Stuart society, whereas wines tended to be consumed by the middle and upper classes of these two societies. Gin and other distilled spirits became popular in England during the 17th century, when England experienced its darkest period of alcohol-related history. Thus many people became addicted to gin in poor urban inner city areas and died from "Dropsy", which is a form of alcoholic liver disease, whereas rural communities continued to consume beers, stouts, ales, ciders, and wines. (London, 2005) The majority of people in the UK consume alcohol, mostly on a regular basis (Hendry & Kloep, 2006), with only 12.2% abstainers (WHO, 2004). For young people a major part of the socialisation process, and to some extent the transition to adulthood, involves drinking alcohol (Foxcroft et al., 1996).

UK drinking guidelines. According to the United Kingdom's Department of Health (DOH) guidelines that were en force for 20 years, men should drink no more than 21 units of alcohol per week, which equates to no more than three or four units in any one day. Women should drink no more than 14 units of alcohol per week, and this equates to no more than two or three units in any one day. However, these guidelines were radically changed in early 2016. According to the new guidelines (2016, p.4), "There is no level of regular drinking that can be considered as completely safe". Nevertheless, the units recommended for men and women is the same; both are advised not to drink regularly more than 14 units per week. In addition, it is recommended that the drinks be spread over three or more days (DOH, 2016, p. 2).

Between 2005 and 2012, the proportion of men who drank alcohol in the week before being interviewed fell from 72% to 64%, and the proportion of women fell

from 57% to 52%. Furthermore, between 2005 and 2012 there was a fall from 22% to 14% in the proportion of men who were frequent drinkers (those who drank alcohol on at least five days in the week before being interviewed), and from 13% to 9% in the proportion of women. In 2012, people aged 65 and over were most likely to have drunk frequently, both men (23%) and women (14%). Young people (those aged 16 to 24 years) were more likely to have drunk very heavily (more than 12 units for males and 9 units for females) at least once during the week (27%), with similar proportions for men (26%) and women (28%). Only 3% of those aged 65 and over were very heavy drinkers. However, in 2002 it was estimated that 27% of men and 17% of women drink in excess of the recommendations (Raistrick, 2005). Raistrick goes on to claim that 7% of males and 3% of females are drinking.

Among adults who had drunk alcohol in the last week, 55% of men and 53% of women drank more than the recommended daily amounts, including 31% of men and 24% of women who drank more than twice the recommended amounts.

According to Health and Social Care Information Centre (HSCIC, 2015), between 2005 and 2012 the proportion of men who drank alcohol in the week before being interviewed fell from 72% to 64%, and the proportion of women fell from 57% to 52% in Great Britain.

In 2012, 43% of school pupils (aged 11-15) said that they had drunk alcohol at least once. This continues a downward trend because in 2003 61% of the pupils interviewed had drunk alcohol.

In 2012-2013, there were an estimated 1,008,850 hospital admissions related to excessive alcohol consumption where an alcohol-related disease, injury or condition was the primary reason for the admission or was a secondary diagnosis. The alcohol-

related admissions were estimated at 1,008,850; however, the rate of alcohol-related admissions varied regionally from an estimated 2,500 per 100,000 in the North East region to 1,500 admissions per 100,000 in South East region. All rates, to allow meaningful comparisons, are age and gender standardised.

In 2012-2013, there were an estimated 325,870 admissions where the primary diagnosis or external causes recorded in secondary diagnoses were attributable to the consumption of alcohol.

In 2013, there were 183,810 prescriptions written (in a primary care setting or NHS hospital) for the treatment of alcohol dependency and dispensed in the community. The Net Ingredient Cost (NIC) of these prescription items in 2013 was £3.13 million, which was an increase of £0.2 million since 2012 and just over double the NIC in 2004 of £1.51 million. In 2012, there were 6,490 alcohol-related deaths. This is a 19% increase from 2001 (5,476), but a 4% decrease from 2011 (6,771).

Alcohol-related harm in the UK. Alcohol-related harm is one of the major public health and social concerns in the UK. Over the last 20 years, per capita alcohol consumption has risen remarkably, and also binge drinking has increased. Alcohol-related harms, including family breakdown, social disorder and crime, lost productivity, and health harms, such as rising incidence of liver disease and alcohol-related hospital admissions, increased substantially. Special involvement has focused upon alcohol and young people, with levels of youth binge drinking in the UK among the highest in Europe. Moreover, alcohol-related hospital admissions of young people increased. Additionally, young people's drinking behaviour is a strong predictor of alcohol dependence in their later life and has a role in long-term health-related harms.

Accordingly, there has been increased attention paid to factors that may influence young people's drinking behaviours (HM Government, 2012).

A study showed that the last decade had a 20% increase in alcohol consumption in the UK (HM Government, 2012). Additionally, research indicates that alcohol consumption amongst young women has sharply risen to the point where it is now almost as heavy as young men's alcohol consumption (Reynolds et al., 2004). Furthermore, this tendency has been shown in binge drinking with young girls now reporting higher levels than their male peer (Cosco et al., 2013). The UK now has one of the highest recorded rates of binge drinking and associated harm in the whole of Europe (Danielsson et al., 2012, Makela et al., 2001). Alcohol consumption in the UK, at both personal and social levels, is associated with a broad range of social and health problems (Klingemann, 2008; WHO, 2014).

Alcohol Consumption in England

65% of hospital admissions (651,010) were due to conditions, which were categorised as partly attributable to chronic conditions, and 6% (60,830) were for conditions categorised as partly attributable acute conditions. Males were more likely to be admitted to hospital with alcohol-related diseases, injuries and conditions than females, with 65% of the overall admissions being male patients. However, among people who were under 16, the opposite was true, with females being more likely to be admitted to hospital with alcohol-related diseases, injuries and conditions than males, with females accounting for 55% of all admissions, there were 1,890 alcohol-related hospital admissions per 100,000 of the population in England (WHO, 2014).

Additionally, in England in 2012 there were 6,490 alcohol-related deaths. This was a 19% increase from 2001 (5,476) but a 4% decrease from 2011 (6,771). The

number of male deaths decreased from 4,498 in 2011 to 4,230 in 2012, and the number of female deaths decreased from 2,273 in 2011 to 2,260 in 2012.

Alcohol Consumption Trends in the UK

Changes in drinking cultures and consumption typologies have been particularly marked in the UK. Alcohol consumption in the UK has been rising steadily since the 1950s, from 3.9 litres of pure alcohol per capita to a peak of 9.4 litres in 2005. This increase in consumption has been especially evident during the last decade with a 23% increase in consumption (HM Government, 2012). Since 2005. there has been a slight tailing off of the increase in per capita consumption levels to 9.1 litres in 2006, 9.2 litres in 2007 and 8.9 litres in 2008, a 6% drop since 2004 ([2]BBPA, 2009) [2]. However, recent results show that the UK alcohol consumption fell in 2013 to the lowest level of this century (BBPA, 2009). In 2013, alcohol consumption per capita decreased by 1.7 per cent from 2012. The new results show a strong downward trend in consumption in the past decade, with per capita consumption down a substantial 18.1 per cent since 2004. Nonetheless, this does not account for unrecorded consumption from illicit alcohol supplies and home brewed alcohol. An estimate of the illicit alcohol market showed an increase in 2008, for example spirit‘s from 5% to 6% (BBPA, 2009).

Binge drinking in the UK. The UK has one of the highest recorded rates of binge drinking and associated harm in the whole of Europe (Romelsjo et al., 2014). Using a proxy for the number of people who drank more than double the recommended daily guidelines of 3-4 units for a male and 2-3 units for a female, it

[2] British Beer and Pub Association (BBPA)

was estimated that 5.9 million adults drink above this level in the UK (HM Government, 2012). However, it is not only an increase in consumption that causes concern, but the way that people consume alcohol. Binge drinking has increased dramatically in the UK, especially among younger people. This has led to the UK being labelled as Binge Britain (Plant & Plant, 2006). Using a five-drink, 30-days definition, more than half of 15-16 year olds in Britain binge drink; the fourth highest level in Europe, and 57% report intoxication in the last 12 months (Romelsjo et al., 2014).

Youthful drinking in the UK. The level of youthful drinking in the UK rose considerably during the 1990s to 28% of all 11-15 year olds in 2001, before levelling off in the last few years, to 21% in 2006 (White, 2009). In Scotland, there was a 60% increase in reported drinking among 15 year olds, and more than a 100% rise among 13 year olds during the period 1990-2002 (HM Government, 2012). Although overall rates of consumption have fallen slightly since 2004, the amount consumed by those aged 11-15 who do drink has increased in recent years, from 5.3 units per week in 1990 to 14.6 units in 2008 in England (Stock at al., 2009), with the equivalent figure in Scotland of 14.5 units in 2006 (Black et al., 2011).

Data from Scotland shows a slight decrease for alcohol in units consumed by adolescents per week. This takes into account adjustments made for the new conversion factors for calculating consumption, which were introduced in 2008. For 15 year olds, the average number of units consumed was 18 in 2008 (14 units, using the old conversion factors), compared to 16 units in 2006. For 13-year olds, the corresponding figures are 16 units per week in 2008 (12 units using the old conversion factors) compared to 13 units per week in 2006 (Black et al., 2011).

The financial costs of alcohol-related problems in the UK. The financial costs of alcohol-related problems to the UK, and in particular Scotland, are extremely high. In England alcohol-related harm was estimated to cost the National Health Service (NHS) £2.7 billion in 2006-2007 (Department of Health, 2008), with the total cost to the UK economy, including crime and lost productivity, estimated to be as much as £25.1 billion per year (Department of Health, 2008). However, recent results show the estimated cost of alcohol harm to society is £21 billion per year. Information on estimated cost to the NHS of alcohol misuse shows that it costs £3.5 billion every year, which is equal to £120 for every taxpayer. These updated assessments take into account increases in unit costs as well as more recent and accurate data on alcohol consumption and harm. Harmful use of alcohol may also bring significant social and economic costs on society. For example, alcohol-attributable costs have been estimated at about 125 billion euros in the European Union for 2003, 21 billion pounds in 2009 in the United Kingdom of Great Britain and Northern Ireland, and 233.5 billion dollars in 2006 in the United States of America. Such social costs attributable to alcohol represent from 1.3% to 3.3% of the gross domestic product of these countries. Even when intangible costs are omitted, these costs are substantial, not only in comparison to the gross domestic product, but also in relation to the costs associated with other risk factors. In the Republic of South Africa, the estimates made of the combined tangible and intangible costs of harmful use of alcohol to the economy reached nearly 300 billion rand or 10–12% of the 2009 gross domestic product (Health Social Care Information Centre, 2014).

In Scotland, alcohol-related problems were estimated to cost £2.25 billion during 2006-2007; £405 million to the NHS, £170 million to Social Work Services,

£385 million to Criminal Justice and Fire Services, £820 million in Wider Economic Costs and £470 million in Human/Social Costs (Health Social Care Information Centre, 2014).). The extent of alcohol-related harm has led alcohol to be described as more harmful than heroin (Nutt, 2014).

History of Problematic Alcohol Consumption

The modern term ‘alcohol’ is generally said to have entered into the English language around 1543 from the Arabic language (Irvin et al., 1995). However, Magnus Huss, a Swedish physician who used the term to describe the aversive consequences of drinking alcohol (as cited by Miller & Hester, 1995; Viktor, 2009), introduced the term “alcoholic” in the mid-1800s. Up until that time, it was believed that the individual was personally responsible for the decision to drink. Excessive consumption and problematic consequences were viewed as the individual’s responsibility and under his or her own control; thus, such excess represented a moral failure of the person. There was no need perceived for administering any form of treatment for alcohol problems during this period, largely because it was believed that individuals could control their own drinking if they desired. Instead, social sanctions were imposed on people who were disorderly and exhibited problems from drinking alcohol, and intoxication was viewed as a punishable crime (Rychtarik et al., 2000).

It was believed that alcohol consumption was extremely dangerous, and there was no assured standard level of drinking for anyone who chose to use the substance. Therefore, drinking alcohol was considered harmful to everyone, and as a result, consuming alcohol became prohibited by law.

Alcohol and legalization into society. Following the legalization and reintroduction of alcohol into society, the disease model dominated. Although it was

still stressed that alcohol was related to many problems, not everyone was destined to become an alcoholic; only those people who were predisposed to the illness because of biological or dispositional factors were considered to be affected. People who were believed to be alcoholics were considered physically and psychologically vulnerable, and they differed from normal individuals. Efforts to intervene involved determining who displayed these traits and ensuring that these individuals remained abstinent from alcohol (Caetano, 2008; Crawford, 2016). For those who did not share the disease view of alcoholism, however, it was considered safe to consume alcohol; therefore, moderation was an acceptable alternative.

Among those individuals who were believed to be "alcoholics," the confrontational approach was regarded as one of the standard modes of therapeutic intervention to treat alcohol-related problems, despite its lack of empirical support. The idea of 'alcoholism' as a disease also grew during the nineteenth century, with many European countries developing homes or asylums to treat "alcoholics".

Summary

According to WHO (2014), approximately one billion people in the world consume alcohol. Alcohol, in fact, is the second most widely used drug worldwide psychoactive drugs after caffeine. In the UK, National Health Service statistics suggest that over 69% of men and 55% of women over 18 drink socially, as defined as having at least one alcoholic drink per week (NHS, 2011).

Among young adults, the incidence of harmful drinking is comparatively higher. The prevalence of hazardous drinking in women is highest at ages 16 to 19 (23%) and in men, at ages 19 to 24 (63%), according to the Office of National Statistics (ONS

2005). This is especially concerning when it is considered that in Europe, over 35% of male deaths between the ages of 15 to 29 are alcohol-attributable (WHO, 2014), and over 320,000 of the 2.5 million annual deaths are individuals aged 29 and under. A large proportion of young adults who attend university in the UK (61% of male, 48% of female) drink more than the recommendations put forward by the Department of Health (Mok et al., 2013). With specific regard to university students, the pattern of increased harmful drinking is driven largely by alcohol binging. Again, a significant proportion of young adults are aged 16 to 24, comprising 42% men and 39% women. Alcohol is a major part of the social, cultural and economic life of European citizens, with the countries of Europe dominating the global alcohol market. Europeans are employed in the production, sale, and advertising of alcoholic drinks, and many European governments collect more than 1% of their tax income from excise duties on alcohol.

The Department of Health (2008) reports that the average weekly alcohol consumption is 9.2 units for females and 19.9 units for males (1 UK unit = 25ml of a standard spirit = 8 grams of pure alcohol). Whilst the majority of adults in the United Kingdom drink alcohol, an increasing number of individuals are drinking more than was recommended by the Department Of Health under the earlier guideline: 14 units per week for women and 21 units for men. National statistics from the Information Centre for Health and Social Care suggest that 26% of men and 18% of women report drinking above these limits regularly (ICHSC, 2011). However, based on the current Government Alcohol Guideline in the United Kingdom, the units recommended for Men and Women, is 14 units per week (Department of Health, Alcohol Guideline Review, 2016).

Use, Abuse and Dependence

According to the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV), individuals can be categorized based on the severity of symptoms associated with their alcohol use. In a clinical approach, individuals referred to or seeking treatment for their alcohol use, their behaviour may be labelled as substance abuse or substance dependence. An individual's drinking behaviour that places them in the *substance abuse* category must have led to one or more of the following symptoms in the past 12 months: Failure to fulfil major obligation (e.g. absence from work) Substance use under physically hazardous conditions (e.g. driving a car) Legal problems as a result of substance use or recurrent social/personal problems due to substance use Individuals in substance dependence category must fulfil at least three of the following symptoms in the past 12 months:

Tolerance to drug effect (same amount of drug has a diminished effect or more of the substance is needed to achieve the same effect) Withdrawal Increased use over longer period of time than planned A persistent desire and/or to control substance intake Increased time spent procuring the substance or recovering from the effects Reduction of other social/occupational/recreational activities to focus on substance use And/or continued use in the knowledge that it is exacerbating a physical or psychological problem.

Alcohol abuse can be seen as a precursor to dependence, which is characterised as a physical or mental addiction to alcohol. The DSM-IV states that there can be no overlap between abuse and dependence for any specific substance, outlining a distinction between the two. A large proportion (over 30%) of heavy drinking students in United Sates fulfil the criteria for alcohol abuse (Knight et al., 2002).

Alcohol Dependence and Alcohol Abuse Disorders

Alcohol-related disorders can generally be divided into three groups: (1) those caused by direct effects of alcohol on the brain (including alcohol intoxication, withdrawal, delirium caused by withdrawal, and hallucinations), (2) disorders related to behavior dependent on alcohol (alcohol abuse and dependence), (3) abnormality with a lasting effect (including disorder lasting alcohol-induced amnesia, dementia, Wernicke encephalopathy and Korsakov syndrome). Alcohol abuse is a pattern of compulsive alcohol dependence as defined by DSM IV TR is associated with at least three major alcohol-related disturbances that occur within 12 months or these fields alcohol withdrawal, it may levying spent plenty time for alcohol, continued use of alcohol despite adverse physical or psychological follow-come, repeatedly failed to control their alcohol intake. Diagnosis of alcohol abuse is when alcohol comes into the dangerous physical conditions (e.g. during driving). Alcohol abuse and dependence are different, because tolerance and withdrawal is not included, in contrast, alcohol abuse is defined as the occurrence of negative consequences resulting from the use of repeated abuse. Alcohol abuse may lead to dependence, and maladaptive patterns of alcohol use might cause continuous and heavy consumption of alcohol, being drunk on weekends, or the inability to limit the intake of alcohol.

DSM-V and alcohol-use disorder. In DSM-V, the alcohol use disorder combines the DSM-IV categories of alcohol abuse and alcohol dependence into a single disorder called Alcohol Use Disorder (AUD) and places it on a continuum from mild to moderate to severe.

This thesis, however, does not involve clinically diagnosed samples of participants, and the purpose of the thesis is not to provide a clinical review of alcohol

consumption based on DSM. Thus, the DSM criteria for diagnosing alcohol consumption were not used in the thesis. Instead, the UK Department of Health's guidelines for healthy drinking were used as one of the possibilities for defining participants' drinking status. Chapter Five of the thesis explains this in greater detail.

Alcohol Consumption Among University Students

Until recently, little was known about the patterns of university student drinking in many parts of the world, most notably in the Arab region where cultural and religious affiliations of students have theoretically an important impact on alcohol use. Not only does the religion of Islam (most common in the Arab region) forbid the use of alcohol; in addition, many Arab countries along with some non-Arab countries forbid alcohol use by law. Despite these norms and legal restrictions, studies have revealed the presence of problems related to alcohol use among university students in Arab countries, especially among men. However, to have a comprehensive understanding of these cultural and religious factors, further studies needs to be considered. This, however, is beyond the purpose of this thesis.

Alcohol use as part of university culture. In many western countries, alcohol consumption is a common feature of university culture that may be related to perceived social benefits for students. Public health concern about alcohol consumption and associated risk behaviours in young people is increasing, especially among university students who, in some countries, appear to be at particularly high risk. Therefore, alcohol consumption is a notable concern among university students. In fact, the leading cause of injury and death among university students and young adults in the USA is reported to be binge drinking. Multiple negative consequences often occur due to heavy drinking, including academic impairment, unintended and

unprotected sexual activity, impaired driving, suicidal ideation and attempts, property damage, and interpersonal violence (Turner, et al., 2008). College presidents in the US rank alcohol abuse as the number one problem on campus (Perkins et al., 2005), and concern about heavy drinking among college students has led to national initiatives in the US to reduce the prevalence of this behaviour. (Department of Health and Human Services, 2007). First-year students in particular are overrepresented in alcohol- related injuries and disruptive behaviour (Harford, Wechsler, & Muthen, 2003).

Prevalence of Drinking Alcohol Among University Students

Studies from different parts of the world have shown that university students have a higher prevalence of alcohol drinking and alcohol-use disorders than non-university youth. This could be attributed to the well-established developmental phase university students go through, in which they are away from home, family and long-standing friendships. Throughout their university years, students pass through a phase of vulnerability (intellectually, emotionally and socially) in a new environment characterized by considerable peer influence, and often-aggressive promotion of alcoholic beverages.

An estimated two in three university students report consuming alcohol in the past month (LaBrie et al., 2011). Also national studies conducted in the United States specify that problem drinking among college students is highly prevalent, with at least 40 percent of students reporting heavy episodic or ‘‘binge’’ drinking (i.e., consuming five or more standard drinks in one sitting for men and four or more drinks for women (Orchowski et al., 2012). In contrast, relatively few studies have been conducted in

the United Kingdom on university students' drinking. Delk and Meilman (1996, cited by Cox et al., 2006) found higher rates of weekly alcohol consumption, binge drinking, and frequency of binge drinking (for those who did binge) among students at a Scottish university than had been reported for American students. However, Webb et al. (1997) found a lower prevalence of binge drinking than had been reported for either Scottish or American students. One study conducted at Bangor University (Cox et al., 2006) has shown a mean of 12.50 units of weekly alcohol consumption among Bangor University students. Unfortunately, the situation does not seem to be improving. Alcohol consumption by university students has changed little over the past decade (Johnston, 2010). Moreover, a national prevalence survey study revealed that nearly 32% of college students met DSM-IV criteria for alcohol abuse and approximately 6% of college students met DSM-IV criteria for alcohol dependence (Knight et al., 2002). Most importantly, research indicates that college students tend to have higher rates of alcohol abuse (Slutske, 2005) and alcohol dependence (Dawson, Grant, Stinson, & Chou, 2004) than young adults not in college.

Alcohol consumption: short- and long-term negative consequences among students. Among college students, alcohol consumption can lead to severe short- and long-term negative consequences (Rosenberg & Mazzola, 2007; White et al., 2011). In the United States, every year approximately 1800 college students die because of alcohol-related injuries; 599,000 students are injured due to drinking; 696,000 students are assaulted by another college student who has been drinking alcohol; and 97,000 students are subjected to date rape or sexual assault associated with alcohol use (Hingson et al., 2008). Multiple negative consequences often occur due to heavy drinking, including academic impairment, unintended and unprotected sexual activity,

impaired driving, suicidal ideation and attempts, property damage, and interpersonal violence (Perkins, 2002).

Heavy alcohol consumption as a gateway to other drug use. Among college students, heavy alcohol consumption is also associated with increased likelihood of use of licit and illicit drugs. For example, college students who drink heavily are approximately five times more likely to use marijuana and eight times as likely to use cocaine as their peers who engage in light drinking (Arria et al., 2008). Similarly, frequent binge drinking is associated with the usage of cigarettes, marijuana, hallucinogens, and LSD during the previous year (Hingson et al., 2011). Substance use in addition to alcohol consumption is associated with a greater number and greater severity of negative consequences (Chadler et al., 2006; Lemstra et al., 2010). For example, students who binge drink and use drugs are twice as likely than those who binge drink only to ride with a drunk driver or to get into an accident (Feigelman et al., 1998) and are more likely to drink and drive, have blackouts, unplanned sex, and drug-related problems (McCabe et al., 2006). College students are usually more likely to engage in risky alcohol-related behaviours, such as drinking and driving while intoxicated, in comparison to people their age who are not attending college (Kypri et al., 2016).

Some Alcohol Etiological Frameworks

As already mentioned in the beginning of this chapter, alcohol use like other complex human behaviours is multiply determined (Cox & Klinger, 2011). Therefore, to have a comprehensive understanding regarding the development and maintenance of alcohol use and misuse, multidimensional frameworks such as psychological theories have been developed within last few decades. These theories ought to account for the

dynamic interaction between personality (McEvoy, Stritzke, French, Lang, & Ketterman, 2004), motivational mechanisms (Cox & Klinger, 1988, 2004, 2011), and affective regulation (Cooper et al., 1997). This approach to the study of alcohol use generates questions that are more theoretical and has better predictive utility. However, a comprehensive review of the advantages and disadvantages of each model is beyond the aim of this thesis. Thus, in the next part of this chapter a brief overview of several models, which are closely related to the purpose of this thesis, is presented.

Information Model

The core aspects of this model are simple. Implicit in information models is the perspective that alcoholism is the result of a deficit in knowledge about the harmful effects of alcohol or excessive drinking (Hester et al., 1990). Hence, on people become aware of how alcohol can damage them, their family unit, and society, they will reduce their alcohol intake or abstain completely. Prevention and harm-reduction programmes based on this model usually deliver lectures and films to various groups, such as school children, college or university students, co-morbid participants, alcoholics who are not in treatment, alcoholics who are in treatment, recovering Alcoholics and offenders such as drunk drivers. Some information programmes include affective components to further encourage the motivation to change or avoid excessive drinking (Miller, 1989).

Personality and the Characterological Model

This model postulates that alcoholism is a symptom of an underlying personality disorder that disturbs or arrests normal development. Some early psychoanalysts claimed that alcoholics are immature and fixated at an early stage of

development (e.g., Strecker, 1937). In the following years, an ample number of personality traits have been considered to be associated with the initiation, development, maintenance, and subsequent relapse to alcohol use, such as extroversion, impulsivity, impulsivity, sensation-seeking, novelty-seeking, reward-seeking, sensitivity to reward, reward-dependence, neuroticism harm-avoidance, punishment-avoidance, sensitivity to punishment, and anxiety. Chapter Two reviews Cox and Klinger's motivational model of alcohol use, which proposes that personality is a distal determinant of alcohol use.

In short, regarding the personality or characterological model of alcoholism, psychotherapy is seen as being the most appropriate treatment for restructuring personality (Hester & Miller, 1989; Miller & Kurtz, 1994). Current theorists propose that substance misuse treatment programmes should consider personality traits when they are designing interventions because they can affect retention, relapse, and outcome rates (Castellanos & Conrod, 2011). Like other early models, the personality model also accounts for some of the intra-individual and inter-individual determinants of alcoholism and alcohol-related problems, but it does not explain entirely for the environmental and pharmacological factors.

Conditioning Model

Like the information model, the general principles of the conditioning model are clear and simple, in that excessive drinking is viewed as being a pattern of learned behaviour that has been acquired through reinforcement (Mackie et al., 2011). In general conditioning models, the term *enabling* refers to the possibility that those people close to an alcoholic indirectly regulate excessive drinking by removing the negative consequences (Hester & Miller, 1989).

By being a learned habit, excessive drinking can be regulated through relearning through different patterns of reinforcement (Mackie et al., 2011). Other strategies include learning new ways and skills to deal with the stressors that precede and hasten episodes of excessive drinking (e.g., coping-skills training). Learning-based prevention programmes can be used to reduce the impact of factors that promote positive alcohol associations and contingencies, which might encourage episodes of excessive alcohol use, such as advertising and two-for-one happy hours (Hester & Miller, 1989). The conditioning model considers environmental determinants of alcoholism; however, it does not include a complete overview of the inter-individual and intra-individual factors. The conditioning model, however, does consider the pharmacological and neuropharmacological aspects of alcoholism and alcohol-related problems.

Biological Models

Intervention or prevention programmes based on the biological model usually attempt to identify those who are most at risk for developing alcohol-related problems because of hereditary factors, physiological processes, or pharmacological addiction. At-risk individuals can be given generic or genetic counselling to emphasise the risk factors and encourage them to reduce, control, or abstain from drinking (Hester & Miller, 1989). Again, like the information models and personality models, biological models consider some of the intra-individual or inter-individual determinants of alcoholism and alcohol-related problems, but they fail to account for environmental factors.

Social Learning Model

The social learning model is considered by Hester and Miller (1989) to be an extension of the conditioning model of alcoholism. The social learning theory model focuses on the social context in which excessive drinking occurs. This model considers a multitude of causal factors. These include coping skills, peer pressure, the modelling of excessive drinking, positive alcohol expectancies, and psychological dependence. Excessive drinking in this model is viewed as being a strategy for altering psychological states and coping with stressors or problems. Hester and Miller (1989) consider the reliance upon a drug to alter affective states and to cope with stressors and problems as being an indicator of psychological dependence. Drinking for affective change to chemically change one's mood is addressed in Chapter 2 of the present thesis.

One of the advantages of the social learning model is that it takes the perspective that alcoholism and alcohol use are multi-determined behaviours, rather than focusing on singular determinants like the personality, and information models. The interventions that have been derived from this model include relapse prevention, coping skills training, emotion regulation training, and strategies for altering a person's relationship with his or her environment, and cognitive restructuring, which can be used to weaken positive associations with alcohol (e.g., expectancies). Prevention programmes can focus on the antecedents in the environment that promote positive alcohol associations, provide heavy-drinking models, or which promote the use of alcohol to alter psychological states and cope with stress (Hester & Miller, 1989). This model, however, does not fully take into account the pharmacological aspects of alcohol use.

Sociocultural Model

The focus of the sociocultural model is social and sub-cultural drinking norms; thus, the more alcohol a society or sub-group drinks the more alcohol-related problems it will encounter (Hester & Miller, 1989). Another key tenet of the model is that the environment in which an alcoholic tends to drink will have a direct influence and impact on how much alcohol that person will drink. For example, if the environment promotes drinking the alcoholic is more likely to drink than not to drink. Other social and cultural determinants include: the level of social distress among deprived and non-deprived socioeconomic groups, alienation, social and cultural encouragement and punishment for drunkenness, general societal attitudes towards the pros and cons of alcohol, and the symbolic or functional importance of alcohol within a society or a sub-group (Hester & Miller, 1989).

Public Health Model

Public health researchers have viewed alcoholism and alcohol use has multi-determined behaviours (Ashley et al., 1978). The public health model considers the interactions between three fundamental factors: (1) the agent (ethanol or alcohol), (2) the host (the alcoholic or alcohol abuser), and (3) the environment, such as family, social, cultural, and socioeconomic factors (Hester & Miller, 1989). Agent factors include the cellular actions of alcohol, how alcohol damages the human body's vital organs, and the interactions between alcohol and other disease processes (e.g., diabetes). The host factors include biological, social, and psychological determinants that are said to influence and mediate drinking (e.g., genetic predispositions, personality psychopathologies, positive alcohol expectancies, and drinking motives). Lastly, one of the most important environment factors is sociocultural drinking norms, as proposed by the sociocultural model. Like this model, the public health model also

advocates that the availability of alcohol should be controlled and reduced (Hester & Miller, 1989).

To sum up, multidimensional models of alcoholism like the public health model are now considered by most current addiction researchers to play an important part in the development of prevention and treatment programmes for alcoholism and alcohol-related problems. Hester and Sheeby (1990) claimed that numerous interventions could be derived from this model, such as opportunistic brief interventions, public health campaigns, reducing the availability of alcohol or increasing the taxation on it, harm reduction strategies, and alcohol screening programmes.

Although these early models are unitary in nature, they identified factors that are now considered to be integral components of multidimensional biopsychosocial models, such as the public health model and Cox and Klinger's (1988, 1990, 2004, 2011) motivational model of alcohol use (reviewed in detail in Chapter 2).

Conclusions

This chapter discusses to what extent alcohol consumption among other drug use is a major concern and has multiple effects on not only individuals but also societies. Alcohol consumption is also one of the main public health concerns in many countries. In addition, alcohol production and consumption is as old as human civilisation. It is not just today's modern societies that have had to deal with some people's tendencies to consume excessive amounts of alcohol and experience alcohol-related problems. Furthermore, studies from different parts of the world have shown that university students have a higher prevalence of alcohol drinking and alcohol-use disorders than non-university youth. Among college students, heavy alcohol consumption is also associated with increased likelihood of use of licit and illicit drugs. To have an understanding regarding the development and maintenance of

alcohol use and misuse, several models such as the information model, personality or characterological model, conditioning model, biological model, social learning model, sociocultural model, and public health model were briefly discussed. The motivational model of alcohol use (Cox & Klinger, 2004, 2011) as a multidimensional model is discussed in Chapter Two.

Structure of the Thesis Chapters

The thesis comprises six chapters. The thesis contains three empirical studies in all of which participants were undergraduate students at Bangor University. Chapter One starts with generally pointing out that alcohol use is a public and societal concern and then some explanations regarding university' students alcohol consumption are discussed. Chapter Two comprises a literature review on self-regulation, Cox and Klinger's (2004, 2011) motivational model, impulsivity, and inhibitory control. The first empirical study is presented in Chapter Three. The first study used survey methodology to assess the relationship between self-regulation, motivational structure and alcohol use. Study Two is discussed in Chapter Four of the thesis. Study Two was an experimental study, which assessed students' performance on a concept-identification task. Study Three as the final study is placed in Chapter Five. The last study employed a Go/No Go task to study students' inhibitory control and how it was related to their drinking status (light and moderate drinkers compared with heavy drinker). Impulsivity and working memory capacity were also assessed. Chapter Six contains a general discussion and summery of the results regarding the three studies that were conducted.

CHAPTER TWO

Alcohol-Related Theoretical Considerations:

Self-Regulation, Motivational Structure, and Impulsivity

As discussed in detail in Chapter One, generally alcohol consumption is considered not only a public concern in most societies around the world, but it is also a major concern among university students. It was also pointed earlier in Chapter One that researchers by considering different approaches try to determine which factor(s) is (are) most closely related to alcohol consumption; however, as noted earlier, alcohol consumption alongside other addictive drugs is a multidimensional behavior. Thus, having a comprehensive approach toward understanding etiology needs to be emphasized. Individuals drink alcohol for their own reasons. There are different reasons or motives to drink which can vary from one person to another. For some people, it could simply be to change their mood chemically from bad to good or from good to even better. Nevertheless, to have a comprehensive understanding regarding the development and maintenance of alcohol use and misuse, multidimensional frameworks such as psychological theories have been developed within the past several decades. Several studies have shown, for instance, that many health problems and mental disorder are caused by multiple psychosocial and emotional factors (Cooper et al., 2000, 2003, 2010).

Chapter overview. The chapter is separated into sections, which presents an overview of two key theoretical perspectives that seek to explain the multiple

factors affecting human behaviour. The first theoretical perspective, Self-Regulation Theory (Baumeister & Vohs, 2004, 2011), considers the capacity that people have in the face of changing life circumstances. The second theory, the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1990, 2004, 2011), was designed to explain the many variables that contribute to individuals' motivation to drink or not to drink alcohol on a particular occasion. This is considered to be a complex and dynamic process. These theories are complementary in many respects; the motivational model of alcohol use considers the variables explored in the self-regulation theory as being some of the key determinants of the person's decision to drink or not to drink alcohol. Therefore, from this point of view, one's ability to self-regulate could certainly be a part of the motivational pathway that leads to the decision to drink or not to do so.

In the next sections, self-regulation as one of the main explanations of psychological factors related to addiction will be discussed. Within this theoretical perspective, addiction has been interpreted as a lack of self-regulation. However, different researchers because of their research purpose have used various terminology, such as self-control, self-management, and self-regulation as similar concepts. Next, goal pursuit as a major part of self-regulation is discussed. After that, motivation from different points is presented in the context of Cox and Klinger's motivational model. Then, the motivational model of alcohol consumption is itself presented. After that, in the last several sections of the chapter, impulsivity, self-regulation, and inhibitory control are discussed. A review of the literature on alcohol is presented separately in Chapter One; however, other variables and constructs which are relevant for the three empirical studies conducted for the thesis are discussed in this chapter.

Addiction: A Lack of Self-Regulation?

To explain addictions, models have been developed that take into account multiple factors, such as biological, social and psychological ones. As discussed earlier, addiction is multifactorial with complexity of complexity of contributing factors. However, as in addiction, person (addicted) is the most one whom is involving in addition procedure, considering the individual factors are important. Several studies have shown that many health problems and mental disorders (alcohol-related problems is one them) are caused by psychosocial and emotional factors (Cox & Klinger, 2011). A problem in self-regulation (for example, having low self-regulation) can cause a dysfunction in the motivational system and lead to loss of control and consuming too much alcohol.

DSM-V considers loss of control as one the most important factors related to alcohol abuse and alcohol dependency. In addiction or the drug dependency cycle, having 'loss of control' (or low self-regulation) is a major risk factor. The following subsections of the thesis discuss self-regulation and motivational factors (such as motivational structure) as two psychological explanations for alcohol-related problems.

As stated above, there are two important psychological considerations related to alcohol consumption that this thesis focuses on. The first of these is self-regulation, which has been defined as "the capacity to plan, guide, and monitor one's behaviour flexibly in the face of changing circumstances" (Brown, 1998, p. 62). Self-regulation skills prepare individuals for goal-directed behaviour; they allow individuals to delay

gratification in the short-term for attaining desired outcomes. Some people use alcohol for changing their mood from negative to positive, and they perceive that by consuming alcohol their mood will be improved. By consuming alcohol, they want to chemically manipulate their affective states. However, someone with self-regulation skills does not need to use alcohol as a regulator. Carey, Carey, Carnrike, and Meisler (1990) found that heavy-drinking college students received lower scores on a general measure of self-control than did light or moderate drinkers, and infrequent drinkers and abstainers received the highest scores on the self-control inventory. There was also evidence that lower scores on the self-regulation inventory were associated with heavier drinking (e.g., more drinking days, larger number of drinks per occasion) and greater likelihood of having alcohol-related problems.

The second consideration is motivational structure. According to Klinger and Cox (2011, p. 4), motivation is defined as ‘’the internal states of the organism that lead to instigation, persistence, energy, and direction of behaviour toward a goal.”

Most of this chapter discusses in detail self-regulation, motivational structure and their relationship to alcohol consumption.

Self-Regulation versus Self-Control

Different authors have viewed self-regulation and self-control in different ways. Some of them have regarded self-regulation and self-control as the same concept. However, for some researchers (for example, Carver & Scheier, 1982) self-regulation has a broader meaning, and self-control is a subcategory of it**.** Furthermore, in some studies, the term “self-control” has been used to refer to volitional behaviour, or behaviour whose initiation is at least partially conscious. In fact, self-regulation

involves both conscious and automatic processes, whereas self-control involves conscious, or executive, management of behaviour. On the other hand, several researchers have used self-control interchangeably with "self-regulation" (e.g., Baumeister & Vohs, 2011). Accordingly, in this thesis a decision was made to consider self-regulation and self-control interchangeably.

Self-Regulation

Self-regulation is an essential approach for understanding human development. Self-regulation is the ability to facilitate one's behaviour to achieve one's goals. To attain their goals, people employ self-regulation to move towards reference points that they value and away from undesirable reference points. According to Miller and Brown (1991), self-regulation contains seven dimensions: (1) informational input which people receive from the environment; (2) self-monitoring current progress goal, which is based on comparing information input with personal goals, norms, and expectation; (3) motivation for change if a discrepancy is found; (4) commitment to reach the change goal; (5) development of a plan to reach the personal goal, particularly for the pursuit of long-term goals; (6) work according the plan, and (7) re-evaluation of the plan (Neal & Carey, 2005). What occurs during this behaviour modification process can happen quickly and without conscious awareness, for example, an automatic processing, as in overlearned behaviours, such as driving a motor vehicle or with conscious awareness and intention in controlled processing.

Self-regulation is not only useful for normal behaviour, such as learning a new procedure, but also for abnormal behaviour, such as an addictive behaviour. What is

happening in an addictive behaviour is a result of failure of one or more self-regulatory steps, which normally protect the person from harm. People need to direct their actions in order to achieve desired outcomes. For example, in order to lose weight, quit smoking, or improve a relationship with a partner, people regulate their behaviour. Studies have showed that losing control and failure to self-regulate has a fundamental role in the majority of social problems, such as drug and alcohol abuse (Baumeister, Heatherton, & Tice, 1994).

Accordingly, people with low generalized self-regulatory capacity would be expected to be less capable of developing adaptive goals and monitoring their current status toward those goals than people with higher self-regulatory capacities. This is because self-regulation refers to the effortful ability to plan and achieve adaptive outcomes through goal-directed behaviour, often by delaying gratification (Carver & Scheier, 1982). From a cognitive control point of view, self-regulation is employed through the overlapping mechanisms of task motivation, task monitoring, and operating processes (i.e., activation of brain-based circuits; Robinson, Schmeichel, & Inzlicht, 2010). Thus, people's self-regulation helps them to move towards valued goals as they monitor their progress. In addition, people's motivation prepares them to care about meeting a given standard. A healthy motivational system is needed in order to help people to delay gratification in the short-term in order to attain longer-range desired outcomes. Cox and Klinger (1988, 2004, 2011) introduced a motivational construct, which they call motivational structure and which can be either adaptive or maladaptive. This concept is explained further in the chapter.

Self-Regulation Defined

The first part of the word *self-regulation*—self—is not easy to regulate as everyone has a unique set of feature and tendencies. Thus, having a single model of self-regulation is neither realistic nor appropriate. Regarding defining self-regulation, there are several consideration from different authors' points of view. For example, Fitzsimons and Bargh (2004) define self-regulation as the capacity of individuals to guide themselves, in any way possible, toward important goal states. Also, according to Brown (1998, p. 62) self-regulation is "the capacity to plan, guide, and monitor one's behaviour flexibly in the face of changing circumstances". This thesis uses Brown's definition of self-regulation.

Goal Pursuits and Self-Regulation

Goal pursuits are a major part of self-regulation. A goal is something that an individual aims to reach or to get away from through actions, which should be attained usually within a specified time (Kruglanski, 1996, p. 60). The goal that an individual is pursuing might be either short-term or long-term (Kanfer & Ruth, 1991).

Although different procedures apply in the pursuit of short- and long-term goals, the pursuit of short-term goals often results in progress in the pursuit of long-term goals. Goal pursuits require an individual's intention, strategy, target, and action in order for the goal to be achieved (Shim et al., 2012).

Goal Setting

An individual's decision to work consciously towards a goal starts with goal setting. The process of setting goals is fundamental for individuals' motivation, choice of activities, persistence, strategies, and progress monitoring (Schunk & Dale, 2013). Goal setting also regulates the standards for people to assess their actions (Bandura, 1986). Throughout the learning process, goals direct individuals' attention

to the most appropriate task features, lead them to take better ways of explaining difficulties, develop attempt, and increase their endurance (Locke & Latham, 1990). Goals are beneficial in helping individuals to find out the distance between their current performance and the goal they intend to reach. Reaching goals or at least making progress toward achieving goals will enable individuals to feel more confident in their ability to conduct similar activities (i.e., will increase their self-efficacy) and will lead to more motivation toward pursuing similar goals (i.e., intrinsic motivation) (Schunk & Dale, 1995). A discrepancy between present performance and the goals, which were previously set, may cause people to increase their attempts, regulate their approaches, seek assistance, or engage in other adaptive activities (Locke & Latham, 1990).

Despite the benefits provided by goals, just having a goal does not end up enhancing performance. Many studies have found that people try harder to achieve goals that they perceive to be difficult than goals that they perceive to be easy (Locke & Latham 2002). When goals are clearly specified, enhancing goal-related behaviour is also easier than having nonspecific goals. Difficult goals are more motivating than general 'do your best' goals. For example, a specific goal such as writing one page daily will be more motivating and tangible for a PhD student who is writing his thesis than a general goal to 'improve writing up!' In Goal Setting Theory, the importance of feedback on performance is also emphasised. People use information attained from progress in relation to their goals to make decisions about future goals.

Additionally, goal setting is an essential part of life because it affects how individuals apply attempts, not giving up over time, or regulating their behaviours to achieve desired results (King, Harner & Brown, 2000). Goals also actuate an individual's attention to relevant task features, actions to be taken, and procedures to

be performed. Goals help an individual to concentrate on the given tasks, choose and use applicable plans and resources, monitor progress, avoid distractions, and focus on improving performance (Schunk, 2001). When individuals work on tasks, they evaluate their performance with respect to their goals, and the results of self-evaluation affect their motivation and self-efficacy.

In this regard, the perceived progress strengthens self-efficacy and sustained motivation. When individuals see a discrepancy between present performance and the current goal, they may increase their efforts, adjust strategies, seek assistance or conduct other adaptive behaviours to regulate themselves. Individuals' self-efficacy is enhanced when they attain or progress towards their goals.

Although some individuals may benefit from goal setting in many ways, simply having a goal does not automatically help an individual's performance. In fact, effective goals are determined by three properties: specificity, proximity, and difficulty (Locke, Shaw, Saari, & Latham, 1981). Goal proximity applies to temporal aspects of goals (Lock & Latham, 1990). Based on how far goals project into the future, goals can be classified into two categories: proximal and distant goals. Proximal, short-term and reachable goals lead to higher motivation and improved self-regulation than distant and long-term goals, which can be achieved only in the distant future (Bandura, 1997; Boekaerts et al., 2000; Locke & Latham, 1990). Proximal goals boost self-efficacy because they allow frequent and unambiguous self-monitoring and self-evaluation of progress. Compared with proximal goals, distant goal are difficult to use when gauging goal progress and, in turn, do little to promote self-efficacy (Schunk & Dale, 1995). Individuals benefit more from having proximal goals.

However, it is important to note that a distant goal may appear alongside a proximal goal if the proximal goal is divided into a series of sub-goals (Locke & Latham, 1990). On the other hand, goals that an individual perceives as easy to attain do not motivate the person (Johnson & Graham, 1990).

Generally, as stated earlier, complex goals demand that individuals make a greater attempt to achieve them than less difficult ones. However, individuals are unlikely to attempt goals they view as too difficult or impossible to attain. On the other hand, individuals, when facing difficult goals, may initially feel unsure about whether they can reach them; nevertheless, working towards and attaining them boosts self-efficacy (Schunk & Dale 1990).

Self-Set versus Assigned Goals

Some studies investigating the effects of self-set goals show that allowing individuals to set their own goals improves motivation and self-regulation, possibly due to the higher level of commitment related to self-set goals (Schunk & Dale, 1995). Other studies do not support this conclusion by showing that assigned goals are as effective as self-set goals (Locke & Latham, 1990). Schunk et al. (2007) explained that when individuals accept the legitimacy of assigned goals and commit themselves to attaining them, the benefits of assigned goals could be as strong as self-set goals. Furthermore, Zimmerman et al. (2015) hypothesized that self-set goals would produce greater self-efficacy and better self-regulated performance than assigned goals, only when individuals have mastered how to set appropriate and realistic goals conference-only and control conditions.

Goals and Self-Efficacy

Self-efficacy refers to people's beliefs in their capacity to learn or to perform at a certain designated level. Individuals with high self-efficacy about their performance

are likely to achieve significantly more than individuals with low self-efficacy (Zimmerman & Barry, 2008). As soon as individuals find themselves making progress toward and/or reaching their goals, they feel more self-efficacious, consider the subject to be more enjoyable, and value similar activities to a greater degree (Locke & Latham, 1990). Subsequently, they may plan more challenging goals for their consequent activities (Bandura & Schunk, 1981).

When individuals make acceptable improvements compared to their accepted ideals (i.e., goals), they feel self-effective and more confident in their capability to perform tasks. Next, they may continue to make efforts, focusing on the tasks, and regulating their activities to overcome difficulties with the tasks. In their future performance, individuals may set more goals that are challenging and plan their actions more deliberately. After making progress in their performance and increasing their knowledge about some subject areas or activities, individuals may feel more satisfied with their performance, and may also apply and generate more adaptive strategies to improve their learning in other activities (Pretz et al., 2009).

Goal Pursuits and Motivation

The majority of research on goals that has been discussed so far in this thesis concerned goal setting and goal content (different goals on different dimensions of interest, for example, specific vs. vague goals, proximal vs. distal goals) rather than with goal striving. However, for attaining the goal, it is people's level of motivation (need or drive to attain the goal) that determines their success (Ajzen, 2002; Rogers, 2008).

Motivation from Different Points of View

The research on motivation has a long history in psychology. During development of this concept, many different theories and approaches have been

developed, such as motivation, goal theory, achievement motivation, expectancy-value models of motivation, and self-regulated learning (Atkinson & Feather, 1966; Covington, 2000; Cox & Klinger, 2011). Many early motivation theories explained motivated behaviour in terms of drives, instincts, and internal traits, such as the basic need to succeed or to avoid failure (Cox & Klinger, 2011) However, more recent motivational theories explained motivation in accordance with goal pursuits. (See Cox & Klinger, 2011).

Definition of Motivation

As stated, there are several points of view about explaining motivation. As a result, there are varieties of definitions of motivation. Here we discuss just a few of the definitions to find out one that is most applicable to this thesis.

According to Pintrich and Schunk (2002, p. 5), "Motivation is the process whereby goal-directed activity is instigated and sustained".

The Corsini Encyclopaedia of psychology (2010) defined motivation as a process of instigating, sustaining, and directing psychological or physical activities, including internal forces, such as impulses, drives, and desires.

Cox and Klinger (2004, 2011) defined motivation as the internal states of organisms (humans or animals), which lead to initiation, persistence, energy, and direction of behaviours towards specific goals. Cox and Klinger's Motivational Model of Alcohol Use is discussed in this thesis, and their defined of motivation is most applicable for the purpose of this thesis. According to Cox and Klinger (2004, 2011), the successful pursuit of goals is not just the most important thing in the life of humans and animals; it is eventually the only factor that helps to carry on being alive. As Klinger (1977) stated, a current concern is a dynamic motivational state that starts with setting a goal that will direct the goal-pursuit. Next sections explained current

concern in detail. In addition, Cox and Klinger (2004, 2011) considered goal pursuit as the state of an individual between becoming committed to a particular goal and either attaining the goal or quitting the pursuit. Incentives are defined as potential goals, i.e. the objects, events, or circumstances through which a person expects that their realization will result in a desirable affective change (Cox & Klinger, 2004). Generally, people are motivated either to acquire positive incentives to achieve a positive affective change (e.g., increased pleasure), or they strive to reduce negative incentives that create discomfort.

As will be discussed later, for some people consuming alcohol works as a motivator, providing them with a positive incentive; on the other hand, for some other people consuming alcohol is a way to reduce their negative incentives. However, for both kinds of people (whether consuming alcohol to reduce a negative incentive or consuming to acquire a positive incentive), drinking alcohol is their perceived option for regulating their mood from bad to good or from good to better.

Value*Expectancy Theory and Self-Regulation

According to Value*Expectancy Theory (Feather, 1982), a choice of goals is determined because of the value and the expectancy of each alternative. To start pursuing a goal, people normally confront with different choices, however, there are two important variables determine this choice: The first is the value which individual consider for alternative and second is how likely individual consider himself to achieve this alternative (Cox & Klinger, 2011). Therefore, an individual will normally consider the alternative with the highest value-expectancy product. Thus, the probability that an object or circumstance becomes a goal (incentive)

depends on the amount and possibility of the affective change that the individual expects to derive (Klinger, 1977). It is the balance between value and cost needed to realize this value that makes an object an incentive. As stated earlier for self-regulation, people need to delay gratification in the short-term for attaining desired outcomes. So, they will evaluate the value of what they need to delay (as a short-term gratification) with the value of an alternative (as a long-term outcome) if the value-expectancy for waiting and delaying short-term gratification is higher than the alternative individual will delay otherwise will follow to get just short-term gratification. Based on this theory, for some people drinking alcohol provides such short-term gratification like changing chemically their mood immediately; thus, drinking has high value*expectancy for these people (Cox & Klinger, 2011).

Motivational Model of Alcohol Use

Cox and Klinger (1988, 1990, 2004, 2011) presented a motivational model of alcohol use. According to the model, the decision to drink or not arises from one's decision-making processes. The decision to drink is a combination of emotional and rational processes in that the decision is made based on the affective change that the person expects to achieve by drinking compared with not drinking.

As mentioned earlier, an effective goal pursuit can be described as a latent process in which individuals are sensitized to the goal-related cues and are ready to act without consciously thinking exclusively about the goal. In fact, a person does not have to be aware of either having made a decision to drink or the factors affecting this decision. In most cases, decisions about drinking are mostly unconscious and

automatized. However, this does not mean that the decision or its underlying motivational process could not be consciously reflected when individuals encounter cues, which push them to reflect on their reasons for consumption. A young female, for example, might drink to be more sociable and to better enjoy a mixed-sex party. However, when she perceives that this leads to unintended intimate contact with boys, she might stop drinking or leave the party. Cox and Klinger (1988) stress that the decision to drink is voluntary and individuals can exercise control over it.

According to the motivational model, the decision to drink or not to drink is affected by historical factors (past drinking experiences), past reinforcement from drinking, current factors, and expected positive and negative affective change from drinking. Historical factors are related to the nature of experiences with alcohol use, which influence the current motivation of individuals to drink. Historical factors have been categorised into three groups, which are biochemical reactivity to alcohol, personality characteristics, and the socio-cultural environment. Genetic predisposition of individuals can determine biochemical mechanisms regarding how individuals react physically to alcohol consumption.

Many studies have showed that personality characteristics (such as impulsivity, sensation seeking, neuroticism, non-conformity, and extraversion) are related to alcohol consumption (McCrae & John, 1992). Research that investigates personality factors related to addiction has a long and complex history. In one of these attempts regarding alcoholics, a researcher (Barbara, 1945) tried to identify the alcoholic personality. Although some personality traits such as narcissism and neuroticism, have been proposed, based on the current research there is no alcoholic personality type which directly causes alcohol problem, although there could be some

personality traits that predispose an individual to alcohol abuse or dependency (Viktor, 2009). Socio-cultural and socio-environmental factors include culture-specific drinking styles, as well as drinking habits observed in the proximal social environment, such as parents' or peers' drinking. As discussed earlier, in most European countries (included the UK), alcohol consumption is part of socializing such as at parties. In addition, studies have found that the family context provides important role models. Adolescents tend to copy their parents' heavy drinking habits, even if the negative consequences of the parents' drinking are obvious (e.g., Donaldson, Handren, & Crano, 2016). In addition, positive experiences from drinking in the past may lead individuals to be reinforced to drink in the future. For example, when faced with a choice between having a drink or not, a person with past positive experiences would be more likely than others to decide to drink. Situational factors are also related to an individual's decision about whether to drink or not. These are the features of the immediate physical environment, including whether alcohol is available and being exposed to people who might drink it. For example, at a social event individuals' drinking motive could be to gain a kind of unusual emotional effect that they are unable to obtain through non-chemical incentives. People's thoughts, perceptions, and memories as cognitive mediators indicate the nature of their expectations about the chemical and instrumental impact of alcohol use on their affect. These expectations are related to short- and long-term experiences with alcohol. For some people who want to carry on consuming alcohol, experiencing (or expecting) positive short-term effects will be an excuse for not considering the negative long-term consequences. The Motivational Model was specifically developed as a motivational approach for alcohol consumption, which also can be useful to apply to different kinds of behaviours in general (Cox & Klinger, 2011).

According to the Motivational Model, drinking alcohol becomes a potential goal (an incentive) because an individual expects an affective change from attaining this goal. Individuals generally striving for things or circumstances that will make them feel better, by either giving them pleasure or relieving their discomfort. Although the decision to drink alcohol use is volitional, individuals might not have a conscious intention to drink; nevertheless, they must be prepared to deal with goal–related cues in the environment, which might subconsciously affect them. Actually, the decision to drink is a combination of emotional and rational processes in that the decision is made based on the affective change that the person expects to achieve by drinking compared with not drinking. However, a person does not have to be aware of either having made a decision to drink or the factors affecting this decision. In many cases, decisions about drinking are actually unconscious and automatized.

The Motivation to Drink Alcohol

As stated, according to Motivational Model, the motivation for engaging in drinking arises from a variety of sources. In fact, Cox and Klinger (1998, 1999) consider the decision to drink or not as the final common pathway to alcohol use, i.e. the gateway through which more distal influences pass. According to the Motivational Model, the concept of drinking motives is based on the assumption that people drink in order to attain certain valued outcomes (Cox & Klinger, 2002). Expectancies, on the other hand, are defined as beliefs that are related to the positive or negative behavioural, emotional and cognitive effects of alcohol use.

As mentioned, according to the Motivational Model an individual decides to drink alcohol based on the affective change that he or she expects to achieve by drinking compared with not drinking. The affective change can either be related to the

direct chemical effects of alcohol, e.g., tension reduction or mood enhancement, or the indirect effects such as peer acceptance. Historical, current, situational, and cognitive factors are the basis for individual expectancies, both in terms of the chemical effects of alcohol intake, e.g., mood enhancement, and the non-chemical effects, e.g., to celebrate with friends or to enjoy meals. The expected effects can either be either positive (to enhance positive moods) or negative (to avoid or attenuate negative experiences). Accordingly, by adopting a specific reason for drinking, the decision to consume alcohol has been made. For example, people might decide to drink because it gives them a pleasant feeling or because it helps them when they feel depressed or nervous.

Theory of Current Concerns and Motivational Structure

According to Klinger (1977), a current concern is a dynamic motivational state that starts with setting a goal that will direct the goal-pursuit. When people attain their goals or give up the pursuit, their current concerns will decline. Cox and Klinger (2002) introduced the construct *motivational structure* to explain the dynamics underlying goal-strivings. This concept is discussed here in detail.

Many factors, such as genetics, culture, and the person's current situation help to form their current concerns. The unique combination of these factors determines an individual's chances of success in or failure at goal attainments. To address the dynamics underlying goal-strivings, Cox and Klinger (2002) introduced the construct *motivational structure.* A person's goal strivings (as attempts to resolve their current concerns) are influenced by a combination of factors (e.g., knowledge, commitment, emotional involvement), which influence their motivational structure. As discussed later in the chapter, it has been shown that people with an *adaptive motivational*

structure have greater success at goal attainments than those with a *maladaptive motivational structure*. A maladaptive motivational structure has been shown to reduce people's success in maintaining desirable emotional states, and it increases their decisions to resort to chemicals to regulate their mood (for example, by consuming alcohol or taking other drugs).

Incentives and Goals

The term *incentive* is central for understanding the meaning of current concern (Cox & Klinger, 1988). Simply put, incentives are objects or events that attract or repel an individual because they result in positive or negative affective changes (Klinger, 1977; Klinger & Cox, 2004); thus, incentives are valued positively or negatively. People will care about those objects, events, and experiences that are emotionally important to them (Klinger, 1977); they might try to obtain those incentives that are valued positively and to get rid of those incentives that are valued negatively.

Although incentives are objects or events that are valued, this does not mean that people will work to obtain everything that they value positively or get rid of everything that they value negatively (Klinger, 1977). For example, a person might value owning an expensive car but be unwilling to spend the money to obtain it. Although a given car is an incentive because it is valued, it is not a goal unless the individual is prepared to put forth the effort to obtain it. Similarly, a student might consider one of his habits as undesirable (for example, drinking too much at university social events), but is unwilling to change. A goal is set when an incentive becomes the target of an intended activity ("to get" or "to get rid of"). In other words, although each goal corresponds to an incentive, the opposite is not true; incentives may or may not become the object of goals.

Some incentives are associated with negative emotions, such as anxiety, stress, frustration, depression, and other negative emotions, which in turn might lead an individual to resort to maladaptive coping mechanisms (e.g., substance use, alcohol abuse) (Klinger, 1977). To regulate their feeling people normally pursue incentives that they expect will increase their positive feelings or reduce their negative feelings. If people achieve goals that bring them emotional satisfaction, they are less likely to turn to maladaptive ways of obtaining their desired emotional state.

According to Cox and Klinger (1988), "If a person does not have satisfying positive incentives to pursue or is not making satisfactory progress toward reaching goals that produce positive incentives, weight will be added to that person's expectations that he or she can better enhance positive affect by drinking [alcohol]" (p. 174).

To sum up, people may drink alcohol or use other substances to regulate their emotions chemically in two ways: to enhance their positive emotions (enhancement motives) or to reduce their negative emotions (coping motives) (Cooper, Frone, Russell, & Mudar, 1995).

Adaptive and Maladaptive Motivational Structures

Life provides opportunities for people to pursue their goals. However, it does not mean individuals will achieve all the goals that they are striving for. Failure to achieve goals can be a result of two main things: (a) sometimes external obstacles that are out of our control stop us from achieving our goals, or they make it very difficult for us to achieve them; (b) sometimes having a faulty, maladaptive motivational structure (next sections explained about this concept) inhibits the individual from

achieving his or her goals. A combination of the two reasons is also possible. Maladaptive motivation might occur because of misguided decision-making, manifested as selecting negative goals or conflicting goals, or it may occur because of the manner in which the person pursues the goals.

To measure motivational structure, Cox and Klinger (Cox & Klinger, 2004, 2011b) developed the Motivational Structure Questionnaire (MSQ). On the MSQ, participants are asked to think about various areas of their lives and to name and describe their current concerns in each area and the goal that they have (or would like to have) for resolving each concern. Only respondents' answers on the rating scales are used to determine whether the person's motivational structure is adaptive or maladaptive. The life areas include Home and Household Matters; Relationships; Love, Intimacy and Sexual Matters; Self-Changes; Finance and Employment; Leisure and Recreation; and Health and Education. The MSQ is a comprehensive measure of motivational structure, but it is lengthy and time-consuming for respondents to complete. The Personal Concerns Inventory (PCI) is a brief version of the MSQ, which is explained later in this chapter. Administering the MSQ to alcohol abusers, Cox, Blount, Bair, and Hosier (2000) identified two primary factors, which they called adaptive motivation and maladaptive motivation.

According to Cox and colleagues (Cox & Klinger, 2002, 2004, 2011; Cox, Schippers, Klinger, et al., 2002) the characteristics of people with an adaptive motivational structure compared to people with an maladaptive structure are (a) having more appetitive than aversive goals, (b) having greater control over achieving their goals, (c) emotional involvement in achieving or failure at achieving their goals, (d) greater commitment to achieving their goals, and (e) less anticipated distance from goal attainment. In several studies (Cox et al., 2000;

Cox et al., 2002; Cox & Klinger, 2002; Fadardi, 2003; Fadardi & Cox, 2002, Shamloo, 2007), participants with a maladaptive structure compared to people with an adaptive motivational structure had (a) fewer positive incentives, (b) less hope for achieving their goals, (c) less anticipated happiness from achieving their goals and less anticipated sorrow from not achieving them, (d) longer expected distances from their goals, (e) less commitment to their goals, and (f) less perceived personal control over achieving their goals. However, it should be noted that whether a motivational pattern is adaptive or maladaptive depends on relationships among the motivational indices that are derived from participants' ratings of their goals. For example, a person with a high sense of control would be expected also to have a high sense of commitment to achieving goals, or vice versa, and would be described as having adaptive motivation. A person who scores high on Commitment but low on Control would be described as having maladaptive motivation, just as would another person who is high on Control but low on Commitment (Cox et al., 2002; Man, Stuchlikova, & Klinger, 1998; Shamloo, 2007).

Alcohol, Goal-Pursuits and Emotional Regulation

As discussed earlier in this chapter, excessive drinking is considered to be a disorder of motivation (e.g. Cooper et al., 1995; Cox & Klinger, 2011, 1988; Monti, Roshsenow & Hutchison, 2000; West, 2001), in which problems with self-regulation are apparent (Lyvers, 2000; Skutle & Berg, 1987). Emotional experiences play an essential role in determining human behaviour. When faced with unpleasant emotions, people try to find ways to regulate their emotional states. Although some strategies may be helpful and do not interfere with long-term goals, other strategies may be immediately rewarding, but maladaptive in the long run (for example, drinking alcohol to feel relaxed after a bad job interview). There is

ample evidence showing that university students who drink alcohol to cope with negative emotions such as depression or anxiety are more likely to drink heavily and experience greater levels of alcohol-related problems (Park & Levenson, 2002; Kuntsche, Knibbe, Gmel, & Engels, 2006a, 2006b, 2010). On the other hand, some people consume alcohol to enhance their emotional experience, which may also lead them to problematic drinking. For example, some studies have shown that on some occasions, such as on days of celebrations, university students drink more heavily to enhance their positive mood (Cooper, Agocha, & Sheldon, 2000; Del Boca, Darkes, Greenbaum & Goldman, 2004; Goldman et al., 2011). As discussed, motivation is intertwined with goals pursuits, which, in turn, are vital to emotional regulation, specifically for increasing positive emotional experiences and avoiding negative emotions.

To summarise, motivational structure is a construct that is related to people's success in achieving their goals and their positive and negative feelings from their goal-seeking activities. Motivational structure is related to self-regulation and also related to people's decisions to drink, or not to drink, alcohol.

Motivational Model of Alcohol Use and Self-Regulation

Some people consume alcohol or take another drug to regulate their negative emotional states, as they are unable to regulate their emotions in adaptive and productive ways (Cox & Klinger, 1988; 2002, 2011). As stated, people with maladaptive motivation are more likely to have negative goals than those with adaptive motivation.

Therefore, measuring the person's motivational structure becomes important. There are several methods for measuring drinkers' motivation, some of which are as

follows: a counsellor's judgments about a client's motivation during treatment (Brown & Miller, 1993; Leake & King, 1977), open-ended questions about motivation for drinking and for change .The Alcohol Expectancy Questionnaire (AEQ; Brown, Goldman, Inn, & Anderson, 1980), and the Readiness for Change questionnaire (Heather, Rollnick, & Bell, 1993; Rollnick, Heather, Gold, & Hall, 1992). The Stage of Change Readiness and Treatment Eagerness Scale (Miller & Tonigan, 1996, 1997) was designed to measure stages of change with regard to alcohol use. The Alcohol Use Inventory (Horn, Wanberg, & Foster, 1977) also provides information about motivations for drinking and readiness for change.

As discussed earlier, Cox and Klinger (1988; 2004, 2011) introduced an indirect way to measure motivational factors underlying drinking behaviour. Based on individual differences in the way that people select and pursue goals, Cox and Klinger (2002) argued that the construct "motivational structure" is important for understanding goal-directed behaviour. According to Cox and Klinger's model, the decision to drink may be made when individuals are unable to achieve emotional satisfaction through other goal pursuits or to overcome the miseries that impede their lives. They might drink, for instance, to feel more optimistic or less anxious and depressed (Hussong, Hicks, Levy, & Curran, 2001).

A dysfunctional motivational structure likely could prevent alcohol abusers from achieving their goals in various areas of life. The more maladaptive the motivational structure compared to people with an adaptive motivational structure is, the greater will be the risk of excessive drinking, and the lower the possibility of reducing excessive drinking (Cox et al., 2000; 2002; Cox & Klinger, 2002; 2004; 2011, Shamloo, 2007). In fact, research based on the MSQ has demonstrated that maladaptive motivation is associated with excessive drinking (Cox et al., 2000, 2002;

Cox & Klinger, 2002, 2004; Fadardi, 2003; Shamloo, 2007).

In summary, people's ability to regulate their emotions partly depends on the nature of the goals that they select to pursue (e.g., family relationships vs. gambling; drug use vs. participation in sport). However, another factor that is crucial to people's happiness is their success in achieving their goals. Cox and Klinger's motivational model of alcohol use states that people's success or failure in achieving their alcohol-unrelated goals influences their decisions to drink alcohol. In turn, people's chances of success in achieving their goals depend on the pattern of their goal strivings; this pattern is called motivational structure, which can be adaptive or maladaptive. A person with a maladaptive motivational structure has lower chances of succeeding with goal pursuits than other people and, therefore, less satisfaction with his/her life. In turn, this increases the person's risk of deciding to drink alcohol in an attempt to chemically regulate his or her emotional states. For these reasons, it is crucial to identify the factors that affect people's motivational structure, and to determine whether they can be manipulated in order to change the person's motivation.

Impulsivity

Several studies have shown that impulsivity is important for understanding university students' alcohol use. For example, higher levels of impulsivity are consistently related to greater alcohol use and risk (Casewell et al., 2013; Lipetzky, 2015; Magid, MacLean, & Colder, 2007; Shin, Hong, & Jeon, 2012; Wardell et al., 2016). Also, studies have shown that impulse control is a predisposing factor that possibly leads an adolescent to try start drinking earlier and then drink more heavily over time (Fox, Bergquist, Gu, & Sinha, 2010; Papachristou et al., 2012; von Diemen et al., 2008; Wetherill et al., 2013).

Impulsivity has been conceptualized in a variety of ways, suggesting that different aspects of impulsivity may contribute to drinking patterns (Henges et al., 2012; MacKillop et al., 2007; Mitchell et al., 2013; Preston-Campbell, Rebecca, 2013). In one way, impulsivity is considered as a personality trait which is "a dimension of relatively stable individual differences in the tendency to be impulsive'' (DeYoung, 2011, p. 485) Recently, some research has suggested that the different features of impulsivity may uniquely predict different aspects of alcohol use and alcohol problems (Mullen et al., 2016; Reich et al., 2015; Schaumberg et al., 2015; Stojek et al., 2014).

As impulsivity is conceptualised in various ways, there is no commonly accepted definition of impulsivity, and this naturally leads to a variety of theories and measures too. According to Dawe and Loxton (2004), impulsivity is considered as a collective term for a range of behaviours that are rash or poorly planned, or that focus on short-term outcomes at the expense of long-term benefits. That impulsivity is a multidimensional and Reynolds et al. (2006) further explored complex construct, using a combination of behavioural measures and self-reports. In this thesis, the Barratt Impulsivity Scale was used as a self-report measure, and a Go/No Go task was used as a behavioural measure, the details of which are given in the next section. According to Hamilton et al. (2013), impulsivity partially mediates the effect of stress on drinking behaviour. Furthermore, impulsivity has a role in the relationship between depression and alcohol problems among adult college drinkers (Gonzalez et al., 2011).

Barratt Impulsivity Scale

The Barratt Impulsivity Scale **(**BIS) is a self-reported measure of trait impulsivity. Thirty statements are included in this measure, which are scored from 1

to 4, using the anchors ‘rarely, ‘occasionally’, ‘often’ and ‘always’. The BIS includes three subscales; Motor Impulsiveness, Attention and Non-Planning, and a total score is derived for each. A BIS total score can be computed by adding the scores on the three subscales to give an overall measure of impulsivity.

Disinhibition is one of the components of impulsivity. It is the inability to inhibit a pre-potent response (Logan et al., 1997). Studies have been shown that disinhibition is related to poor self-regulation, substance abuse and also alcohol-related problems (Hanif, 2013).

Go/No Go Task and Response Inhibition

The basic Go/No Go task involves the separate presentation of two different types of stimuli: Go stimuli and No Go stimuli (Fassbender et al., 2009; Murphy & Garavan, 2011). Response inhibition can be measured by the Go/No Go task (among other tasks, such as the stop-signal task). On the Go/No Go task, the participant is asked to quickly respond to Go stimuli and not to respond to No Go stimuli. The measure of inhibition in this task is commission errors, which is the number of Go responses to No Go stimuli. Alcohol/No Alcohol–related stimuli were used on the Go/No Go Task in Study Three of this thesis. Chapter Five of this thesis presents this task in detail.

There is ample evidence showing a relationship between disinhibition and alcohol problems. (Anderson et al., 2013; Fernie et al., 2013) in this regard, Goudriaanet al. (2006), in their studies that also used Go/No Go and stop-signal tasks found a deficit in inhibitory control in alcohol dependent individuals compared to controls.

Inhibitory Control, Self-Regulation and Alcohol

Inhibitory control (which is one aspect of self-regulation) is the ability to stop, delay or change a behaviour (Bickel et al., 2012; Hanif, 2013; Lopez-Caneda et al., 2014; Miller, Melissa Angelina, 2015). This construct can be measured in the laboratory using a computer task such as a Go/No Go task (Pike et al., 2013). Several kinds of evidence have shown that Go/No Go tasks can differentiate between alcoholics and controls, and between heavy and light social drinkers (Easdon et al., 2005; Houben et al., 2011; Kreusch et al., 2013, 2014; Rose et al., 2008; Weafer et al., 2012a,b). In addition, results of two studies (Jones et al., 2011a, 2011b) showed that experimentally induced fluctuations in inhibitory control could have an immediate impact on alcohol-seeking in social drinkers. In their studies, these authors explained that participants who had been primed with a restrained mental set drank significantly less beer in the laboratory, compared to participants who had been primed with a disinhibited mental set.

It has been shown that inhibitory control training can lead to less alcohol consumption. (Bowley et al., 2013, Gass et al., 2014, Laude et al., 2015) In this regard, Jones et al. (2013) studied the "effects of cue-specific inhibition training in heavy social drinkers''. Their training was based on a modified stop-signal task. The results of this study showed that training motor inhibition while alcohol-related cues were presented led to a reduction of alcohol consumption in the experimental group. Houben et al. (2011a, 2012) ran a series of studies in which participants performed a Go/No Go task in which alcohol-related and neutral stimuli were presented. One group of participants were consistently required to inhibit motor responses when alcohol stimuli were presented, but to respond rapidly to neutral stimuli; these

contingencies were reversed in a different group of participants. In both studies, Houben et al. (2011a, 2012) demonstrated that, compared to participants who had to exercise inhibition in response to neutral stimuli, participants who exercised inhibition when faced with alcohol stimuli reported drinking significantly less alcohol in the week immediately following the task. Furthermore, in the first study (Houben et al., 2011a), there was a non-significant trend for participants in the alcohol-cue inhibition group to drink significantly less beer in the laboratory compared to participants in the neutral-cue inhibition group. Recently, Pentz et al. (2016), run series of studies to improve substance use prevention with executive functioning training. Results showed emotional control was predictive of alcohol use among late-elementary school students and inhibitory control was predictive of alcohol use among students.

People who regularly take drugs or use alcohol show reactivity to stimuli related to drug administration or alcohol consumption. Increased craving or physiological arousal is often a part of this reactivity (Carter & Tiffany, 1999, McHugh et al., 2016). For example, adolescents dependent on alcohol who are exposed to their alcoholic beverage of choice report increases in subjective craving and salivation (Thomas et al., 2005, see also, Ramirez et al., 2015 a, 2015b), and exposure to alcohol advertisements increases alcohol consumption in young adults (D'Amico et al., 2016; Jones, Magee, 2011; Morgenstern et al., 2011; Koordeman et al., 2012). Reactivity to drug stimuli is explained because of classical conditioning. In the drug use procedure, stimuli such as sights and smells associated with the substance become conditioned stimuli, which can evoke a variety of conditioned responses, ultimately increasing the likelihood of drug self-administration (Rubonis et al., 1994; Sinha et al., 2011, Milovojevic, Fox, & Sinha, 2015).

Impulsivity has been viewed as relatively unchangeable during a person's people. However, it has recently been suggested that disinhibition may vary among people. In this regard, de Wit (2009) argued, "abrupt environmental, physiological or emotional events may cause transient 'state' changes in either self-control or inhibition that may result in re-initiation of drug use" (p. 28). If, then, a person's impulsivity can be changed, this offers hope for changing the maladaptive behaviours associated with impulsivity (Weafer, de Arcangelis, & de Wit, 2015).

Chapter Five presents the third study of this thesis. Study Three was designed to explore whether the relationships among the withholding response, impulsivity, self-regulation, and memory capacity are related to each other, and to drinking behaviour.

Conclusions

This chapter presents an overview of two key theoretical perspectives that seek to explain the multiple factors affecting human behaviour, including excessive drinking and the problems associated with it. The first theoretical perspective, Self-Regulation Theory, views an addictive behaviour as a result of failure of one or more self-regulatory steps, which normally protect the person from harm. It has been emphasized that losing control and failure to self-regulate plays a fundamental role in the majority of social problems, such as drug and alcohol abuse (Baumeister, Heatherton, & Tice, 1994).

The second theoretical perspective is the Motivational Model of Alcohol Use (Cox & Klinger, 1988, 1990, 2004, 2011). Cox and Klinger's motivational model of alcohol use provides a useful multidimensional perspective. One's ability—or

inability—to self-regulate could certainly be a part of the motivational pathway that leads to the decision to drink or not to do so.

Self-regulation as one of the main explanations for different psychological factors related to addiction. Within this theoretical perspective, addiction has been viewed as a lack of self-regulation. Different researchers based on their own research perspective have used various similar terminology, such as self-control, self-management, and self-regulation. In addition, motivational model of alcohol use presented. Furthermore, impulsivity, self-regulation, and inhibitory control presented.

As was discussed in detail in Chapters One and Two, alcohol consumption is considered not only as a public-health concern, it is also a major growing concern among university students. It was also pointed out that self-regulation and motivational structure are two different variables that have been studied in relationship to alcohol consumption. However, little is known about relationships among alcohol consumption, motivational structure and self-regulation.

Chapter Three presents the first study in this thesis. In the first study, relationships among self-regulation, motivational structure, and alcohol were investigated.

CHAPTER THREE

Study One

Self-Regulation, Motivational Structure and Alcohol Use

As stated in Chapter One, university students' excessive alcohol consumption is an important problem. Many university students drink alcohol excessively in binges, with resulting serious negative consequences. It would, therefore, be worthwhile to identify the factors that help them to control their drinking. As discussed in Chapter Two, there are two important considerations related to alcohol consumption. The first is self-regulation, which has been defined as the capacity to plan, guide, and monitor one's behaviour flexibly in the face of changing circumstances (Brown, 1998, p. 62). Some people use alcohol for changing their mood from bad to good, and they think by consuming alcohol their unlucky circumstance will be improved. By consuming alcohol, their aim is to chemically manipulate their affective state. However, someone with self-regulation skills does not need to use alcohol as a mood regulator.

The second consideration is motivational structure (Cox & Klinger, 2011). Motivational structure is an individual's pattern of goal striving. Motivational structure plays an important role in our well-being and whether or not our lives are meaningful. People's self-regulation is also related to their motivational structure. Self-regulation is an important factor for distinguishing adaptive motivation from maladaptive motivation (adaptive motivation and maladaptive motivation with more details have been discussed in Chapter Two). Motivational structure refers to the combination of factors (e.g., knowledge, commitment, emotional involvement) that influence a person's goal striving. Thus, an individual with an adaptive motivational

structure is better able to self-regulate than an individual with maladaptive motivational structure. The motivational model of alcohol use is presented next.

As discussed in Chapter Two, the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004, 2011) is a biopsychosocial approach because it accounts for the biological, psychological, and sociocultural/environmental influences on alcohol use and misuse. In addition, the model specifies how each component increases or decreases a person's motivation to engage or not to engage in alcohol use on a particular occasion.

Motivational alcohol use model: whether to drink or not. Based on Cox and Klinger's model of alcohol use, the final decision to engage or not to engage in alcohol use is considered to be a volitional act. Although the act is volitional, it may be made at an explicit or implicit level. Thus, a person does not need to be entirely aware of his or her decision-making processes to reach the final decision to consume alcohol or not. What is driving the decision-making is the net expected change in affect that a person expects to gain from engaging or not engaging in alcohol use. If the net expected change is positive, he or she is more likely to engage in alcohol use, whereas if the net expected change is negative, he or she is less likely to engage in alcohol use.

Drinking alcohol for affective change. Cox and Klinger claim that the motivation to drink is driven by expected affective change is an essential principle of the motivation to drink. Within the motivational model of alcohol use, affect refers to the emotion(s) a person subjectively experiences. Thus, a person will strive to obtain outcomes that yield positive affective changes, and to avoid, withdraw from, or get rid of outcomes that yield negative affective changes. Classes of stimuli, objects, situations, and goals that can bring about a change in affect become incentives that a

person will pursue. Incentive motivation is positively valenced if the stimulus is something that increases positive affect or reduces negative affect, and it is negatively valenced if the stimulus reduces positive affect or increases negative affect.

Current concerns. In Cox and Klinger's model, people attempt to get, obtain, or accomplish the things that are positively valenced, and to avoid or get rid of the things that are negatively valenced. The subset of incentives that a person is committed to pursue or achieve is that person's goals or aspirations. During the time between when a person becomes committed to pursuing a goal and achieving or disengaging from it, there is a latent brain process termed a current concern. Current concerns correspond to the activities in which people engage in order to achieve their goals. If the goal is to drink alcohol, then drinking becomes the most important current concern and this goal is pursued vigorously whilst other life goals are neglected.

To summarise, according to the motivational model of alcohol use (Cox & Klinger, 1988, 1990), alcohol use and misuse need to be viewed in the context of other incentives (goals, desires, and aspirations) people have, and the emotional satisfaction they obtain or do not obtain from these incentives (Cox & Klinger, 2002, 2011). For example, if alcohol users and misusers fail to gain emotional satisfaction from other life areas, such as relationships, employment, or hobbies, alcohol itself can become a positive incentive by facilitating desirable changes in affect (Cox & Klinger, 2004, 2011). However, manipulating one's affect chemically by drinking alcohol can have many undesirable consequences, particularly if the consumption of alcohol is excessive.

Motivational Model of Alcohol Use and Self-Regulation

Recall that Cox and Klinger's motivational model of alcohol use notes that a person's final decision to drink or not depends on the net expected affective change from drinking. A person is motivated to drink alcohol for a variety of reasons. For example, a drinker may decide to drink because he or she has deficits in adaptively maintaining or enhancing emotional states and is unable to regulate them. Self-regulation can be viewed as involving cognitive, motivational, affective, behavioural, and physiological processes that are involved in the control of goal-directed behaviours affect (Cox & Klinger, 2011).

Emotional regulation and goal-directed behaviour. Emotional regulation can be defined as the strategies a person applies to affect and modulate emotional experiences. It might include suppression or cognitive-reappraisal of the stressful situation, event, or problem (Gross, Richards, & John, 2006). Carver and Scheier (1990) emphasized that emotions are not just associated with the resolving of goals, because during goal-directed behaviours emotions can provide feedback on goal progress and the possibility of attainment or goal failure. Positive emotions can occur during goal-striving before the goal is attained. For example, people may feel happier just because they have made good progress towards achieving their goal (e.g., writing the component parts of a thesis chapter). Likewise, negative emotions such as anger, frustration, and sadness can appear because the person has failed to make any concrete progress toward the goal, even though the goal is still attainable (e.g., failing to complete chapters in a PhD thesis in a timely manner).

Negative emotions can also be adaptive if they provide feedback concerning one's goals, especially if they indicate that one's goals need to be reconsidered and re-

prioritised (e.g., another goal may appear that needs immediate attention and action). Thus, emotions can function as an information-giving process, because they provide immediate feedback on a person's concerns, needs, and goals at a given moment in time, especially when there is a discrepancy between the current state of the sub-goal and the desired end-state of the goal (e.g., Mennin, Heimberg, Turk, & Fresco, 2005; see also, Carver, Scheier, Johnston, 2014).

Emotional dysregulation. Affective or emotional dysregulation means that maladaptive patterns of emotional regulation might impair daily life functioning (Carver, Lawrence, & Scheier, 1996). There is ample evidence that negative affect and difficulties in emotion regulation are related to other health problems such as smoking, eating disorders. (e.g., Dvorak et al., 2014; Keenan, 2014) Affective dysregulation can be the result of affective lability or experiential avoidance. Affective lability refers to frequent and rapid changes in affective states; it has been found to be associated with substance use problems (Marwaha et al., 2014; Oliver & Simons, 2004; Simons & Carey, 2002).

Research into difficulties in emotional regulation is concerned with how people control behaviour when they are experiencing negative emotions, rather than the control of emotions per se (e.g., Frias-Armenta et al., 2010, 2012; Gratz & Gunderson, 2006; Tull & Roemer, 2007; Rugar, 2007,). Gratz and Roemer (2004) proposed that difficulties in emotional regulation can be conceptualised as involving a lack of: (1) awareness and understanding of emotions, (2) acceptance of emotions, (3) ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (4) the ability to use situationally appropriate emotional regulation strategies in order to meet individual goals and

situational demands. Difficulties engaging in goal-directed behaviours reflect difficulties in concentrating upon on or accomplishing goals when experiencing negative emotions. Impulse control difficulties reflect difficulties in remaining in control of one's behaviour when experiencing negative emotions. In a recent study, Dvorak et al. (2014) investigated association between emotion regulation difficulties and problematic alcohol use. This study supported that emotion regulation difficulties are associated with alcohol-related consequences.

On the basis of Cox and Klinger's motivational model of alcohol use, affective or emotion regulation is considered to be proximal determinants of the decision to drink or not to drink. Thus, affective or emotion regulation might play an important part in a drinker's net expected affective change from drinking, which, in turn, enables the person to maintain or enhance positive emotions, alleviate negative emotions, or a combination of both of these factors. Alcohol-use motives can be viewed as being another form of maladaptive emotion regulation strategy. They might be related to difficulties in emotion regulation, but are considered to serve a different function as them (Cox & Klinger, 2004, 2011).

Aims of Study One

The review of alcohol use and of self-regulation presented in Chapter One and Cox and Klinger's motivational model point to the relevance of two key concepts in the study of determinants of alcohol use—self-regulation and motivational structure. Accordingly, the aim of Study One was to investigate to what extend self-regulation and alcohol consumption are related to each other and to motivational structure.

Personal Goals and Self-Regulation

Personal goals are an important aspect of motivation in Cox and Klinger's model of alcohol use, where the setting and attainment of personal goals is considered

to be a fundamental factor for an adaptive motivational structure and possibly a drinker's decision not to drink. Research has found that decreasing people's motivation to obtain non-alcohol-related incentives increases the motivation to drink (Vuchinich & Tucker, 1996). In this regard, studies showed that there is an association between alcohol dependency and motivation to drink (Drobes, Saladin, & Tiffany, 2001). Likewise, Man et al. (1998) found that alcohol abusers had 40% fewer goals than non-alcohol abusing students. Having realistic and attainable personal goals, which are likely to lead to emotional benefits, can be viewed as giving meaning to a person's life (Dickson, 2006). Sheldon and Elliot (1999) proposed that personal goals represent people's attempts to achieve new levels of positive adaptation, self-discovery, and psychological well-being. In this regard, Messersmith and Schulenberg (2010) studied the relationship between goal achievement, goal striving and well-being. The results of this study suggested that having a long-term goal striving is helpful for transition to adulthood (See also Ehrlich, Bipp, & Tanja, 2016; Ehrlich & Christain, 2012).

Self-regulation refers to the processes by which people manage their goal-directed behaviours in the absence of immediate external constraints (Kirschenbaum, 1987; Weidner, Sieverding, & Chesney, 2016). Self-regulation can be said to involve interactions among cognitions, actions or behaviours, physiology, affective states, and intrinsic or extrinsic constraints (Weidner, Sieverding, & Chesney, 2016). Carver and Scheier (1981) hypothesised that self-regulation involves goal-setting and related processes, such as expectancies and plans, the self-monitoring of behaviour, and observing performance relative to attaining the goal (self-evaluation). Furthermore, any discrepancy between the desired and current state of the goal directs or guides behaviour, actions, and efforts to attain the goal (Bandura, 1991; Sun et al., 2014).

This might be how an adaptive motivational structure facilitates movements towards the goal and a maladaptive motivational structure hinders movements towards the goal or facilitates movements away from the goal. The self-regulation of goal-setting and attainment processes can fail for a number of reasons, such as difficulties coping with emotional problems or excessive drinking. Impulsivity as deregulated inhibition control can cause self-regulatory behaviours to fail because the person responds in an exaggerated approach manner. Self-regulatory process can also fail because the person does not have the ability to resist cues and urges (an inhibition deficit). Chapter Five discusses the relationship between alcohol consumption, self-regulation, and impulsivity in detail.

Research Hypotheses

The current study aimed to identify relationships among self-regulation, motivational structure and alcohol use. The hypotheses tested were as follows:

1. Self-regulation will be negatively correlated with alcohol consumption.

2. Adaptive motivation will be negatively correlated with alcohol consumption.

3. Self-regulation will be positively correlated with adaptive motivational structure.

4. Motivational structure will partly mediate the relationship between self-regulation and the amount of alcohol consumed.

Method

Ethical Approval

Before participants were recruited, an application for ethical approval was prepared and submitted through the ethical approval system. It was reviewed and approved by the School of Psychology Ethics Committee. Informed consent was

obtained from all participants, who were aware of their right to withdraw from the study without penalty (none did so). They were debriefed at the end of the procedure, and the research answered any questions that they asked. Personal information that could identify individuals was not recorded on the study materials. Data were kept on a password-protected computer in a locked office. The consent forms and information sheet that were given to participants are shown in Appendix 1 and 2.

Participants and their Demographic Characteristics

There have been four studies on the relationship between students' motivational structure and their drinking behaviour (Cox et al., 2002; Fadardi, 2003; Shamloo, 2007; Victor, 2009). The effect sizes (ESs) reported in two of these studies (f = .12 and .25) were used to conduct a power analysis for the present study. According to the guidelines provided by Cohen (1992), an ES of .16 and power of .90 were considered appropriate for this study. The power analysis was conducted for regression analyses that are the necessary steps in testing mediational relationships. G*Power software (Erdfelder, Faul, & Buchner, 1996) with k = 3 (maximum number of predictors in the mediational analyses) revealed that a sample size of 105 participants was adequate for detecting a significant effect.

Therefore, in this study participants were 105 male and female (Female = 77.7%; females' mean age = 19.82 years, SD = 3.07; males' mean age = 19.61 years, SD = 1.43) undergraduate students from Bangor University. Participants were recruited through the School of Psychology SONA website, which is used to recruit psychology students (See Appendix 4 for SONA description). They volunteered as part of a requirement for their degree in psychology, and they earned 400 printer credits for their participation. The only inclusion criterion was being a consumer of alcohol; however, the amount of alcohol that participants must consumed was not

specified. Recruitment of participants was discontinued when 105 participants who met the inclusion criteria had been tested. One participant was excluded because he indicated that he did not consume alcohol. The number of male and female participants and their mean age according to years of university education are shown in Table 3.1. An independent-samples *t*-test showed that males (*M = 19.61, SD = 1.43*) and females *(M = 19.82, SD = 3.07)* did not differ in age [$t_{(92)} = -1.11, p = .27$]

Table 3.1. Means and Standard Deviations of Male and Female Participants' Age According their Year of University

	First Year (Male = 18; Female =18)		Second Year (Male = 16; Female = 22)	
Gender	*M*	*SD*	*M*	*SD*
Male	18.55	1.12	20.23	2.11
Female	19.88	1.77	20.75	3.31

Instruments

Participants were asked to complete four questionnaires. These included the Personal Concern Inventory (Cox, Klinger, 2011), Alcohol Use Questionnaire (Cox, 2003), Short Self-Regulation Questionnaire (Carey, Neal & Collins, 2004) and a brief questionnaire about demographic characteristics.

Research Version of the Personal Concern Inventory (PCI-R)

The Personal Concerns Inventory (PCI) was developed within the framework of the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2002, 2004, 2011). It is an abridged version of the Motivational Structure Questionnaire (MSQ; Klinger, Cox, & Blount, 1995). The present study used the PCI-R, which was developed to be a brief version of the PCI by Fadardi and Cox (2003). On the PCI-R, respondents state their current concern(s) and their desired goal in each life area, but in the abridged version (PCI-R), participants are not asked to describe the content of

their concerns but only to rate their views about their most important goal/s in each area of life (Cox & Klinger, 2004, 2011). These areas were (a) Home and Household Matters, (b) Relationships, (c) Love, (d) Intimacy and Sexual Matters, (e) Self-changes, (f) Finance and Employment, (g) Leisure and Recreation, (h) Health and (i) Education. After participants had decided whether or not they had a current concern in a particular life area, they rate their goal striving related to that concern on 10 rating scales. Each rating scale has two fixed anchors, 0 (zero—the least amount) and 10 (the greatest amount). The first scale rated is the action scale for resolving the concern; they were asked to rate on 11 dimensions their goal for resolving each concern they had. The rating scales were (a) Appetitive Action (to "get," "obtain," or "accomplish" the goal); (b) Aversive Action (to "get rid of" or "avoid" the goal); (c) Perceived Control (over achieving the goal); (d) Knowledge (about ways of achieving the goal); (e) Chances of Success (in achieving the goal "if I do my best"); (f) Chances of Success if Not Try ("if I do nothing"); (g) Joy from achieving the goal); (h) Conflict (unhappiness from achieving the goal); (i) Sorrow (from failure to achieve the goal) ; (j) Commitment (to the goal); and (k) Goal Distance (i.e., how long it would take to achieve it). The original version of the MSQ has two additional rating scales, which were not used in the current study. Scores on each of the 10 rating scales for each life area were summed to produce a total score, which was then divided by the number of life areas the participant reported having a concern in, to produce an average rating for each scale. In total, 10 averaged indices were derived from the R-PCI. The R-PCI questionnaire is shown in Appendix (3). Fadardi (2004) calculated the internal consistency of the R-PCI, and he concluded that the inventory provides consistent scores for respondents' perceptions of their goal-directed behaviours. The ratings across a respondent's goals are summarised into motivational

indices, from which that respondent's motivational profile can be drawn (Cox & Klinger, 2004, 2011).

Alcohol Use Questionnaire

The Alcohol Use Questionnaire (AUQ; Cox, 2000) was used to assess respondents' quantity and frequency of alcohol consumption during the prior year. The AUQ asks about quantity and frequency of consumption of various types of alcoholic beverages (i.e., beer, wine, spirits and alcopops). The response categories for the amount of alcohol consumed range from one to fifteen units of alcohol, and there is the option for an individual to specify a figure above the specified range. The person's average total consumption can be calculated on a weekly, monthly, or yearly basis. The AUQ yields three indices of drinking: (a) usual consumption, (b) unusual consumption, and (c) overall consumption. A sample questionnaire is presented in Appendix 5.

Short Self-Regulation Questionnaire

To measure self-regulation, Carey and colleagues (Carey et al., 2004) developed a Short Self-regulation Questionnaire (SSRQ) which is a 31-item inventory based on the 63-item SR Questionnaire that is designed to quantify an individual's ability to self-regulate his/her behaviour in each of the seven hypothesized factors of generalized SR (i.e., information input, self-evaluation, investigation to change, plan searching, ability to plan, plan implementing, and plan evaluation). The SSRQ uses a 5-point Likert scale ranging from strongly disagree [1] to strongly agree [5] (see appendix 6).

Demographics Questionnaire

As mentioned above, all participants were undergraduate students from the School of Psychology. On the demographic questionnaire, participants were asked to

state their gender, age, year of study (Year One or Year Two; Year Three students were not eligible to participate in SONA).

Procedure

Upon their arrival, participants were given an Information Sheet, which explained that the study was investigating the relationship between self-regulation, motivational structure and alcohol use. All participants were tested in small groups of approximately five participants each in a research room with normal illumination conditions and minimum background noise. Prior to distributing the questionnaires, the experimenter briefly explained the goals of the study to the participants and how they should complete each questionnaire. Next participants received a package that included (a) Information Sheet, (b) Consent Form (c), the demographics questionnaire (d) Short Self-Regulation Questionnaire (e), Personal Concerns Inventory, (f) and Alcohol Use Questionnaire. Sessions lasted between 40 and 60 minutes, and the researcher was available at all times to answer any questions. After participants had completed the questionnaires, each participant was given a debriefing sheet (see Appendix 7). Participants were given a full explanation of the procedures employed and were given an opportunity to ask questions. Participants were debriefed, then thanked, and were discharged from the study with the knowledge that they could contact the researcher later if they had further questions.

RESULTS

Data Analysis

Participants' responses on the questionnaires were scored and their data were entered into a spreadsheet. The statistical package SPSS version 20 was used for all analyses. Cronbach's alpha was used to determine the internal consistency of each psychometric measure. The minimum accepted alpha value was set at .70 for this

study (Viktor, 2009). No scales violated this assumption. Descriptive statistics were calculated to establish that the data from the sample were normally distributed. In addition, Pearson correlations were used to identify any significant relationships between the demographic variables and the PCI scores, and between (a) the demographic variables and the AUQ measures of alcohol consumption and (b) the demographic variables and the SSRQ scores. These correlations also allowed the researcher to identify any variables that needed to be controlled for in Step 1 of the regression analysis. Two-tailed, independent sample *t*-tests were used to establish whether there were any significant differences among the independent variables that were attributable to participants' characteristics (e.g., their gender). The accompanying Levene's test was used to identify any violations of homogeneity of variance. No violations of homogeneity of variance were found. Cohen's *d* as an index of effect size was used to identify the magnitude of the differences between the means. The conventional standards for *d* are: small, $d = 0.2$; medium, $d = 0.5$; and large, $d = 0.8$. The results from the *t*-tests were used to identify any variables that needed to be controlled for in Step 1 of the regression analysis.

Next, hierarchical multiple regression was used to determine whether self-regulation scores predicted weekly alcohol consumption. Thus, weekly drinking was the dependent variable, and self-regulation was the predictor variable.

Regression Diagnostics

The independent variables were examined for collinearity and multicollinearity by examining the tolerance and the values for the Variance Inflation Factor (VIF) in the regression output table. Simple collinearity occurs when two independent variables are highly correlated. Multicollinearity occurs when more than two independent variables are highly correlated. Collinearity (and multicollinearity)

increases the uncertainty around the parameter estimates and results in an increased standard error (Miles & Shevlin, 1998). Two methods were used for detecting collinearity violations. First, the tolerance index was examined in the regression output. The tolerance of an independent variable is the extent to which the independent variable cannot be predicted by the other independent variables in the regression model. The values for tolerance can vary between 0 (zero) and 1.0. A tolerance value of 0 indicates that one independent variable can be completely predicted from the other independent variables; thus, there is perfect collinearity. Likewise, if the tolerance value is close to 1 then one independent variable is completely uncorrelated with the other independent variables in the regression model (Miles & Shevlin, 1998). Second, the VIF index in the regression output table can be examined for violations of collinearity when the model contains more than two independent variables. The VIF indicates the amount that the standard error of an independent variable has increased because of collinearity. Miles and Shevlin (1998) argue that when the VIF value reaches 4, the standard error has doubled, indicating that collinearity has become a major problem. Furthermore, if independent variables are highly correlated with one another it can be difficult to distinguish the unique effect of each independent variable on the criterion variable. This problem can be resolved by removing variables from the data set or by combining them (Pedhazur, 1991).

Results

Relationships Among Demographic Variables and Alcohol Consumption

Pearson correlations were performed to identify the relationships among participants' demographic characteristics and their alcohol consumption. No relationships were

found between age, sex, or year of the study and alcohol consumption as all *r* values were close to *0*, $p > .05$ in all cases".

. It would appear that in this sample these demographic variables were independent of participants' alcohol use.

Personal Concerns Inventory

As mentioned earlier, on the PCI respondents rate each of their goals on eleven different scales (e.g. Chances of Success in achieving the goal "if I do my best" or; Chances of Success if Not Try "if I do nothing"). One way to summarize the PCI data is to subject them to Principal Component Analysis (PCA). PCA is not a true factor analysis because factor analysis methods such as Principal Axis Factoring (PAF) take into account only *common* sources of variance, whereas PCA takes into account both *common* and *unique* (i.e., specific plus *error*) sources. This feature of the PCA is considered an advantage when summarizing a set of data. Comparing PCA and PAF methods, Preacher and MacCallum (2003) concluded that if a researcher is specifically interested in data reduction and seeks a simple structure, PCA using a screen plot for determining the number of factors should be the standard procedure (see also Mvududu & Sink, 2013).

The results from earlier research using PCA to extract the PCI adaptive and maladaptive components (e.g., Cox et al., 2000; Cox et al., 2002; Cox & Klinger, 2002; Fadardi, 2003; Shamloo, 2007) led to an array of factor loadings for adaptive and maladaptive motivation; nevertheless, there are similarities among the results of the different studies (Klinger & Cox, 2004). In other words, the *pattern* of high or low loadings on the PCI indices on each PCA factor can be used to describe one factor as more adaptive than another. Usually, a pattern of positive high loadings on Commitment, Control, Happiness, and Chances of Success If Try suggests an

adaptive motivational structure. A pattern of high positive loadings on Happiness and Chances of Success but not on Commitment and Control would suggest a maladaptive motivational pattern. This is because motivationally people should be committed to pursuing goals from which they expect to experience joy and at which they expect to succeed. Based on the guidelines provided in previous studies (e.g., Cox et al., 2000; Cox & Klinger, 2002; Cox et al., 2002; Fadardi, 2003; Shamloo, 2007), a two-factor solution was selected to summarise the PCI data. Factor One reflects adaptive motivation and Factor Two reflects maladaptive motivation. . For PCI data analysing I followed the SPSS syntax which Fadardi (2003) was provided.

Alcohol Use Questionnaire

As stated earlier, the Alcohol Use Questionnaire (AUQ; Cox, 2000) was used to assess respondents' quantity and frequency of alcohol consumption during the prior year. The means and standard deviations of the alcohol consumption indices are shown in Table 3.2, separately for males and females. These indices are weekly usual drinking and weekly unusual drinking. Independent-samples *t*-tests were conducted to compare males and females on the alcohol consumption indices. In this study, males reported drinking more than females as follows: (a) Weekly Usual Drinking [$t_{(88)} = 5.80$, $p = 0.02$]; (b) Weekly Unusual Drinking [$t_{(88)} = .49$, $p = 0.02$]; or (c) Total Weekly Drinking [$t_{(88)} = .28$, $p = 0.02$]. These results are consistent with the results of previous studies (e.g., Timmer, Verhoff, & Colten, 1985; Viktor, 2009).

Table 3.2. Means and Standard Deviations of Weekly Units of Alcohol Consumed

Sex	Indices of weekly units of alcohol consumed	*N*	Mean	Standard Deviation
Males	Total usual	30	16.61	11.99
	Total unusual	30	9.15	12.46
Females	Total usual	74	14.77	11.92
	Total unusual	74	6.04	7.05

Short Self-Regulation Questionnaire

As discussed earlier, to measure self-regulation Carey and colleagues (Carey et al., 2004) developed a Short Self-regulation Questionnaire (SSRQ) which uses a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). It is scored as follows: First, fourteenth of the items (Items 2, 3, 4, 6, 7, 9, 10, 11, 16, 19, 22, 23, 27 and 31) are reverse scored. Then, all of the items are summed to obtain a total score (see Appendix 6). Cronbach's alpha for the total score was .92.

The means and standard deviations from the Short Self-Regulation Questionnaire (SSRQ) are shown in Table 3.3, separately for males and females.

Table 3.3. Means and, Standard Deviations of Total SSRQ Scores

Sex	N	M	SD
Male	30	147.10	9.15
Female	74	147.74	7.60

Independent-samples *t*-tests were conducted to compare males and females on their scores from the Short Self-Regulation Questionnaire. No significant difference was found between males and females [$t_{(92)} = .46$, $p = .65$].

Testing the Research Hypotheses

Recall that the current study aimed to explain relationships among self-regulation, motivational structure and alcohol use. The hypotheses tested were as follows:

1. Self-regulation will be negatively correlated with alcohol consumption.

2. Adaptive motivation will be negatively correlated with alcohol consumption.

3. Self-regulation will be positively correlated with adaptive motivational structure.

4. Motivational structure will partly mediate the relationship between self-regulation and the amount of alcohol consumed.

Table 3.4 shows the inter-correlations among SSRQ, PCI Adaptive Motivation, and the weekly drinking indices. Total SSRQ was negatively correlated with weekly drinking indices. However, there was no relationship between PCI Adaptive Motivation and SSRQ nor between SSRQ and PCI Adaptive Motivation and weekly drinking. Thus, only the first hypothesis was supported. So, only usual drinking was correlated significantly with SSRQ, but usual drinking very closely approached significance.

Table 3.4. Inter-Correlations among PCI, SSRQ, Alcohol Consumed Indices

Variables	PCI	SSRQ	Unusual D	Usual D
Unusual D	-.004	-.44*	1	.56*
Usual D	-.40	-.38	.56*	1
SSRQ	.004	1	-.44*	-.38
PCI	1	.004	-.40	-.40

Note. PCI = PCI Adaptive Motivational; Usual D = Usual Weekly Drinking; Unusual D = Unusual Weekly Drinking; SSRQ = Total Short Self-Regulation Questionnaire. * $p < 0.01$

Mediational Analysis

The fourth hypothesis of this study was that motivational structure would partly mediate the relationship between self-regulation and the amount of alcohol consumed. An overview of this statistical technique and the procedures for performing mediation analysis are presented next.

A simple bivariate correlation specifies the direct relationship between the independent variable (X) and the dependent variable (Y). A mediational model, on the other hand, indicates that X is correlated with Y not because it exerts direct effects upon Y, but because it causes changes in M, and then M causes changes in Y (see Baron & Kenny, 1986). Mediational models extend simple bivariate correlation models by including a third variable, the mediator (M). A mediator accounts for the relationship between the predictor and the criterion (Baron & Kenny, 1986). The most important factor in a simple mediation model is the indirect effect of X on Y through M (Mackinnon, Fairchild, & Fritz, 2007; McGrath, 2013). If a study includes a

measure of the mediating variable (MV) alongside measures of the IV and DV, mediation is considered to be a viable method for eliciting further information from the study because it can be investigated statistically (MacKinnon et al., 2007). Figure 3.1 shows the X and Y relationships for a mediation model.

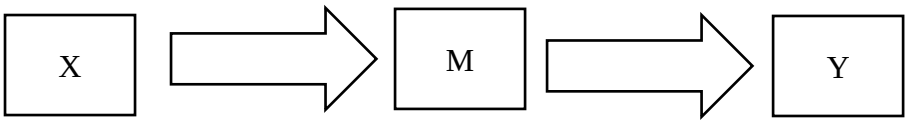

Figure 3.1. X and Y relationships for a mediation model

Baron and Kenny (1986) state four criteria that must be met when performing simple mediation. *First,* X must be correlated with Y. *Second,* X must be correlated with M. *Third,* M must be correlated with Y when controlling for the direct effect of X on Y. *Fourth,* when the effect of M on Y is removed, X should no longer be correlated with Y. If this happens there is complete mediation, but if the correlation between X and Y is reduced, but still significant then there is partial mediation. According to Shrout and Bolger (2002), partial mediation occurs when: (1) X has a direct upon Y in addition to its indirect effect on Y through M, (2) X may have no direct effect on Y because it may have indirect effects on Y through M_1 and M_2. If M_2 is not included in the model, then the indirect effect of X on Y that is accountable to M_2 will be mistakenly identified as the direct effect of X on Y through M, and (3) there may be two subsets of participants. Hence, in one subset there may be a direct effect for X on Y, and in the second subset there may only be an indirect effect for X on Y through M.

There are four steps in testing Baron and Kenny's simple mediation. In Step 1, the significance of the correlation between X and Y needs to be specified; the relationship must be significant. In Step 2, the significance of the correlation between X and M needs to be specified. In Step 3, Y needs to be predicted from X and M. The

partial effect of M when controlling for X must be significant. In Step 4, the direct effect of X on Y needs to be examined. Again, for complete mediation, the β weight for X must not differ significantly from 0 (Zero). If the β weight is less than the correlation of X and Y but still significant, then there is partial mediation (Shrout & Bolger, 2002).

Mackinnon et al. (2008) argue that X does not have to be correlated with Y because X may have both a direct and an indirect effect on Y through M. They consider these effects to be equal in size but opposite in direction. Thus, mediation would occur even though X is not correlated with Y because X is functioning as a suppressor variable. In the regression equation, it would be observed that the prediction for Y actually decreases as X increases (see Yuan, MacKinnon, 2014).

The indirect effect of X on Y through M can be computed by multiplying the coefficient for the XM path by the coefficient for the MY path. The coefficient for the XM path is the correlation between X and M. Likewise, the coefficient for the MY path is the β weight for M from the regression that predicted Y from X and M. The null hypothesis that the 'indirect effect' is zero in the population sampled can be estimated by dividing the coefficient for the indirect effect by the standard error.[3] The most commonly used procedure to do this is Sobel's test. Sample sizes need to be large for the Sobel test, because the critical value for a two-tailed test must exceed +/- 1.96 for α = .05 (Preacher & Hayes, 2014). If the Sobel test is significant, mediation has occurred.[4]

[3] The indirect effect is defined as the mediational effect in which X leads to Y through M.

[4] Sobel test formula: *z*-value = $a*b/\text{SQRT}\ (b^2*s_a^2 + a^2*s_b^2)$. Run a regression analysis with the independent variable predicting the mediator (M). This will give *a* and *s*a (standard error of *a*). Next, run a regression analysis with the independent variable and mediator (M) both predicting the dependent variable. This will give *b* and *sb* (standard error of *b*). Both *a* and *b* are the unstandardized regression coefficients from output tables. Square root (SQRT).

Baron and Kenny (1986) state that there are two fundamental assumptions that should be met for mediation to have occurred: (1) there should be no measurement error in M, and (2) Y should not cause M (Preacher & Hayes, 2014). Measurement errors can be reduced by standardising or transforming variables. This serves to decrease the influence of outliers and normalizes the distribution (see Chapter 3 for a fuller discussion of data transformations). In a similar manner, mediations that are based on theoretical predictions should reduce the possibility of violating Baron and Kenny's Y and M casual sequence assumption.

Mediation can be said to violate one of the assumptions of regression, that of collinearity (and multicollinearity), because for M to be a successful mediator it must be correlated with X, and M must account for some of the unique variance in Y, but X must not account for all of the unique variance in M. Collinearity in mediation can be reduced by combining the scores from instruments that contain separate scales to produce a global score, rather than using each scale score in the mediation analysis if the scale scores are correlated with M and Y.

In this study, as there was no correlation between Motivational Structure (as M) and Alcohol Consumption (as X) the mediational analysis was not performed. Thus, the fourth hypothesis was not supported.

Summary of the Results

The current study aimed to clarify relationships among self-regulation, motivational structure and alcohol use. The Short Self-Regulation Questionnaire (Carey et al., 2004), PCI (Cox & Klinger, 2004), and Alcohol Consumption Inventory (Cox, 2000) were administered to student drinkers (N = 105, Females = 77.7%

females' mean age = 19.82 years, *SD* = 3.07; males' mean age = 19.61 years, *SD* = 1.43). The results only partially supported the first hypothesis. Total SSRQ was negatively correlated with students' unusual drinking, as was predicted. That is, as participants' degree of self-regulation increased, the amount of alcohol that they consumed decreased.

Discussion

This study assessed relationships among self-regulation, motivational structure and alcohol use using different questionnaires. The results of this study showed that Total SSRQ was negatively correlated with students' unusual drinking. This result is consistent with Carey, Carey, Carnrike, & Meisler, 1990, Hustad, 2007, Garcia-del-Castillo et al., 2012. The finding of Study One confirmed that as participants' degree of self-regulation increased, the amount of alcohol they consumed decreased

The results of the study did not support all of the main hypotheses. Particularly, the results of fourth hypothesis are not consistent with the results of other studies (e.g. Logan, Olson, Lindsey, 1993; Shamloo, 2010). It is possible that the interactions predicted from the theoretical accounts and published literature simply did not exist in the present sample. It is also possible that these effects existed, but that they were too subtle to be detected with the present design and sample size. However, the original contribution of this study is that it found a strong relationship between self-regulation and alcohol consumption. This suggests, unlike what was previously thought, that self-regulation is a stable personality characteristic, and it is an important determinant of university students' alcohol consumption; in fact, it seems to be a stronger predictor than overall motivational structure.

Therefore, based on the results of Study One, it was reasonable to expect that experimental manipulations to increase self-regulation would help to reduce students' alcohol consumption.

To conclude, manipulations might be developed to examine individuals' self-regulation and clarifying whether any changes are causing their motivational structure to become more adaptive and reduce their drinking.

CHAPTER FOUR

Study Two

Students' Performance on a Concept-Identification Task

As stated in Chapter Three, Study One assessed relationships among self-regulation, motivational structure and alcohol use. The results showed that Total SSRQ was negatively correlated with students' unusual drinking. Therefore, based on the results of Study One, it was reasonable to expect that experimental manipulations to change self-regulation would be effective in reducing students' excessive drinking. As discussed in the literature review in Chapter One, it seems likely that a person's self-regulation could be changed by altering the person's perceived choice among options and the person's knowledge about how to attain a goal and by providing feedback about the person's performance and helping him or her to set goals for completing the task.

Accordingly, the next study in the thesis research aimed to test (a) the effectiveness of an experimental technique (e.g., information enhancement and goal setting) for changing individuals' self-regulation; (b) whether these changes would have beneficial, enduring effects on participants' task-specific motivational structure; (c) whether the experimental manipulations would affect their urges to drink; (d) whether participants' self-efficacy is related to their alcohol consumption and self-regulation; and (e) how procrastination affects individuals' self-regulation.

Therefore, manipulations were developed to examine individuals' self-regulation and to clarify whether a manipulation for changing their self-regulation would cause their motivational structure to become more adaptive and thereby reduce their alcohol

consumption. Developing and testing these techniques was the focus of the experiments in the thesis research that are presented in this chapter.

Research Hypothesis

The main purpose on the study was to examine the effects of a task that used Concept Identification Cards on participants' self-regulation. The task that used these cards aimed to examine individuals' self-regulation and clarifying whether any modifications are triggering their motivational structure to become more adaptive and reduce their alcohol drinking.

Method

Power Analysis and Participants

To calculate the sample size needed for the study a power analysis was conducted. In conducting a power analysis, the researcher needs to first assess the size of the effect that the proposed study will be able to detect. The results of previous research can be used to decide whether a small, medium, or large effect size is expected.

Studies investigating motivational structure have produced a wide variety of effect sizes using a variety of research designs. In the present study, it was planned that ANCOVA would be used to test the hypotheses. A medium effect size (f = .30) was calculated based on the results of Study One and was deemed suitable to be used in the present power analysis. Using the G*Power programme (Erdfelder et al., 1996, Shamloo, 2007), with an expected effect size of f = .30 and two groups of participants, a sample size of 79 was calculated to be adequate.

Participants

Eighty undergraduate psychology students (males = 26.6 %, males' mean age = 21.19 years, *SD* = 3.1; females' mean age = 19.38 years, *SD* = 1.08) were recruited through the Student Participant Panel of the School of Psychology, Bangor University. Participants received print credits for their participation. The inclusion criterion was that the participant be a consumer of alcohol. However, the amount of alcohol they drank was not considered important. They could a light, moderate or a heavy drinker. Recruitment of participants was discontinued when 80 participants who met the inclusion criteria had been tested. One participant was excluded because he indicated that he did not consume alcohol. (See Appendix 8 for the SONA recruitment description used for this study).

Instruments

Two kinds of instruments were employed. The first type included those that were administered to identify changes in participants' self-regulation, motivational structure, self-efficacy, procrastination and urges to drink. Except for the alcohol consumption questionnaire (which was given only at the pre-test to confirm that the participant was a consumer of alcohol), these tests were given at baseline (pre-test) and again post-experimentally (post-test). The second type of instrument included those used in the task that the experimenter used to manipulate self-regulation in the experimental group.

The pre- and post-test measures were as follows:

Self-report measures: The self-report measures were: (a) the Task-Specific Personal Concerns Inventory (TSPCI), which was used to measure participants' motivational structure; (b) Urges to Drink Questionnaire; (c) Alcohol Use Questionnaire, (d) Self-Regulation Questionnaire, (e) Procrastination Questionnaire,

(f) Self-Efficacy Questionnaire.

Self-Report Measures

Task-Specific Personal Concern Inventory (TSPCI)

Cox and Klinger (2011) developed the Personal Concerns Inventory (PCI) to identify motivational structures that help people to or prevent them from reaching their goals. For example, the PCI measures (a) knowledge about how to accomplish goals, (b) commitment to attaining them, and (c) anticipated emotional satisfaction from goal attainments. Therefore, as discussed with detail in Chapter Two, accordance with Cox and Klinger (2011) motivational structure can help or prevent a person from reaching his or her goals.

A task-specific version of the PCI that Shamloo (2007) developed was used in this thesis research. It was administered at the pre- and post-test assessments to identify characteristics of participants' motivational structure and how they changed as a result of the intervention. The pre-test version of the test requires participants first to rate from zero to 10 their familiarity with Concept-Identification Cards task. Next, based on their anticipation of their performance on the task, participants give ratings from zero to 10 on eleven TSPCI scales that reveal the characteristics of their motivational structure. These scales are similar to the original PCI rating scales (see Appendix 9).

Alcohol Use Questionnaire

The Alcohol Use Questionnaire (AUQ; Cox, 2000) was used to assess respondents' quantity and frequency of alcohol consumption during the prior year. The AUQ asks about quantity and frequency of consumption of various types of alcoholic beverages, including beer, wine, spirits and alcopops. The person's average total consumption can be calculated on a weekly, monthly, or yearly basis. The AUQ

yields three indices of drinking: (a) usual consumption, (b) unusual consumption, and (c) overall consumption. The formula to calculate weekly overall consumption is based on the Khavari Alcohol Test (KAT, 1978): ((usual drinking frequency *minus* unusual drinking frequency) usual drinking quantity + (unusual drinking frequency) unusual drinking quantity))/52.

Urges to Drink Questionnaire

"Urge to drink" is often used to describe an emotional state in which a person is strongly motivated to attain and drink alcohol (Rohsenow & Monti, 1999; Shamloo, 2009; Shamloo & Cox, 2014). The Urge to Drink Questionnaire (Bohn, Krahn, & Steahler, 1995) is an eight-item, self-report questionnaire that assesses three dimensions of drinking urges: (a) the desire for a drink (four items), (b) the expectation of positive effects from drinking (two items), and (c) the inability to avoid drinking if alcohol is available (two items). Bohn et al. (1995) factor analysed the Urges to Drink Questionnaire and reported a single factor that represented 38% of the variance. The authors also reported a high degree of internal consistency and acceptable construct, convergent, and discriminant validity, and test-retest reliability. Drummond and Phillips (2002) reported an alpha of .93 for the reliability of the questionnaire among a British sample of drinkers (Shamloo, 2007).

In the current study, the Urges to Drink Questionnaire was administered before and upon completion of the experimental task (see Appendix 11).

Short Self-Regulation Questionnaire

To measure self-regulation, Carey and colleagues (Carey et al., 2004) developed a Short Self-regulation Questionnaire (SSRQ), which is a 31-item inventory based on the 63-item SR Questionnaire that is designed to quantify an individual's ability to

self-regulate his/her behaviour in each of the seven hypothesized factors of generalized SR (i.e., information input, self-evaluation, investigation to change, plan searching, ability to plan, plan implementing, and plan evaluation). The SSRQ uses a 5-point Likert scale ranging from strongly disagree [1] to strongly agree [5].

General Self-Efficacy Questionnaire

The General Self-Efficacy (Schwarzer & Jerusalem, 1995) is a 10-item scale designed to assess optimistic self-beliefs used to cope with a variety of demands in life. The scale was designed to assess self-efficacy, i.e., the belief that one's actions are responsible for successful outcomes. The scale used for each question ranges from 1 to 4. Higher scores indicate a stronger belief in self-efficacy.

General Procrastination Questionnaire

The General Procrastination scale (Lay, 1986) is a 20-item scale based on a 5-point Likert-type scale; half of items are reversed scored. This scale examines behavioural procrastination tendencies, that is, delays in starting to complete of everyday tasks. Items range from everyday statements to school-related statements (see Appendix 10).

Materials Used for the Manipulation Task

The Computerized Concept–Identification Cards were the experimental material that was used to manipulate self-regulation. The Concept-Identification Cards were formerly used by Hiroto and Seligman (1975), Tennen and Eller (1977), and Kofta and Sedek (1989) in their studies of learned helplessness and low sense of control. The present researcher used a computerized version of the cards (Shamloo, 2007) in the current study. Participants were shown a series of cards, each of which contained two geometric patterns (see Figure 4.1).

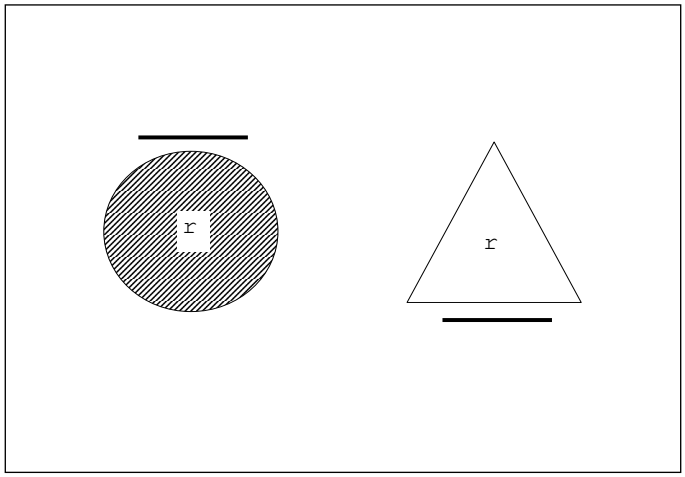

Figure 4.1 Sample Card Pair that has Two Values in Common

These two geometric images can vary on five dimensions, and for each dimension there are two possible values (see Table 4.1).

Table 4.1. Dimensions and their Value in the Concept-Identification Task.

Dimension	First value	Second value
Shape	Circle	Triangle
Size of the shape	Large	Small
Surface of the shape	Striped	Plain
Size of the letter	Large	Small
Position of the line	Above the shape	Below the shape

Procedure

All participants were seen separately in one of the School of Psychology's experimental rooms, the background noise in which was minimal. The room was equipped with both a PC and a Macintosh. The experimenter briefly clarified the goal of the study to the participant before distributing the study pack. Participants were then requested to study the Information Sheet (see Appendix 12) and sign the Consent

Form, if they wanted to carry on with the experiment. Next, the participant began the baseline assessment by completing (a) the Demographic Information Sheet, (b) Urges to Drink Questionnaire, and (c) Task-Specific PCI, (d) Self-Regulation Questionnaire, (e) Self-Efficacy, and (f) Procrastination.

After the baseline tests (pre-test) had been finished, the experimental task (Concept-Identification Cards) was ordered to each participant regardless of their group membership. However, the instructions that participants received before completing the task depended on the group to which they had been assigned. For instance, to provide participants in experimental group with a choice, they had the opportunity to choose whether they would work on the PC or the Macintosh.

Concept-Identification Cards

The Concept-Identification Cards were available in PowerPoint by the slideshow type. The participant was first asked to study the instructions that appeared across five slides at the start of the task. On Slide One, they were, "You are about to see a series of cards. You will see these cards in pairs. Each card contains five dimensions. Moreover, each dimension has two values. You will receive these cards in pairs. The next page shows a pair of cards with the 10 values. Five pairs of cards make a set. You will receive five sets. You will receive the 5 sets separately." Slide Two showed a pair of cards with the 10 values (see Table 4.1) accompanied by a full description of these dimensions as follows: "As you see, the five dimensions are Shape: circle/triangle; Size of the shape: small/large; Surface: plain/stripped; Position of the line: above the shape/below the shape; and Size of the letter r: small r/big r." The title of Slide Three was: "What is the target?" and it included these instructions: "You will receive five pairs of cards; there are two common values in each pair, BUT you should name only one of them. You should listen to the feedback to find the right

answer." The Control Group did not receive the last sentence of the instructions in Slide Three. The title of Slide Four was: "What was repeated most often?" "You should decide about the common value that is repeated most often across the five pairs. Each pair will stay on the screen for only 10 seconds." The Control Group did not receive the last sentence of the instructions in Slide Four. In addition, because this group did not have a time limit (i.e., the 10 seconds), they were instructed, "On each pair, click or press a key before saying your answer."

The experimental group read one additional slide that the No-Intervention Group did not see. It included these instructions: "At the end of each set, the experimenter will tell you whether your final answer is correct or incorrect. When you have finished all the sets of cards, the experimenter will tell you how well you have done in comparison to other participants. Are these instructions clear?" The next slide informed the participant that the warm-up trial was about to start and that it would familiarize him or her with the task. They read, "You will receive one set of cards. Try to become familiar with the task. Remember to try to find the answer across five pairs." They were informed that they would see five subsequent slides, each of which would present a pair of cards (i.e., a set of five pairs in sequence), and that they should name the one value that was common across each pair on each slide. Each slide remained on the screen for 10 seconds but only for the experimental group. After 10 seconds had elapsed, the slide was automatically replaced by this sentence: "Please, say your answer!" This required the participant to express his/her choice about the common value. The experimenter provided participants with feedback that depended on the participants' answer about the common values through the pairs of cards. However, the form of feedback were different depending on whether the participant was in the Experimental Group or Control Group. Full explanations of the

types of feedback, which were part of the experimental manipulation, are delivered in the next section. At the completion of the warm-up set (as well as the main sets), participants were indicated as follows: "The five pairs are over! Now please tell the experimenter the common value that was repeated most often across all pairs." After giving their answer for the warm-up set and receiving the feedback, they proceeded with the next slide, which said: "That's all for the warm-up. Before you start the experiment, ask the experimenter if you have questions." Next, they saw this instruction: "Ready? Click or press a key to proceed and start!"

The combination of the pairs of cards for two groups of participants was based on the following procedures: First, all pairs of cards had two values in common. Second, the same series of cards was directed to both groups. Through each set of five pairs of cards that were presented sequentially, only one common value was repeated three times; therefore, the tasks were: (a) to find one common value in each pair, and (b) to report the common value that was repeated most frequently across the five pairs in each set. For instance, if two of the five pairs had a line above the shape, one had a triangle (i.e., the common shape), and three had small-sized shapes, the correct answer was "small size of the shape." Participants in the Control Group received one warm-up trial, whereas participants in the Experimental Group received two warm-up trials. This was to deliver the Experimental Group with more information and more practice with the task. At the completion of the main sets, the Experimental Group expected two extra sets for the goal-setting part, which was specific to this group (see below).

In summary, the computerised procedure for delivering the Concept-Identification Cards was as follows: (a) participants received an outline with an example about how they could resolve the problem; (b) participants in the Control

Group had a set as a warm-up trial, but participants in the Experimental Group received two sets of warm-up trials; (c) on receipt of each pair, participants had a maximum of 10 seconds (except for the Control Group, which had no time limit) in which to decide on a dimension that was common to the pair; (d) after this, they were asked to give their answer about the common value; (e) at the end of each set, participants were requested to specify the common dimension that had occurred most repeatedly across all five pairs; (f) participants in the Experimental Group received feedback about their answers after each pair on the warm-up or the main-task sets (i.e., within-trials feedback), at the end of each set (i.e., across-sets feedback), and at the end of the entire five sets (i.e., overall feedback).

Manipulation techniques used with Concept-Identification Cards. The manipulation methods provided for the Concept-Identification Cards included six components as follows:

(a) General information. As detailed earlier, after carrying out the pre-test, all participants received general information about the experimental task. However, the general information was to some extent altered for the two groups of participants. The Control Group was stated only, "your task contains a few patterns." The Experimental Group was stated, "You will get a task to solve, cards which have several things in common, such as the size and shape of the figure and the type of surface, and the position of the line (referring to the sample pair on the screen). Your task is to find the common features across these cards. Practice on this task could have important consequences for your future learning; I expect that they will benefit you. Other participants have enjoyed doing this task, and I am sure you will enjoy it too. While doing this task, try to keep calm, it would help you concentrate on the task. It does not matter if you make mistakes, try your best and you will be fine! May I ask you which

type computer (PC or Mac) you would like to work with?" These instructions were necessary to help participants to make a choice to better understand potential benefits of doing the experiment.

(b) Specific information and choice. As stated, as general information, the participants were also stated that (a) the task could probably advantage them and expand their upcoming learning; and (b) other participants had enjoyed doing the task. Furthermore, they were provided directions about emotional control (e.g., "Don't worry if you can't find the right answer; staying calm and relaxed will help you do better."). Furthermore, the Experimental Group received brief but more wide-ranging information about the task than the Control Group. They presented an additional slide entitled, "To remember things easier." This slide taught the participants that the five dimensions on the cards could be divided into three categories. The first category was about figures (i.e., shape, size, and surface). The second category was the size of the letter, and the third category was the position of the line. This additional information allowed the concepts to be categorized in a simpler and more effective way. After providing participants in the Experimental Group with the necessary information about the task, they were asked, "Which kind of computer do you want to work with?" Thus, they were given a choice.

(c) Warm-up sets. Prior starting the Concept-Identification Cards, participants were presented a set of warm-up trials to familiarise them with the task; although, the Experimental Group received two sets of warm-ups.

(d) Time limit. The Control Group had no time limit for finding the common values in the pairs, while the Experimental Group had a time limit of 10 seconds for each pair.

(e) Feedback. All participants in the Experimental Group were provided

feedback after each pair of cards that was depending on the accuracy of their answers (i.e., within-trials feedback). However, the Control Group received no feedback on the accuracy of their responses (i.e., overall feedback). Oppositely, the Experimental Group acknowledged feedback depending on their performance after each pair, each set, and at the end of the task. While giving the across-sets feedback to the Experimental Group, the experimenter highlighted participants' success and encouraged them when they were successful. If participants face with an error, the experimenter tried to help them by saying sympathetic statements, such as "Don't worry, you have time to do better on the next pairs."

(f) Goal setting sets. As stated earlier, the Experimental Group also provided two extra sets of cards as goal-setting trials to help them improve their performance after they had completed the five experimental sets. For example, the experimenter encouraged them to do the same task again with two more sets, but this time the goal was to do it 20 per cent faster than the average time that they took on the last two of the five sets (i.e., Sets Two and Three) that they did. For example, if the participant, on average, took 35 seconds to answer Set Two and 33 seconds to answer Set Three (an average of 34seconds), he or she was encouraged to try to find the correct answer for each of the additional sets in 27 seconds.

Results

Participants and their Demographic Characteristics

Participants (*N* = 79, 26.1% males) were randomly assigned to the Control Group (*N* = 39, 49.3% males) or the Experimental Group (*N* = 40, 48.4% males). Descriptive statistics for the two groups are shown in Table 4.2.

Table 4.2. Means and Standard Deviations of Age and Years of University Education of Participants by Groups

		N	Mean	Std. Deviation
Age	Control	39	19.79	2.002
	Experimental	40	19.93	2.018
	Total	79	19.86	1.998
Study year	Control	39	1.46	.505
	Experimental	40	1.63	.490
	Total	79	1.54	.501

One-way ANOVAs showed that there were no significant differences among the groups on age [$F_{(2, 103)} = .83$, $p = .44$] or years of university education [$F_{(2, 103)} = .30$, $p = .74$].

Scoring the Measures

Urges to Drink Questionnaire

To score the Urge to Drink Questionnaire, Items 1, 3, 4, 5, and 7 were fist reverse scored. Then the mean was calculated for these items and Items 2 and 6.

Familiarity with the Tasks

In the first part of the TSPCI, participants were asked to rate their familiarity with the task (Concept-Identification Cards). Table 4.3 shows the means and standard deviations of participants' ratings of their familiarity with the task, separately for the experimental and the control group.

Table 4.3. Means and Standard Deviations of Familiarity with the Task

Groups / Task	Experimental		Control	
	M	SD	M	SD
Concept Identification Task	3.63	2.30	3.10	2.15

One-way ANOVAs on the pre-test showed that there were no significant differences among the groups on their familiarity with task *[$F_{(1.084)}$, $p = .30$]*.

Performance on the Task

Recall that one of the aims of Study Two was to test the effectiveness of an experimental technique for changing individuals' self-regulation. The number of correctly answered Concept Identification Cards in the Experimental Group was higher than in the Control Group. One-way ANOVAs showed a significant main effect for Groups on number of correctly answered Concept-Identifications Cards [$F_{(2, 103)} = 50.02, p < .0001$]. The results, therefore, confirm that the manipulation techniques were effective in causing the Experimental Group to be more successful than the Control Group on the experimental task.

Changes in Adaptive Motivation

Recall that another aims of Study Two was to test whether these changes would have beneficial, enduring effects on participants' task-specific motivational structure. The means and standard deviations of the baseline and post-experimental Adaptive Motivation scores are shown in Table 4.3. One-way ANOVA showed that the groups did not differ on pre-test Adaptive Motivation [$F_{(2, 104)} = 1.67, p = .28$]. To additional test between-group differences on Adaptive Motivation on the pre-test, a univariate analysis of covariance (ANCOVA) using a general linear model (GLM) was conducted, in which Group was entered as the independent variable (fixed factor), familiarity with the task was entered as the covariate, and the pre-test Adaptive Motivation was entered as the dependent variable. There was no effect for Group on pre-test Adaptive Motivation (p = .16). This indicates that the two groups did not differ from one another on adaptive motivational structure.

To test whether the groups differed from each other on post-test Adaptive Motivation, an ANCOVA was performed. In the model, Group was entered as the independent variable (fixed factor); the pre-test Adaptive Motivation and Familiarity scores with the task were entered as the covariates; and post-test Adaptive Motivation were entered as the dependent variable.

Table 4.4. Means and Standard Deviations of Two Groups on Adaptive Motivation on the Pre- and Post-tests

	Pre-test		Post-test	
Group	*M*	*SD*	*M*	*SD*
Control	4.75	1.52	4.61	1.59
Experimental	4.42	1.14	5.60	1.30

The results showed that there was a significant main effect for Group *[$F_{(2, 99)}$ = 21.10, $p < .0001$]*, after controlling for pre-test Adaptive Motivation [$F_{(1, 99)} = 35.35$, $p < .005$] and the covariate—i.e., familiarity with task [$F_{(1, 99)} = .36$, $p = .55$]. Pairwise comparisons revealed significant differences among the groups *($p < .000$* for all comparisons). Therefore, the results confirmed that manipulation technique were effecting on changing motivational structure to be more adaptive.

Procrastination Questionnaire

Recall that another aims of Study Two was to test how procrastination would affect individuals' self-regulation. One-way ANOVAs performed on the pre-test scores from the Procrastination Questionnaire showed that there were no significant differences among the groups on their procrastination score [$F_{(3.22), P} = .41$].

To determine whether the groups differed from each other on post-test procrastination, an ANCOVA using GLM was performed. In the model, Group was entered as the independent factor; procrastination scores on the pre-test was the covariate; and post-test procrastination scores was the dependent variable. There was a main effect for Group [$F_{(2, 102)} = 7.07$, $p < .001$,], after controlling for pre-test procrastination [$F_{(1, 102)} = 7.28$, $p < .0001$]. The significant effect for Group indicates that the Control Group was higher on Procrastination than the Experimental Group (mean = 85 and 63, respectively). Therefore, the results confirm that the manipulations technique were more effective in lowering procrastination in the self-regulation group than in the control group.

Urges to Drink Questionnaire

Recall that another aims of Study Two was to test whether a manipulation technique would affect participants' urges to drink alcohol. Table 4.5. Shows each group's means and standard deviations on Urges to Drink at the pre- and post-tests. As table shows Means in Experimental Group is lower in post-test compare with pre-test. A one-way ANOVA showed no difference among the groups on Urges to Drink at the pre-test [$F_{(2, 98)} = .68, p = .51$].

Table 4.5. Means and Standard Deviations of Two Groups on the Pre- and Post-Tests Urges to Drink Questionnaire

	Group			
	Control (N = 39)		Experimental (N = 40)	
Urges to Drink	*M*	*SD*	*M*	*SD*
Pre-test	13.11	6.24	12.46	5.06
Post-test	12.05	6.38	10.12	4.13

To specify whether the groups differed from each other on post-test urges to drink, an ANCOVA was conducted, in which post-test urges to drink were entered as the dependent variable; Group was entered as the independent factor; and pre-test urges to drink scores was the covariate. The results showed that after controlling for pre-test urges to drink [$F_{(1, 97)} = 102.01, p < .0001$], there was a significant main effect for Group [$F_{(2, 97)} = 18.14, p < .0001$]. As the means shown in Table 4.5 indicate, the significant effect for Group indicates that the Control Group was higher on urges to drink than the Experimental Group (mean = 12.05 and 10.12, respectively). Paired-sample *t*-tests were also conducted to test whether the groups' urges to drink changed from the pre- to the post-tests. The results were as follows: (a) the Experimental Group showed a reduction [$t_{(34)} = 3.25, p = .003$], but (b) the

Control Group showed no change [$t_{(32)} = .33$, $p = .86$].

Table 4.6. shows the inter-correlations among Urges to Drink, Self-Regulation, Procrastination, Task Specific PCI and Alcohol Consumption. Urges to drink was positively correlated with total Alcohol Consumption, but Self-Regulation was negatively correlated with Procrastination and also the same for Alcohol Consumption.

Table 4.6. Intercorrelations Among Urges to Drink, Self-Regulation, Procrastination, Task Specific PCI and Alcohol Consumption

		Urges to Drink	Self-Regulation	Procrastination	TSPCI summary	Alcohol Consumption
Urges to Drink	Pearson Correlation	1	-.130	.012	.057	.258*
	Si (2-tailed)		.254	.914	.619	.022
	N	79	79	79	79	79
Self-Regulation	Pearson Correlation	-.130	1	-.590**	.012	-.412**
	Sig. (2-tailed)	.254		.000	.914	.000
	N	79	79	79	79	79
Procrastination	Pearson Correlation	.012	-.590**	1	.045	.228*
	Sig. (2-tailed)	.914	.000		.696	.044
	N	79	79	79	79	79
TSPCI summary	Pearson Correlation	.057	.012	.045	1	-.057
	Sig. (2-tailed)	.619	.914	.696		.618
	N	79	79	79	79	79
Alcohol Consumption	Pearson Correlation	.258*	-.412**	.228*	-.057	1
	Sig. (2-tailed)	.022	.000	.044	.618	
	N	79	79	79	79	79

** $p < 0.01$, * $p < 0.05$ (two-tailed).

Discussion

Several manipulation techniques were used to enhance the Experimental Group's feelings of self-regulation. First, participants in the Experimental Group were provided with an opportunity to choose whether they would work with a PC or a Macintosh; that is, they were given a choice. Second, they received relevant information about how to perform the tasks (Corah & Boffa, 1970; Eads et al., 2000; Miller & Iris, 2002; Ryan et al., 1991; Skinner et al., 1996; Tsigilis & Theodosiou, 2003; Shamloo, 2007). Third, they were given feedback about their performance (Elliot et al., 2000; Goudas et al., 2000; Slavin, 1991; Shamloo, 2007). Finally, they were asked to set goals that were achievable (Bandura, 1983; Gauggel et al., 2002, 2011; Shamloo, 2007).

The effects of the four manipulation techniques (i.e., choice, knowledge, feedback, and goal-setting) on the Experimental Group supports earlier findings that (a) providing individuals with a chance to choose their tasks increases their self-regulation and commitment to the task (e.g., Kim, 2012; Klein, James & Joseph, 2008; Oaten, Cheng, 2006; Surrette & Harlow, 1992). (b) Providing individuals with sufficient information about the tasks that they will perform increases their ability to complete the tasks successfully (e.g., Shamloo, 2007). (c) Giving them contingent and immediate feedback on their performance increases their interest in and enjoyment from working on the tasks (e.g., Gauggel et al., 2002; Shamloo, 2007). Finally, (d) encouraging them to set goals enhances their motivation and performance (Shamloo, 2007). Additionally, another reason why participants in the Experimental Group completed the task more successfully than those in the Control Group might be that the manipulation techniques reinforced their task-related self-efficacy (Bandura, 1994). Prior evidence has shown that there is a direct relationship between self-efficacy and self-regulation (Lachman & Prenda, 2004;

Zimmerman, Sprecher, Langer, & Holloway, 1995). Bouffard, Bouchard, Goulet, Denoncourt, and Couture (2005) showed that self-efficacy increases participants' task involvement and their success in achieving their goals; it also increases their positive beliefs about themselves.

The Experimental Group also showed less procrastination than the Control Group. These results support those of several earlier studies indicating that people who are high in self-regulation feel more enthusiastic about their tasks, more committed to pursuing their goals, and more optimistic about achieving them—all of which fuel feelings of hopefulness and success (Henkel et al., 2002; Lachman & Weaver, 1998; Shamloo, 2007; Wortman et al., 1992).

On the other hand, not using information enhancement (i.e., providing a choice, giving specific information about how to succeed, providing supportive feedback) and not using goal setting likely reduced expected—or at least did not enhance—the Control Group's expected chances of success. Moreover, this group was neither encouraged after giving correct answers nor given negative comments after making errors; this lack of feedback likely added to this group's sense of failure, which was further exacerbated by the time pressure that had been set for them. These are likely the reasons that self-regulation in this group was lower than in the other group. This finding is consistent with that of prior studies showing that poor problem solving is associated with low self-regulation (Charles & Lester, 1984; Secrest & Thomas, 1999).

One of the important finding in the current study was that participants in the Experimental Group showed greater improvement on task-specific motivational structure than the Control Group, which is consistent with the results of Shamloo (2007). Nevertheless, there are various factors may alter individuals' goal-striving (e.g., choices that they have, their feelings of competence); their self-regulation plays a central role

(Shamloo, 2007). People who believe that they are in control are more likely to engage in adaptive behaviours (e.g., Lachman & Firth, 2004; Shamloo, 2007) and are more likely to achieve their desired outcomes. Therefore, there are motivational similarities between people who are high on self-regulation and those with an adaptive motivational structure. Similarly, people who are low on self-regulation share many motivational features with those who have a maladaptive motivational structure. For example, both kinds of people have fewer positive goals that they strive for, little hope of achieving their goals, and little commitment to pursuing them.

The Control Group also showed less adaptive motivation on the post-test than the Experimental Group. Prior evidence (e.g., Cox et al., 2002; Man et al., 1998; Shamloo, 2007) has shown that participants with less adaptive motivation are likely to consume more alcohol than those with a more adaptive motivational structure. Motivational characteristics such as having a low self-regulation, little hope for success, and little expected happiness if successful (but greater expected sadness if unsuccessful) and long expected distance from goals might contribute to a person's negative mood; people are more likely to consume alcohol when they experience negative feelings. The increase in the Control Group's urges to drink from the pre- to post-test supports the idea that the risk of developing alcohol problems increases because of individuals' negative experiences (e.g., Edwards, Dunham, Ries, & Barnett, 2006). For example, the risk of developing alcohol abuse increases when people lack a feeling of control over their work (Hemmingsson & Lundberg, 2001).

A low self-regulation score not only contributes to drinking problems but also is at the core of the problem. Alcohol abuse has been considered from various perspectives, including behavioural (Roberts & Koob, 1997), cognitive (Tiffany, 1990), and biological (Milam, 1992); nevertheless, researchers agree that alcohol abuse reflects a lack of perceived control (e.g., 2001; Robinson & Berridge, 2001, 2003; Tiffany & Conklin,

2000; as cited by Shamloo, 2007). Individuals' desire to drink might increase when they experience negative emotional states (Rohsenow & Monti, 1999), such as anxiety (Morris, Stewart, Ham, 2005), depression (Crum, Storr, & Chan, 2005), or a sense of helplessness (Fouquereau, Fernandez, Mullet, & Sorum, 2003, 1992).

As stated in the Chapter Two, the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004, 2011) clarifies the role of many factors, including social, psychological, cultural, and personality, but it asserts that their impact on decisions to drink can be summarized by the term ''motivation''. Thus, the individual himself/herself makes decisions to drink or not to do so. Decisions to consume alcohol are less likely to the extent that the person obtains satisfaction from his/her goal pursuits. The model holds that obtaining enduring happiness, which usually comes from pursing and reaching important goals, is often in conflict with decisions to drink alcohol (Shamloo, 2007).

According to the model, individuals are more likely to decide to drink alcohol when they cannot achieve emotional satisfaction through other goal pursuits or to overcome their frustrations. Therefore, drinking alcohol might become a way to increase their positive feelings or to reduce their negative feelings (e.g., Hussong et al., 2001). In fact, excessive drinkers who are able to find alternative sources of enjoyment are more likely to change their drinking behaviour (Cox et al., 2002).

Alcohol abusers might not succeed in gaining control over their behaviour if they lack the necessary skills to cope with their situation (Moos et al., 1990). People tend to crave alcohol more when they have little control over a situation than when they feel that they are in control. Some researchers have reported that among excessive drinkers who enter treatment, as many as 70% relapse within three months of completing their programme (e.g., McCusker, 2001), indicating their *lack of control* over their drinking (Vuchinich & Tucker, 1996). The lack of perceived control might fuel abusive drinking, leading to a persistent preoccupation with drinking alcohol (McCusker, 2001; Roberts &

Koob, 1997). Drinking alcohol could become a dominant concern of people who feel that they lack control. For example, relapse is more likely to occur if recovering alcohol abusers are unable to cope with their problems, such as those related to employment, finances, and interpersonal relationships (Vuchinich & Tucker, 1996).

Briefly, a low sense of self-regulation over one's life has been shown to be associated with feelings of depression, anxiety, and alcohol abuse (Shamloo, 2007). The negative affect resulting from having little self-regulation and a feeling of helplessness might increase the motivation to drink both implicitly and explicitly (Wiers et al., 2002). there is ample evidence explained excessive drinking as a disorder of motivation (e.g., Bigelow, Brooner, & Silverman, 1998; Cooper et al., 1995; Cox et al., 2006; Cox & Klinger, 1988, 1990; Monti et al., 2000), with drinkers' problems with self-control at the core of the disorder (Shamloo, 2007).

To conclude, this study indicated that participants with high self-regulation performed better on their task than the Control Group because they had increased their ability to solve tasks successfully. Thus, in turn, led to increases in their task-specific motivational structure and reductions in their urges to drink. Accordingly, the original contribution of this study was that it confirmed that if one considers a particular goal that students are trying to achieve and helps by providing them with specific information about how to achieve the goal and also with feedback about their performance, this increases their feelings of self-efficacy and also their adaptive motivation.

Limitations of the Present Study and Implications for Further Research

In the current study, participants were university students whose age ranged from 18 to 29 years. It has been reported that the use of alcohol to cope with negative emotions is more likely to occur in early adulthood than among older adults (Shamloo, 2007). In addition, Lachman and Weaver (2006) found that self-regulation is age-related, with younger participants reporting greater feelings of being in control

than older ones. Furthermore, Klinger et al. (2007) reported that motivational structure varies with age. For example, older participants name fewer goals than younger participants do, and they report less expected sorrow if they fail and less expected optimism about succeeding in their goal pursuits. They also concluded that adaptive motivation tends to be lowest at about age 40 (Shamloo, 2007).

One might argue that a limitation of the current study is that its results might not be generalizable to older adults. It is entirely correct that young people's self-regulation could be different from that of older people because of the few experiences of success or failure that young people have had. However, it should be recalled that the specific purpose of the present series of studies was to investigate variables related to alcohol consumption specifically among *university students*; therefore, the lack of generalizability of the results to other populations is not a problem. The lack of an effect for age in the present study could be due to the homogenous age range of the participants. Accordingly, future studies might be conducted to determine whether the same experimental techniques are effective with other age groups.

Another limitation of the current study is that it was restricted to healthy university students, a group that has been shown to have a more adaptive motivational structure than problem drinkers (Man et al., 1998). Therefore, one might question whether the same results would be replicable with problem drinkers. Problem drinkers or other people with a maladaptive motivational structure might respond differently to the experimental techniques used in the present study and to changes in their self-regulation that might occur naturally outside the laboratory (Shamloo, 2007).

Conclusions

The current study evaluated relationships among self-regulation, motivational structure, and urges to drink alcohol. The experimental techniques for examining self-regulation—and in turn, motivational structure and urges to drink—were based on principles identified in prior research; as stated earlier, the manipulation technique which used in this study was developed by Shamloo, 2007). These techniques were used in a novel combination under experimental conditions. The techniques (i.e., choice, knowledge, feedback, and goal setting) were effectively used in examining the impact of the experimental task on participants' self-regulation. Compared to the Experimental Group, participants in the Control Group showed (a) lower self-regulation, (b) less adaptive motivation, (c) stronger self-reported urges to drink, and (d) greater procrastination.

One implication of these findings is that increasing excessive drinkers' self-regulation might help them to counteract negative feelings that underlie their desire to drink and their actual drinking. The results also support the notion that improvements in people's motivation can reduce the chances that they will make decisions to drink alcohol (Cox et al., 2000; 2002; Cox & Klinger, 2002; 2004, 2011; Shamloo, 2007).

The next chapter presents the third study in this thesis. Study Three was designed to explore whether the relationships among an experimental withholding response, impulsivity, self-regulation, and memory capacity are related to each other, and to participants' drinking behaviour.

CHAPTER FIVE

Response Withholding: Relationships with Self-Regulation, Alcohol Consumption and Other Variables

This chapter presents the third study in this thesis. Study Three was designed to explore whether the relationships among the withholding response, impulsivity, self-regulation, and memory capacity are related to each other, and to drinking behaviour.

As discussed earlier in Chapter Two, impulsivity is not an easy construct to define. Impulsivity as a multi-dimensional characteristic is believed to be associated with a number of addictive behaviours (e.g., pathological gambling, alcohol abuse, drug abuse, and eating disorders), and the appetitive aspects of hypomania (Heidelberg, 2012). It is also related to obsessive-compulsive disorder (OCD; Enright & Beech, 1993, a, b) and attention-deficit hyperactivity disorder (ADHD; Nigg, 2001). Impulsivity also is related to anxiety, depression and aggressive behaviour (Cosi et al., 2011). According to Coskunpinar and Cyders (2013), there is a relationship between impulsivity and substance-related attentional bias. There is ample evidence showing the relationship between alcohol consumption and impulsivity (e.g. Caswell, Michael, John & Duka, 2013; Coskunpinar, Dir, Cyders, 2013; Lipetzky, 2015; Schaumberg et al., 2105). A recent study showed that there is a relationship between individuals' attempts to commit suicide and their impulsivity (May & Klonsky, 2016; see also Peters et al., 2015).

Impulsivity includes several sub-traits, such as lack of planning and motor and attention deficits. There is a large body of evidence from different genetic and neuroimaging studies, which

proposes an interaction between impulsivity and biological factors (Starc et al., 2014). Based on biological and psychological studies, Moeller and Dougherty (2002, p. 45) suggest a broad definition of impulsivity as follows: "the predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to themselves or others". Three essential concerns are addressed in Moeller and Dougherty's definition. First, impulsivity is separated from other aspects of executive cognitive functioning (see also Leshem, 2016). Second, impulsivity is seen as a relatively stable personality trait, which can fluctuate across time. Third, impulsivity is separate from poor judgement, because rapid and unplanned reactions are part of the definition. Moeller and Dougherty state that some impulsive judgments may be ill-advised, even though the actions might have been thought through in advance. Generally, impulsivity is the tendency to engage in unplanned behaviour without considering the negative consequences of the behaviour (Jones, 2012).

Recently, Stephan (2016) in a meta-analysis that included 77 studies examined the effects of alcohol on individuals' executive functioning, including inhibition and self-regulation. The results of this study showed a large effect for impulsivity. One essential aspect of self-regulation is inhibitory control. In everyday life, individuals must inhibit their proponent responses to distracting stimuli, thoughts, actions, and desires in order to achieve their goals. The ability to exercise inhibitory control is an important executive function that is essential for normal thinking processes and, ultimately, for successful living (Nielson et al., 2004). There is a large body of evidence, which demonstrates that there is a relationship between alcohol cues and craving (e.g. Field et al., 2007, 2013; Ramirez et al., 2015a, 2015b). In one study (Ramirez et al., 2015a), alcoholic participants reported increases in alcohol craving when they were exposed to visual

alcohol cues (relative to alcoholic participants who were exposed to non-alcohol cues). Similar results have been observed in heroin addicts, with drug craving being activated in the limbic system in the brain (Langleben et al., 2008), but with less activation in neural substrates associated with inhibitory control in cocaine addicts (Garavan & Stout, 2005). Pike et al. (2013, 2015) demonstrated that individuals addicted to cocaine had poorer levels of inhibitory control than control participants (see also Bell, Garavan, & Foxe, 2014). One study showed that alcohol increases incentive motivation to take cocaine; the results also showed alcohol administration increased craving for cocaine (Marks et al., 2015).

In summary, individuals (students, in particular, as related to the purposes of this study) often face many temptations that test their self-regulation ability. An important and well-studied aspect of self-regulation is inhibitory control. Individuals who generally display impulsive traits are expected to show less inhibitory control, as impulsivity has been found to be a key aspect of inhibition deficient disorders (Stephan, 2016). The current study examined to what extent alcohol consumption, self-regulation, impulsivity and memory capacity can affect inhibitory control.

Measuring Inhibitory Control

Researchers have used various measures of inhibitory control (Stop Signal, Go/No Go, and other tasks) to investigate a wide range of inhibitory control problems. For example, the Go/No Go task is a paradigm that has been used to study response-based inhibitory control. In the Go/No Go task, participants are required to respond on a keypad to the frequent *Go* trials (for example, the appearance of the letter *X*). However, the participant must withhold his or her response on the (rare) *No Go* trials (for example, the appearance of the letter *Y*).

Several factors have been shown to affect inhibitory control, including impulsivity (Logan, Schachar, & Tannock, 1997; Lorains et al., 2014; Poulton et al., 2016), cognitive load (Gunn, Finn, 2015; Keller, Carpenter, & Just, 2001), and the reward values of objects (Charles-Wash, Upto, & Hester, 2016; Geieret al., 2010; Poulton et al., 2016). One factor that has been linked to inhibitory control is alcohol use. Alcohol use is a factor that can affect many aspects of cognition and self-control. Some researchers (e.g. Hanif, 2013) have postulated that alcohol use will effect an individual's perception and self-regulation ability. Impulsivity (which is correlated with poor self-regulation) is positively related to alcohol consumption. Alcohol-related impulsive responses (impulsive responses that are caused by one's use of alcohol) can be overridden if people have enough cognitive resources to regulate them, e.g., through their self-regulation ability.

Objectives of Study Three

Although some studies have found a relationship between alcohol consumption and impulsivity, little is known about how self-regulation, alcohol consumption, working memory, and impulsivity are related to one another The current study aimed to clarify how the withholding response, impulsivity, self-regulation, memory capacity are related to each other, and to drinking behaviour. Accordingly, this study examined to what extent alcohol consumption, self-regulation, impulsivity and memory capacity can have an impact on inhibitory control.

Research Hypotheses

The hypotheses tested in this study were as follows:

(a) Participants who were heavy drinkers and low in self-regulation, high in impulsivity, and low in working memory capacity would perform more poorly than others on a Go/No Go task.

(b) More errors would be made when the stimuli on Go/No Go trials were alcohol-related than when they were alcohol-unrelated.

Method

Ethical Approval

The research reported here complied with the British Psychological Society (BPS) ethical guidelines; it was reviewed and approved by the School of Psychology Ethics Committee. Informed consent was obtained from all participants, who were aware of their right to withdraw from the study without penalty, but no one did so. They were debriefed at the end of the procedure, and the research answered any questions that they asked. Personal information that could identify individuals was not recorded on the study materials; instead, coded numbers were used. Data were kept on a password-protected computer in a locked office. Consent forms and information sheets given to participants are presented in Appendix 15 and 16.

Participants and Power Analysis

A power analysis was conducted to determine the sample size needed for the study. Power analysis requires the researcher first to estimate the size of the effect that the study being planned will be able to detect. The results of previous research can be used to decide whether a small, medium, or large effect size is expected.

Studies using Go/No Go tasks have produced a wide variety of effect sizes from a variety of research designs. The design used in the present study was a within-group design. In the present study, it was planned that *t*-tests and ANOVAs would be used to test the hypotheses. Also, a repeated-measures ANOVA was planned to test whether heavy drinkers' impulsivity scores would increase over time and across each block A medium effect size ($f = .30$) was calculated based on the results of a similar study (Wang, 2011), and this was deemed suitable for use in the present power analysis. Using

the G*Power programme (Erdfelder et al., 1996) and with an expected effect size of $f = .30$ and three groups of participants, a sample size of 108 was calculated.

Therefore, undergraduate psychology students ($N = 108$, male = 41.8%, males' mean age = 19.86 years, $SD = 2.05$; females' mean age = 20.22 years, $SD = 2.28$) were recruited through the Student Participant Panel of the School of Psychology, Bangor University. Participants received print credits for their participation. The inclusion criterion was being alcohol consumer. However, the amount of alcohol that participants drank was not important. They might be a light, moderate, or heavy drinker. The statement that researcher used for the alcohol criteria was: ''to participate in this study you should be a **consumer of alcohol**; however, the amount that you drink is not important. You might be a **light**, **moderate**, or **heavy drinke**r'' (see Appendix 17). Recruitment of participants was discontinued when 108 participants who met the inclusion criteria had been tested. One participant was excluded because he indicated that he did not consume alcohol.

Instruments

Participants were asked to complete three questionnaires. These included a measure of (a) alcohol consumption, (b) impulsivity, and (c) self-regulation. In addition, two computerised tasks were used to measure participants' behavioural impulsivity and memory capacity. Cronbach's alpha was set at .70 for this study; all of the scales met this criterion. Hence, the scales employed in this study were found to be internally consistent and reliable.

Short Self-Regulation Questionnaire

The Short Self-Regulation Questionnaire (SSRQ; Carry et al., 2004) is a 31-item inventory based on the 63-item Self-Regulation Questionnaire (Brown et al., 1999). It was designed to quantify an individual's ability to self-regulate his/her behaviour on each of the seven hypothesized factors of generalized self-regulation.

Alcohol Use Questionnaire

The Alcohol Use Questionnaire (AUQ; Cox, 2000) was used to assess respondents' quantity and frequency of drinking. The person's average total consumption can be calculated on a weekly, monthly, or yearly basis. The AUQ yields three indices of drinking: (a) usual consumption, (b) unusual consumption, and (c) overall consumption.

Barratt Impulsivity Scale

The Barratt Impulsivity Scale (BIS; Patton et al., 1995) is a self-reported measure of trait impulsivity. Thirty statements are included, each of which is scored from 1 to 4 using the anchors 'rarely', 'occasionally', 'often', and 'always'. The BIS includes three subscales: Motor Impulsiveness, Attention, and Non-Planning. A BIS total score can be computed by adding scores on the three subscales to give an overall measure of impulsivity (see Appendix 18).

Go/No Go Task

A Go/No Go task were modified to include alcohol-related and non-alcohol-related stimuli. Colour images (N = 120) of beverages (each measuring 320 x 320 pixels) were used. The images were obtained from various websites. Although they were not displayed according to type, the images can be grouped into following two categories: non-alcohol (images of water glasses) and alcohol (images of beer mugs, pints, and glasses). All trials required a 'Go' response (space bar press) unless a particular stimulus was presented twice in row (about 11% of trials). The second presentation constituted a 'No Go' trial, and the participant had to withhold responding.

Backwards Digit Span Memory Task

Participants were presented with a series of digits (e.g. 8, 3, and 4) or a longer list (2, 4, 0, 1, 8, 3). In this task, a series of digits started with three digits, and in the final step participants needed to remember nine digits. The length of the longest list a person can remember is that person's digit span. Participants needed to reverse the order of the numbers on every trial.

Materials and Design

Apparatus

Both the Go/No Go task and the Backwards Digit Span memory task were presented on a 15-inch monitor with a resolution of 800 x 600. The experiment was run using E-prime, Version 2.0 (Eschmann et al., 2005). A keyboard was used to record participants' responses.

Stimulus Images

As explained above, in this study, 120 colour images of beverages were used in a standard Go/No Go design. The images can be grouped into the following categories: non-alcoholic (images of water glasses) and alcoholic (images of beer mugs, beer pints, and wine glasses). All participants wore headphones to ensure that others did not disturb them in the testing room and to allow the software to give auditory feedback on their performance. In addition, to ensure that participants actively engaged in the Go/No Go task, we added an alarm system to the task. Specifically, if a participant failed to respond correctly on more than two trials in a row, an alarm sounded into their headphones.

Procedure

Participants were given an information sheet that described the study. The experiment was then explained to them, and once they understood it and agreed to participate, they were asked to

sign a consent form. Participants sat at a computer screen in a dimly lit room and positioned themselves approximately 57 cm away from the screen. For the Go/No Go task, as for all computer-based portions of the experiment, instructions appeared on the screen and participants were prompted to press any key to begin or to continue. Participants continued with the assessments by completing (a) the Demographic Information Sheet, (b) Alcohol Use Questionnaire, and (c) Self-Regulation Questionnaire, and (d) Impulsivity Questionnaire. After participants had finished all of the questionnaires, they were introduced to the last part of the assessment, which was the computerized backwards digit memory task.

For the Go/No Go task, participants were instructed to respond on the space bar (Go) to each image, but to withhold their response (No Go) to images that appeared twice in succession. The duration of each trial was 1000 ms: an image of a product appeared on a black background for 600 ms, followed by an inter-stimulus interval (ISI) of 400 ms, during which the screen was blank. When required to do so (i.e. on 'Go' trials), participants were to make the required response (press the space bar) before the end of the ISI. There were 1,080 trials split into four blocks of 270 trials each; each block lasted four minutes and 30 seconds. Between each block, there was a self-timed break of at least 30 seconds to counter general fatigue. There were 960 (89%) Go trials and 120 (11%) No Go trials. Each of the 120 image appeared once as a No Go trial and eight times as a Go trial. Images appeared for 600 ms with an ISI of 400 ms; thus, each trial lasted 1000 ms. An example of a series of experimental trials is shown in Figure 5.1.

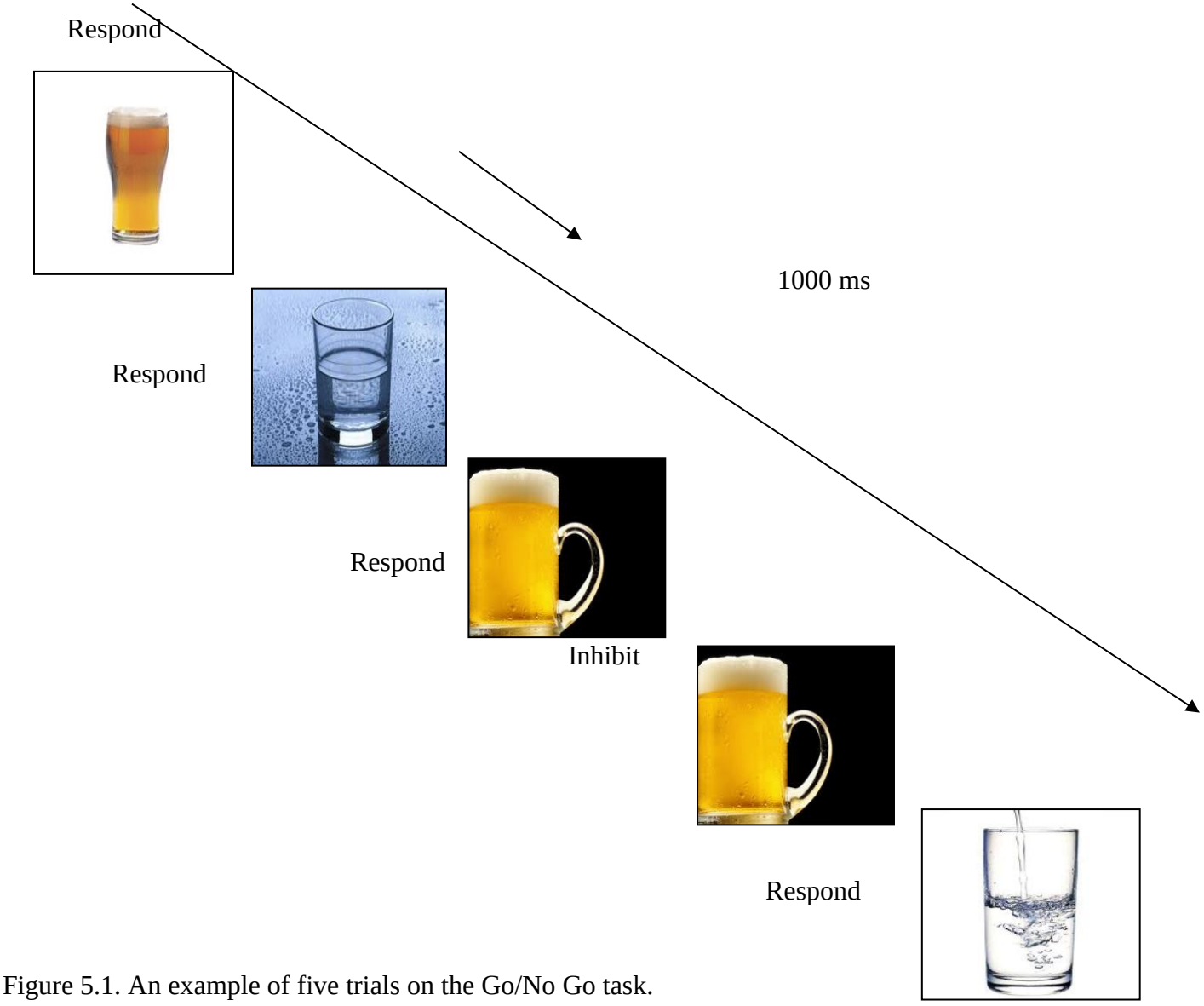

Figure 5.1. An example of five trials on the Go/No Go task.

Participants were required to respond (Go) to images but withhold their responses (No Go) when images appeared twice in succession.

In the backward memory task, participants were presented with a series of digits (e.g., '8, 3, and 4') or a longer list (e.g., '9, 2, 4, 0). In this task, a series of digits started with three digits, and in the final step participants needed to remember nine digits. The length of the longest list a person can remember is that person's digit span. In the backward digit-span task, the participant needs to reverse the order of the numbers.

Results

Scoring the Measures

Alcohol Consumption

As mentioned, the AUQ (Cox, 2000) was used to assess respondents' quantity and frequency of drinking. The person's average total consumption can be calculated on a weekly, monthly, or yearly basis. The AUQ yields three indices of drinking: (a) usual consumption, (b) unusual consumption, and (c) total consumption. The formula to calculate weekly total consumption is based on the Khavari Alcohol Test (KAT, 1978). It is ((usual drinking frequency-unusual drinking frequency) usual drinking quantity+ (unusual drinking frequency) unusual drinking quantity))/52.

The means and standard deviations of the alcohol consumption indices are shown in Table 5.1 separately for males and females. These indices are weekly usual drinking, weekly unusual drinking, and weekly total drinking.

Table 5.1. Means and Standard Deviations of Units of Alcohol Consumed

Drinking indices	Sex	Mean	SD
Overall weekly drinking	Female	18.904	19.3954
	Male	25.806	20.8160
	Total	21.716	20.1799
Total weekly usual drinking	Female	16.3155	17.55469
	Male	23.8470	19.72159
	Total	19.3839	18.75021
Total weekly unusual drinking	Female	6.4869	10.10780
	Male	6.9882	9.75023
	Total	6.6912	9.92071

A one-way ANOVA were conducted to compare males and females on the alcohol consumption indices. There was a significant difference between males' and females' mean total weekly alcohol consumption [$F(1,108) = 4.33, p = .04$], which was in accordance with many studies that found that males drink more than females (e.g., Timmer, Verhoff, & Colten, 1985). Unexpectedly, females' and males' mean unusual weekly alcohol consumption did not differ [$F(1,108) = .06, p = .79$].

To identify relationships among alcohol consumption and the other variables, an intercorrelations matrix among the variables was constructed. Table 5.2 shows the results.

Table 5.2. Intercorrelations among Alcohol Consumption, Memory Capacity, Go/No Go Responses.

	WD	*SR*	*All-Corr*	*EoO-Alc*	*EoC-Alc*	*Impuls*	*CR-Alc*
WD	*1*	*-.352** .000*	*-.043 .659*	*-.463** .000*	*.301* .032*	*.291** .002*	*-.222* .023*
SR	*-.352** .000*	*1*	*.139 .152*	*-.312* .031*	*.090 .357*	*-.621** .000*	*.472** .000*
All-Corr	*-.043 .659*	*.128 .190*	*1*	.034 .730	*.151 .121*	*.143 .142*	*.26** .007*
EoO-Alc	*-.463** .000*	*-.312* .031*	*.034 .730*	*1*	*.652** .000*	*.002 .984*	*-.314* .031*
EoC-Alc	*.301* .032*	*.090 .357*	*.151 .121*	*.652** .000*	*1*	*-.025 .798*	*-.351 .23*
Impuls	*.291** .002*	*-.621** .000*	*.143 .142*	*.002 .984*	*-.025 .798*	1	-.201* .038
CR-Alc	*-.222* .23*	*.472** .000*	*.26** .007*	*-.314* .031*	-.351* .23	*-.201* .038*	*1*

Note: WD = Overall weekly drinking; SR = Self-regulation; All-Cor r = All correct memory digit; EoO-Alc,EoC-Alc,CR-Alc = Go No Go response categories; Impuls = Impulsivity; ** $p < 0.01$, * $p < 0.05$ (two-tailed).

As Tables 5.2 shows, there was a negative relationship between overall weekly drinking and total self-regulation. That is, the more alcohol that participants drank, the weaker was their ability to self-regulate.

There was a negative relationship between overall weekly drinking and errors of omission on trials with alcohol-related stimuli on the Go/No Go task. That is, the more alcohol that participants drank, the less was their ability to withhold responses for alcohol-related stimuli.

There was a positive relationship between overall weekly drinking and errors of commission on trials with alcohol-related stimuli on the Go/No Go task. That is, the more alcohol that participants drank, the more impulsive was their responses for alcohol-related stimuli.

There was a negative relationship between overall weekly drinking and correct rejections on trials with alcohol-related stimuli on the Go/No Go task. That is, the more alcohol that participants drank, the fewer correct rejections of alcohol-related stimuli they made when they needed to withhold their responses.

There was a positive relationship between total correct responses on backward digits memory span and correct rejections on trials with alcohol-related stimuli. That is, the more alcohol that participants drank, the more correct rejections of alcohol-related stimuli they made when they needed to withhold their responses.

However, there was no relationship between total correct responses on backward digits memory span and the other variables, including alcohol consumption. Results undoubtedly would have been different if an alcohol-related digit span memory test were run with alcohol abusers.

Participants' Drinking Status

There were various possibilities for defining participants' drinking status. It was decided to use cut-offs based on the UK Department of Health's guidelines for healthy drinking (2015). These cut-offs are specified in Table 5.3. However, initial inspection of the data indicated that there were too few participants who were light drinkers and also too few who were very heavy drinkers to include light drinkers and very heavy drinkers in separate categories; see Table 5.4. Indeed, one would not expect to find many very heavy drinkers among a sample of university students. For these reasons, light drinkers and moderate drinkers were collapsed into one category; similarly; heavy and very heavy drinkers were collapsed into another category. Additionally, Hypothesis 1 stated that heavy drinkers would be different than moderate drinkers on certain variables; to test this hypothesis, it was necessary to divide the drinkers into categories Table 5.3 shows the cut-offs.

Table 5.3. Cut-offs for Drinking Status Separately for Males and Females

Sex / Drinking Status	Female (units of alcohol)	Male (units of alcohol)
Light and moderate	0 to 18	0 to 21
Heavy	18 to 30	21 to 40
Very heavy	30 and above	40 and above

As mentioned earlier, participants were 108 undergraduate psychology students (males = 41.8%, males' mean age = 19.86 years, *SD* = 2.05; females' mean age = 20.22 years, *SD* = 2.28). Table 5.4 shows drinking status for males and females separately.

Table 5.4. Drinking Status for Males and Females

Drinking Status	Female	Male	Total
Light and moderate	(47%) 30	(25%) 11	(38%) 41
Heavy	(41%) 26	(57%) 25	(47%) 51
Very heavy	(12%) 8	(18%) 8	(15%) 16
Total	(59%) 64	(41%) 44	108

Note: Drinking quantity is based on UK units of alcohol. One alcohol unit equals eight grams of pure alcohol.

Recall that in Study Three, it hypothesised that heavy drinkers' performance would be different from non-heavy drinkers. On the other hand, the review of the literature suggested that very heavy drinker should be considered as a special category with regard to self-regulation. It was decided, therefore to exclude very heavy drinkers as a category of drinkers from the analysis.

Self-Regulation

The means and standard deviations of participants' self-regulation scores according to their drinking status are shown in Table 5.4.

Independent-samples *t*-tests were conducted to compare males and females on their scores from the Short Self-Regulation Questionnaire. No significant difference between males and females was found [$t_{(91)} = .44, p = .62$].

Table 5.5. Means and Standard Deviations of Participants on Self-Regulation according to Drinking Status.

Drinking status			
Light and moderate		Heavy	
M	*SD*	*M*	*SD*
108.4	15.2	98.3	18.1

Independent-samples *t*-tests showed a significant difference between the two types of drinkers in total self-regulation scores. The results showed that heavy drinkers were lower in self-regulation than light or moderate drinkers (*M=87, SD=18.1*), t (44) = 1.24, p = .003.

Impulsivity Scores

As mentioned, the Barratt Impulsivity Scale (BIS Patton et al., 1995) was used in this study. A total score can be computed by adding scores on the three subscales to give an overall measure of impulsivity. An independent t-tests showed that there was no significant difference between males and females on impulsivity *[t* **(*91*)** *= 45, p = 0.62,* Table 5.6 shows the means and standard deviations of participants on impulsivity based on their drinking status.

Table 5.6. Means and Standard Deviations of Participants on Impulsivity Based on Drinking Status

Drinking status			
Light and moderate		Heavy	
M	*SD*	*M*	*SD*
62.2	10.2	74.6	11.4

An independent t-tests showed a significant difference between the types of drinkers on the

total impulsivity score Results showed that heavy drinkers were more impulsive than light and moderate drinkers were *(M=74.6, SD=11.4), t (45) = 1.25, p = .09.*

Go/No Go Task

Withholding Response Performance

The Go/No Go yields four primary measures: correct hits (Hit), correct inhibition (correct rejections: CR), failure to respond on a Go trial (Miss), and failure to inhibit (errors of commission: EoCs). These categories are shown in Table 5.7.

Table 5.7. Response Categories for Go/No Go Task

		Trial type	
		Go	No Go
Response	Yes	Hit	Error of Commission
	No	Error of Omission	Correct rejection

A one-way ANOVA was used to compare the light and moderate drinkers with the heavy drinker on two primary measures: Hits and Correct Rejections. Main effects for drinking status were demonstrated for the total number of Hits and Correct rejections.

Table 5.8. Means and Standard Deviations on 'Correct Rejections on Trials with Alcohol-Related Stimuli based on Drinking Status.

Drinking status			
Light and moderate		Heavy	
M	*SD*	*M*	*SD*
.54	.18	.29	.19

A LSD post-hoc test showed that the light and moderate drinkers (*M = .54, SD = .18*) correctly rejected significantly more alcohol-related stimuli that the heavy drinkers (*M = .29, SD = .19*).

Errors of Commission on Trials with Alcohol-Related Stimuli

Table 5.9. Means and Standard Deviations of Participants' Errors of Commission on Trials with Alcohol-Related Stimuli based on Drinking Status.

Drinking status			
Light and moderate		Heavy	
M	*SD*	*M*	*SD*
.14	.4	.26	.7

A one-way ANOVA showed a significant main effect for drinking status on Errors of Commission on trials with alcohol-related stimuli. A LSD post-hoc test showed that Errors of Commission on trials with alcohol-related stimuli for the light and moderate drinkers (*M = .14, SD = .4*) were significantly less than for heavy drinkers (*M = .26, SD = .7*).

To determine how these metrics changed across blocks, a repeated-measures ANOVA (4 Blocks as levels and two factors of hits and Correct Reject Alcohol Related Stimuli) was conducted. For Hits there was a significant effect for Blocks on alcohol-related stimuli. Figure 5.2 shows the post-hoc results of the effect of blocks over time on mean of Hits for alcohol-related stimuli. It shows that there was a significant effect for blocks on Hits for alcohol-related stimuli (***F*** (2,108) = 2.3, ***p*** = 0.022).

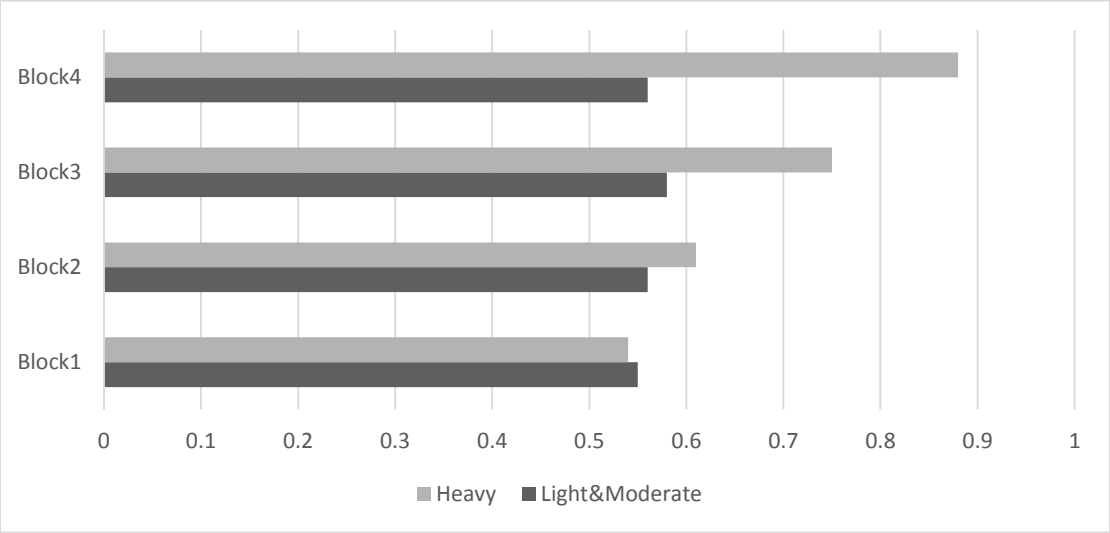

Figure 5.2. Blocks of Hits on Alcohol Related Stimuli based on Alcohol Drinking Status

Of greater significance was the Correct Rejections on trials with alcohol-related stimuli. There was both a main effect of blocks [*F (2,108) = 30.6, p <0.001*,] and an interaction between drinking status x blocks [*F (2,108) = 3.35, p = 0.021,]*. As Figure 5.3 shows, there was a general increase in number of Hits over the four test blocks, and this was more marked in heavy drinkers compared to light and moderate drinkers. Indeed, by Block 4 there was a significant difference in

inhibition between light and moderate drinkers and heavy drinkers. Thus, the post-hoc LSD test shows that heavy drinkers were less able to correctly reject alcohol-related stimuli over time. This means that heavy drinkers' impulsivity scores increased over time.

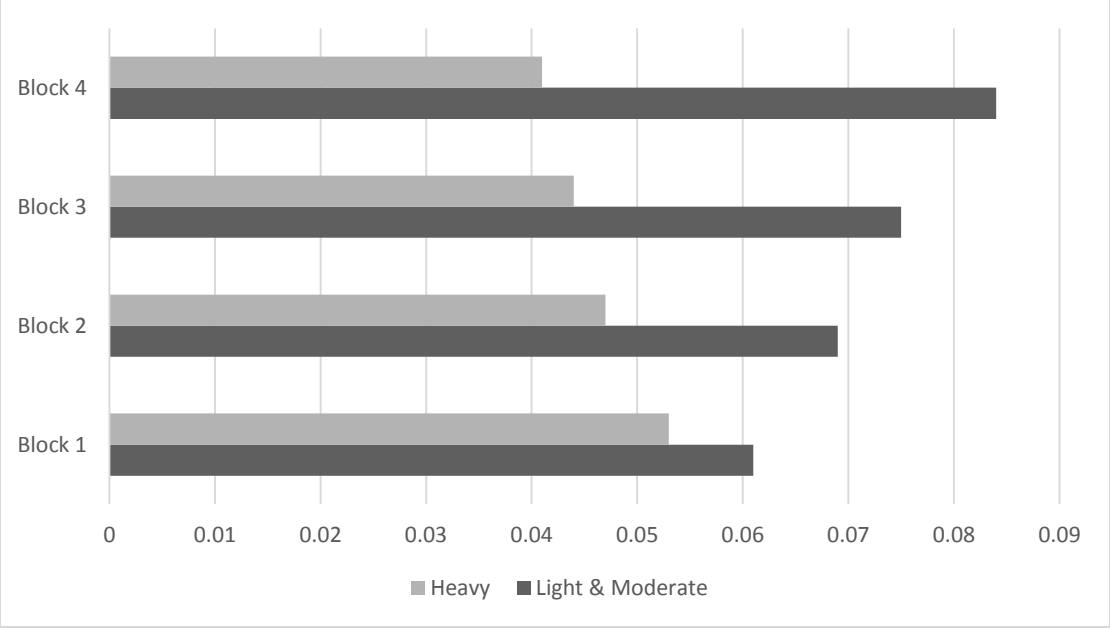

Figure 5.3. Blocks and Correct Rejections of Alcohol-Related Stimuli based on Drinking Status.

Reaction times were compared across participants' drinking status for Hits to alcohol-related stimuli. Table 5.10 shows the means and standard deviations of reaction times on Hits to alcohol-related stimuli based on participants' drinking status.

Table 5.10. Means and Standard Deviations of Participants' Reaction Times to Alcohol-Related Stimuli based on Drinking Status.

Drinking status			
Light and moderate		Heavy	
M	*SD*	*M*	*SD*
340.75	32.46	214.89	36.02

Figure 5.4 shows differences in RTs between the light/moderate drinkers and the heavy drinkers. A one-way ANOVA showed a significant main effect for drinking status on RTs for alcohol-related stimuli. LSD post-hoc tests showed that RTs for alcohol-related stimuli in the heavy drinkers (*M = 214.89, SD = 36.02*) were significantly slower than for the light and moderate drinkers (*M= .340.75, SD= 32.46*).

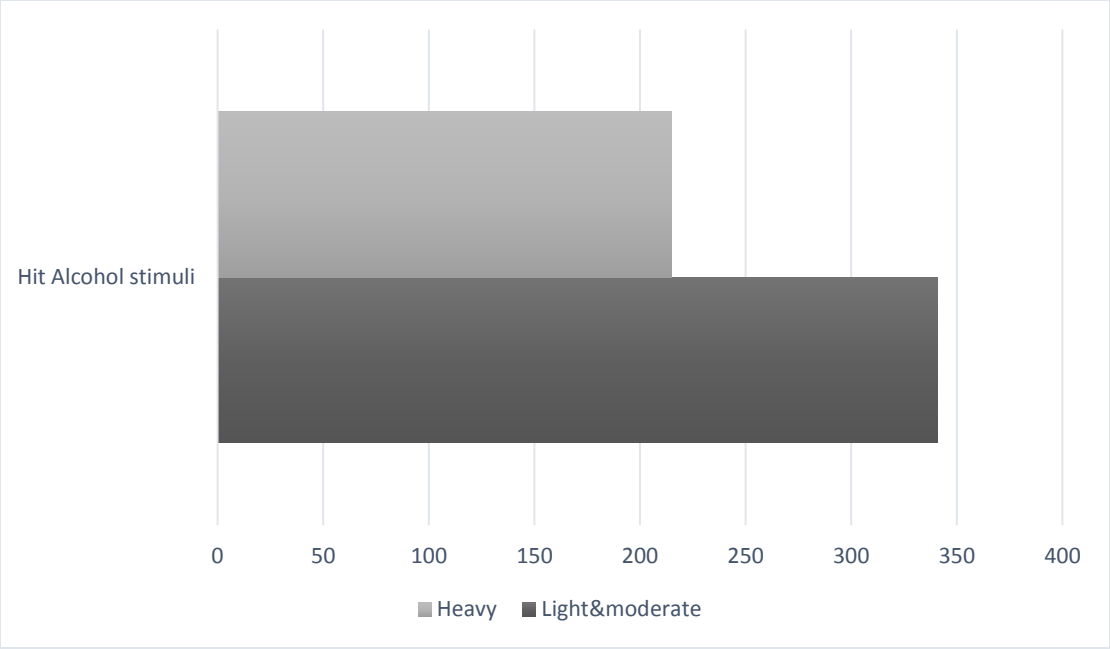

Figure 5.4. Mean RTs of Hit for Alcohol-Related Stimuli based on Participants' Drinking Status

To determine how RTs changed over time, a repeated-measures ANOVA was performed using the four trial blocks as independent variables and the two kinds of RTs (Hits and Correct Rejections) as dependent variables. The post-hoc LSD tests results shown in Figure 5.5 indicate that RTs for Hits in the presence of alcohol-related stimuli significantly decreased over time for heavy drinkers compared to light and moderate drinkers [$F(2,108)=4.1$, $p = .042$].

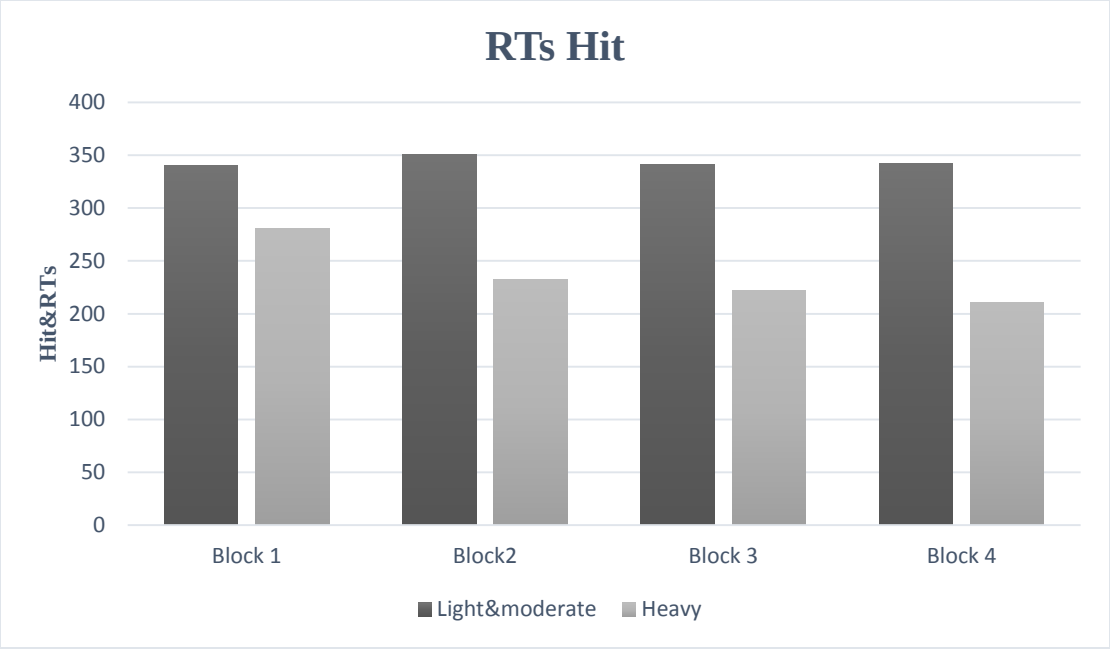

Figure 5.5. Changes across Blocks for Hit RTs in the Presence of Alcohol-Related Stimuli.

Discussion

Study Three was designed to explore relationships among the withholding response, impulsivity, self-regulation, memory capacity, and drinking behaviour. A major purpose of the study was to determine whether heavy and light drinkers would respond differently when the stimuli were alcohol-related versus when they were non-alcohol related. Moreover, participants who were heavy drinkers, low in self-regulation, high in impulsivity, and low in working memory capacity were hypothesized to perform more poorly than others on a Go/No Go task and to make more errors when the stimuli on Go/No Go trials were alcohol-related than when they were alcohol-unrelated.

Along with other instruments, the current study used a modified computerized Go/No Go task with alcohol-related and non-alcohol-related stimuli to investigate whether students' withholding responses would differ based on the amount of alcohol they drank and also whether their self-regulation, impulsivity and memory capacity were related to their withholding responses when the stimuli were alcohol-related rather non-alcohol related.

The results of this study are consistent with the results of other studies, which have shown that impulsivity is important for understanding university students' alcohol use. For example, higher levels of impulsivity have consistently been related to greater alcohol use and risk for alcohol-related problems (Magid, MacLean, & Colder, 2007; Shin, Hong, & Jeon, 2012; Wardell et al., 2016).

This study also confirms the result of other studies, which have shown that disinhibition is related to poor self-regulation, substance abuse, and alcohol-related problems (Hanif, 2013). Moreover, the results support earlier findings showing a relationship between disinhibition and alcohol problems. For example, Goudriaan et al. (2006) used the Go/No Go and stop-signal tasks and found a deficit in inhibitory control in alcohol-dependent individuals compared to controls; also, Peterson et al. (1993); Shields (1997); Stipek (1988, 1998) found that extrinsically motivated people were more vulnerable to developing a poor sense of control, helplessness, and poor problem solving abilities. There is evidence suggesting that in young adults with an established pattern of binge drinking, disinhibition in response to alcohol stimuli is a significant predictor of the amount of binge drinking (Czapla et al., 2015).

As discussed in Chapter Two, inhibitory control (a component of self-regulation) is the ability to stop, delay, or change an ongoing behaviour. The results of this study are also consistent

with several other studies, which have shown that Go/No Go tasks can differentiate between alcohol-dependent individuals and controls, and between heavy and light social drinkers (Christiansen, Cole, Goudie, & Field, 2012; Goudriaan, Oosterlaan, de Beurs, & van den Brink, 2006; Jones et al., 2016). In one study (Jones et al., 2016), participants received inhibitory control training. In this intervention, participants needed to connect appetitive stimuli with inhibition behaviour. Individuals who received inhibitory control training consumed less alcohol than the control group.

Several studies have shown that working memory is related to antisocial behaviour (Chamberlain, Derbyshire, Leppink, & Grnat, 2016; Endres, Donkin, & Finn, 2014; Hansen et al., 2015), dysregulated behavioural disorders (Dovis, Van der Oord, Wiers, & Prins, 2015; MacNamara & Proudfit, 2014), and alcohol abuse (Gladwin, Wires, 2012; Wardell, Quilty, & Hendershot, 2016; Hoffman, Sklar, & Nixon, 2015). Although several studies have shown that working memory plays an important role in such constructs as attention (e.g. Boissoneault et al., 2014) and inhibition of a prepotent response (Noel et al., 2013), there is a lack of consistency among different studies regarding the relationship between alcohol use and memory. Some studies have found alcohol-related memory deficits, but other studies have not (Grattan-Miscio & Vogel-Sprott, 2005; Paulus et al., 2006; Schweizer et al., 2006;; Weissenborn & Duka, 2003). Recently, a study examined the relationship between individual differences in working memory after participants drank alcohol. Results showed that participants who drank alcohol before their working memory was tested had lower memory scores than participates in the control group who had not been given alcohol prior to the working memory test (Lechner et al., 2016). Another recently published study showed that working memory moderated the association between

smoking urges and smoking lapses after alcohol administration. These researchers concluded that participants who scored lower on memory might need additional forms of treatment (Day et al., 2015). There is also some evidence showing that executive functions and motivation can moderate the relationship between alcohol consumption and automatic associations in problem drinkers (e.g. van Deursen et al., 2015).

The current study did not find a relationship between alcohol consumption and backward digits memory span as a measure of working memory capacity. This might be because alcohol selectively impairs certain aspects of working memory (Saults et al., 2007), with impairment revealed when stimuli are presented sequentially, but not when they are presented in an array (Baddeley et al., 1984).

Conclusions

By using three questionnaires and two computerised tasks to measure behavioural impulsivity and memory capacity, Study Three was designed to explore whether the withholding response, impulsivity, self-regulation, and memory capacity are related to one another and to students' drinking behaviour. Two main hypotheses were tested as follows:

(a) Participants who were heavy drinkers, low in self-regulation, high in impulsivity, and low in working memory capacity would perform more poorly than others on a Go/No Go task.

(b) More errors would be made when the stimuli on Go/No Go trials were alcohol-related than when they were alcohol-unrelated.

As discussed in detail in Chapter Two, there is ample evidence showing that deficits in inhibitory control are related to alcohol abuse (Jones, 2012; Lopez-Caneda et al., 2014; Miller, 2015). Also, there is ample evidence showing that performance on Go/No Go tasks can differentiate between alcoholics and controls, and between heavy and light social drinkers (Christiansen et al., 2012; Jones, 2012; Miller, 2015; Roberts et al., 2014). In summary, one of the main aims of this study was to examine to what extent alcohol consumption, self-regulation, impulsivity and memory capacity can have an impact on inhibitory control. A modified Go/No Go task using alcohol-related and alcohol-unrelated stimuli was used to measure inhibitory control.

The study tested a cross-sectional sample of social drinking students who completed self-report measures. Although no directionality can be claimed, the results are consistent with the findings of Study One and Study Two and the published studies that used student, community, and clinical samples to test unidimensional constructs. Study One was designed to show that self-regulation and motivational structure and alcohol consumption are related to one another. Study Two aimed to clarify relationships among self-regulation, motivational structure and alcohol use. Chapter Six discussed connectivity among the three studies that were conducted for this thesis.

In summary, the study achieved its primary aims by identifying associations among the withholding response, self-regulation, impulsivity, and alcohol use with the following results:

Self-regulation was correlated with impulsivity.

Heavy drinkers were low in self-regulation and high in impulsivity.

Heavy drinkers were poor in withholding their responses to alcohol-related stimuli.

Thus, the original contribution of this study is that it points to the importance of stable personality/cognitive characteristics in determining university students' alcohol consumption. For

example, Study One suggests that self-regulation as a stable characteristics is an important determinants of university students 'alcohol consumption.

Limitations and Future Research

As previously discussed in detail, the purpose of Study Three was to explore whether relationships among the withholding response, impulsivity, self-regulation, and memory capacity were associated with one another and related to students' drinking behaviour. Even though the purpose of neuropsychological tasks is to measure impulsivity directly under laboratory conditions, interpreting results is difficult because each task might measure several different cognitive processes. For instance, although in Study Three an alcohol-related Go/No Go task was developed, this behavioural measure might reveal a variety of cognitive processes. For example, errors of commission on a Go/No Go task could reflect a failure at various levels of cognition, ranging from (a) an failure to learn or encode the correct response to the object (and a failure to code a withholding response to a non-target), (b) problems with over-activation of the representation of the response, or (c) a decrease in the capability to discriminate between the two kinds of responses that are required on the task (Perales, Verdejo-Garcia, Moya, Lozano, & Perez-Garcia, 2009).

As pointed out, the current study did not find a relationship between alcohol consumption and backward digit span as a measure of working memory capacity. This might be because alcohol use selectively impairs certain aspects of working memory (Saults et al., 2007), with impairment revealed when stimuli are presented sequentially, but not when they are presented in an array (Baddeley et al., 1984). Therefore, another limitation of study might be limitations on the task that was used to test working memory capacity. Therefore, further research needs to be conduced to

identify the most valid task for testing the relationship between alcohol consumption and working memory capacity.

Chapter Six discusses in detail the theoretical and practical significance of these findings and also how the results might be practically applied in future research.

Chapter Six

General Discussion

This thesis investigated self-regulation and motivational structure as two important psychological constructs related to alcohol consumption. As discussed in detail in Chapter One, alcohol consumption is not only a public concern in most societies around the world, but it is also a major concern among university students, particularly in many Western countries. It was also discussed in Chapter One that researchers by considering different approaches try to determine which variable(s) is (are) most closely related to alcohol consumption; however, alcohol consumption alongside use of other addictive drugs is a multidimensional behaviour. Therefore, having a comprehensive methodology for understanding the etiology of alcohol use needs to be emphasized.

Regarding why people drink, there are different reasons or motives for drinking, which can be different from one person to another. For some individuals, the motive for drinking could be just to change their mood chemically from bad to good or from good to even better. For that reason, self-regulation is one of the main explanations of psychological factors related to addiction. Within this theoretical perspective, addiction is assumed to result—at least in part—from a lack of self-regulation.

Emotional experiences perform an essential role in human behaviour. Individuals when faced with negative emotions try to find ways to regulate their emotional states. Although some strategies may be helpful and may not interfere with long-term goals, other strategies may be immediately rewarding, but maladaptive in the long-term (for instance, drinking alcohol to feel

relaxed after taking a difficult exam). There is also evidence to confirm that there is a substantial increase in heavy drinking while high school students are preparing to enter university (Myrteveit et al., 2016). There is also ample evidence showing that university students who drink alcohol to cope with negative emotions, such as depression and anxiety, are more likely to drink heavily, and experience greater levels of alcohol-related problems such as self-injury as a result of their maladaptive emotion-coping behaviour (Brook, Wiloughby, 2016). Additionally, as discussed in Chapter Two, although social drinking motives tend to be associated with moderate levels of alcohol consumption, coping motives have been positively related to both heavier consumption and alcohol abuse (Cadigan, Martens, & Herman, 2015; O'Hara, et al., 2014; Young et al., 2015).

As discussed in Chapter Two, the relationships between motivational structure and alcohol use have been established in both clinical, "normal", and student samples. Cox, Blount, Bair, and Hosier (2000) studied the relationships between Readiness To Change (RTC) and motivational structure in a clinical sample of 77 inpatients in a detoxification and rehabilitation centre for alcohol dependence. They found that adaptive motivational structure was a positive predictor of the determination to change (Cox et al., 2000). People with an adaptive motivational structure are engaged in goal pursuits, whereas people with a maladaptive motivational structure are less engaged in goal pursuits (Cox & Klinger, 2004, 2011). In an earlier study that used the Motivational Structure Questionnaire (MSQ), Klinger and Cox (1986) found that the motivational structure of 53 inpatients in a treatment centre moderately predicted their responses to treatment. This pattern of results was replicated in a later study with a clinical sample of 202 alcoholic veterans. The alcoholic veterans were followed up 12 months after undergoing a 30-day

detoxification and treatment programme. Once again, adaptive motivational structure predicted more positive treatment outcomes (Glasner, Cox, Klinger, & Parish, 2001).

On the other hand, some people consume alcohol to enhance their positive affect, which may lead them to problematic drinking. For example, some studies have shown that on certain happy occasions (such as on days of celebration) university students drink more heavily (Cooper, Agocha, & Sheldon, 2000; Del Boca et al., 2004; Glindermann, Wiegand, & Geller, 2007; LaBrie, Migliuri, & Cail, 2009; see also, Fjaer & Pederson, 2015). It was also discussed that according Cox and Klinger's motivational model of alcohol use (2004, 2011), a person's final decision to drink or not to drink on any particular occasion depends on the person's expected affective change from drinking. A person is motivated to drink alcohol for a variety of reasons; for example, a drinker may decide to drink because he or she is unable to regulate his or her affect through more adaptive means.

From some of the studies reviewed in Chapter Two, it can be concluded that an adaptive motivational structure is a good predictor of both a dependent drinker's determination to change and his or her treatment outcome, whereas a maladaptive motivational structure is more associated with resistance to change and a poorer treatment outcome. Comparable results were also found for cognitive (alcohol attentional bias) and motivational (motivational structure and readiness to change) predictors of excessive drinking in non-clinical samples (e.g. Cox, Fadardi, Hosier, & Pothos, 2015; Cox, Pothos, & Hosier, 2007). The excessive drinkers in these studies were tested at baseline and retested three and six months later. Cox et al. (2007) found that (1) high scores on readiness to change predicted short-term reductions in excessive drinking, (2) low scores on alcohol attentional bias and a strong family history of alcohol-related problems predicted long-

term reductions in excessive drinking, and (3) motivational structure interacted with alcohol attentional bias and readiness to change. The greatest long-term reductions in excessive drinking were found among participants with an adaptive motivational structure and low scores on alcohol attentional bias and among participants with an adaptive motivational structure and high scores on readiness to change. Therefore, cognitive (alcohol attentional bias) and motivational factors (motivational structure and readiness to change) predicted long-term reductions in alcohol consumption (Cox, Pothos, & Hosier, 2007; Viktor, 2009).

The relationships between motivational structure, alcohol consumption, and alcohol-related problems in students have also been established. Cox and colleagues studied 370 students in four countries: the Czech Republic, Norway, the Netherlands, and the United States (Cox, Schippers, Klinger, Skutle, Stuchikova, Man, King, & Inderhaug, 2002). They hypothesised that adaptive motivational structure would be associated with less alcohol consumption. Although this hypothesis was not supported, they found important relationships between adaptive motivational structure and alcohol-related problems. As students' alcohol-related problems increased, the strength of the negative relationship between adaptive motivational structure and alcohol consumption also increased; in other words, it would appear that as alcohol-related problems and alcohol consumption increased, students' adaptive motivational structure decreased.

Similar studies with students have used the Personal Concerns Inventory (PCI) to establish relationships among motivational structure, alcohol use, and alcohol-related problems. Hosier (2001) found that maladaptive motivational structure predicted alcohol-related problems. In addition, Fadardi (2004) found that maladaptive motivational structure and alcohol consumption were positively correlated.

Furthermore, Hogan (2005) found that adaptive motivational structure and alcohol-related problems were negatively correlated. That is, as the number of alcohol-related problems reported by students increased, their adaptive motivational structure decreased. Hogan's findings are, therefore, consistent with those reported by Cox et al. (2002).

On the other hand, as was pointed out in Chapter Two, individuals with an adaptive motivational structure are more engaged in their goal pursuits. First, they have a tendency to be emotionally engaged because they expect to gain joy if they attain goals and sorrow if they do not. Second, they tend to be more committed to goal attainments, have more success in attaining goals, have more control over attaining goals, know what to do to attain goals, and see the attainment of goals as being very important (Cox & Klinger, 2004, 2011).

Overall, people with a maladaptive motivational structure are indifferent and less engaged in their goal pursuits than those with an adaptive motivational structure. For example, individuals may not expect to derive much emotional satisfaction from goal attainments, and experience little sorrow if they fail to attain goals. Further, they may actively pursue goals that they will never realistically achieve, because they have failed to disengage from the inappropriate goals and refocus their attention on the goals that they can achieve.

According to Cox and Klinger's (2004, 2011) model of alcohol use, personal goals are an essential characteristic of motivation, in that the setting and achievement of personal goals is considered a fundamental aspect of an adaptive motivational structure and probably a drinker's decision not to drink. Research has found that having realistic personal goals provide meaning to a person's life (Dickson, 2006). There are some evidence showing that personal goals characterise people's efforts to achieve new levels of positive adaptation, self-discovery, and psychological

well-being (Gomes, 2014;Thompson, 2015), Accordingly, how self-regulation drives goal-orientated behaviours is central to any debate on how people generate, formulate, and attain personal goals that enable them to manage their psychological well-being.

If one takes the view that goals are mental representations of preferred outcomes, then having the goals must be associated with self-regulatory processes (Heller, Komar, & Lee, 2007; Song, Kalet, & Plass, 2015). Self-regulation refers to the processes by which people manage their goal-directed behaviours in the absence of immediate external limits (Kirschenbaum, 1987). Carver and Scheier (1981) pointed out that self-regulation entails goal-setting and related processes, such as expectancies and plans, the self-monitoring of behaviour, and observing performance relative to attaining the goal (self-evaluation). Furthermore, any discrepancy between the desired and current state of the goal directs or guides behaviour, actions, and efforts to attain the goal (Bandura, 1991). As discussed in Chapter Two this might be why an adaptive motivational structure facilitates movement towards the goal and a maladaptive motivational structure hinders movement toward the goal or facilitates movement away from the goal according to Cox and Klinger's model (Cox & Klinger, 2004, 2011). It also has been pointed that self-regulation of goal setting and achievement processes can be unsuccessful for a number of reasons, such as difficulties in coping with emotional problems or excessive drinking (Gross, 2007).

It was also discussed in Chapter Two that self-regulation could be related to some motivated behaviours, such as alcohol consumption and smoking. For example, individuals who practiced self-regulation, in the form of reducing sweet consumption or squeezing a handgrip over a two week period, demonstrated a greater ability to regulate their behaviour on a stop-signal task, relative to their baseline performance. Indirect self-regulation training, such as the uptake and

maintenance of an exercise programme, also led to increased control over a wide range of regulatory tasks in the laboratory, but also extended to decreases in smoking, alcohol consumption and caffeine use, independent of changes in perceived self-efficacy and stress outside the laboratory (Hanif, 2013). In those motivated to restrain their behaviour, similar effects have been found. Individuals wanting to quit smoking had lower relapse rates when they self-trained to restrain smoking temptation two weeks prior to giving up (Muraven, 2010).

As discussed in Chapter Two, inhibitory control is one of the most investigated mechanisms of impulsivity and executive functioning (Jones, 2012, Meule et al., 2014; Muller et al., 2015, Secrist, 2015). There is ample evidence showing that deficits in inhibitory control are associated with substance-use disorders, including alcohol abuse and dependence (Jones, 2012; Poulton et al, 2016; Smith et al., 2014; Stephan, 2015). In addition, results from some research show that performance on the stop-signal task and Go/No Go tasks can differentiate between alcoholics and controls, and between heavy and light social drinkers (Christiansen, Cole, Goudie, & Field, 2012; Jones, 2012). The understanding that disinhibition in the form of self-regulation can vary within individuals over time has potential for explaining excessive alcohol consumption. Friese et al. (2011) in the horse-and-rider model similarly proposed that self-regulation could be trained, which suggests an area of research that might inform treatment and prevention outcomes.

Gauggel et al. (2010) showed that exposure to alcohol cues in detoxified alcoholics increased in a self-regulation group (participants who sniffed alcohol before performing the inhibition task) compared with exposure to neutral cues. Another study showed that acute stress could increase the effects of alcohol cues on disinhibition, specifically in male problem drinkers (Zack et al., 2011). This evidence suggests that current motivation and environmental factors (e.g.

ability to obtain rewards and to control urges, and exposure to stress) may influence inhibition but can vary according to individual differences. Furthermore, Guerreri et al. (2009) ran manipulation instructions in a stop-signal task. They prompted one group to respond with restraint ('inhibition group') by placing a motivational emphasis on inhibition, and another group to respond with disinhibition ('impulsivity group') by emphasizing the importance of reaction times. The group required to respond with restraint demonstrated slower reaction times but fewer inhibition errors, and the disinhibited group showed longer reaction times but more inhibition errors. Inhibitory control plays a fundamental role in the development and maintenance of alcohol use disorders; therefore, it is likely that training heavy drinkers to improve their inhibitory control would be a useful adjunct to established interventions for reducing drinking (Jones et al., 2011; Jones, 2012).

According to Gauggel et al. (2010), heavy drinking is often stimulated by alcohol-related environmental cues (e.g. the sight and smell of beer); accordingly, such cues lead to temporary deficiencies in inhibitory control. Several recent studies investigated the relationship between inhibitory control and alcohol consumption. For example, in a series of studies by Houben et al. (2011, 2012), participants performed a Go/No Go task in which alcohol-related and neutral cues were presented. One group of participants were constantly required to inhibit motor responses when alcohol cues were presented, but to respond promptly to neutral cues; these response options were reversed in a different group of participants. In both studies, Houben et al. (2011, 2012) established that, compared to participants who had to exercise inhibition in response to neutral cues, participants who exercised inhibition when faced with alcohol cues reported drinking significantly less alcohol in the week immediately following the task. Moreover, in their first study

(Houben et al., 2011), there was no significant link between alcohol cues in the inhibition group to drinking less beer in the laboratory compared to participants in the neutral-cue inhibition group (Jones, 2012). Two studies (Jones et al., 2011a; Jones et al., 2011b) found that participants who had been trained to perform a stop-signal task quickly (in a disinhibited fashion) subsequently consumed more alcohol than participants who had been trained to perform the stop-signal task gently and thoughtfully. Moreover, the results of both studies showed that individual differences in disinhibition were positively correlated with the amount of alcohol consumed (Jones et al., 2011a; 2011b; Jones, 2012).

In addition, there is ample evidence showing that the presence of alcohol cues leads to short-term increases in disinhibition in alcohol-dependent individuals and social drinkers. For example, Noel and colleagues (2007) established that alcohol-related words presented in the context of a Go/No Go task increased disinhibition in alcoholics. Likewise, Gauggel and colleagues (2010) in a study testing detoxified alcoholics found increased stop-signal reaction times, a measure of disinhibition, as soon as they had been instructed to smell alcohol as opposed to water. Weafer and Fillmore (2012) and Petit and colleagues (2012) found that alcohol pictures increased inhibition errors during a Go/No Go task in social drinkers. There are also other noteworthy findings, which are consistent with the idea that there is a close link between disinhibition and cue reactivity (Hanif, 2013; Jones, 2012; Papachristou et al., 2012). In a recent study Monk, Sunley, Qureshi & Heim (2016) investigated how the smell of alcohol along with visual alcohol cues impacted alcohol-related thoughts and behaviour. The results showed that when alcohol-related visual stimuli were presented the false alarm rates were lower than when neutral olfactory stimuli were presented.

From the present research, it was concluded that experiencing alcohol-related stimuli might activate cognitive responses leading to the consumption of alcohol.

According to Carver and Scheier (1990), emotions are not just related to resolving goals, because during goal-directed behaviours emotions can be responsible for feedback on goal progress, possible achievement, and possible failure. Positive emotions can arise in goal striving before the goal is achieved. For instance, individuals may feel happier just because they have made good progress toward achieving a goal. Similarly, negative emotions, such as sadness, anger and frustration can occur because the person has failed to make any concrete progress toward achieving the goal, even though the goal is still attainable. Adaptive emotional regulation involves flexibility in the use of emotion regulation strategies (Gratz & Roemer, 2004; Hoorelbeke et al., 2016). Emotion regulation strategies are considered to be psychologically challenging when a person is distressed, an attentional shift is more likely to happen; it draws the person's attention towards more immediate pleasure-seeking goals, such as drinking alcohol (Dvorak & Simon, 2014; Gross 2007).

Affective or emotional dysregulation refers to maladaptive patterns of emotional regulation, which weaken everyday life functioning (Carver, Lawrence, & Scheier, 1996). Investigations into complications in emotional regulation are concerned with how people regulate their performance when they are experiencing negative emotions, rather than controlling their emotions. These are marked by intrinsically (e.g., Gratz & Gunderson, 2006; Gratz & Roemer, 2004; Tull & Roemer, 2007). The previous studies reflect participants' difficulties in understanding and awareness of their emotions. These are marked by deficits in their behavioural self-regulation of affective states and self-control over affect-driven behaviours (Carver, 2006; Carver et al., 1996; Carver, et al.,

2000; Gratz & Roemer, 2004). Gratz and Roemer (2004) suggested that difficulties in emotional regulation include a lack of (1) awareness and understanding of emotions, (2) acceptance of emotions, (3) ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions, and (4) an ability to use situationally applicable emotional regulation strategies in order to pursue individual goals and situational demands. Difficulties engaging in goal directed behaviours reflect difficulties in concentrating on or accomplishing goals when experiencing negative emotions. Impulse control difficulties refer to difficulties remaining in control of one's behaviour when experiencing negative emotions. Non-acceptance of emotional responses is the tendency to make negative secondary emotional responses to one's negative emotions or non-acceptance of responses to one's distress (Gratz & Roemer, 2004). Some scientists have argued that the achievement of short-term goals can produce long-lasting regulatory changes because the achievement provides immediate incentives and feedback about performance (e.g., Carver & Scheier, 1982). Long-term goals bring few immediate incentives or feedback and are more likely to cause a reduction in attention or efforts to accomplish them compared to short-term goals. Accordingly, a combination of short, medium, and long-term goals is considered most adaptive for maintaining a person's attention, efforts, motivation, and self-regulatory behaviours in order to achieve goals.

Studies Conducted for this Thesis

The first study conducted for this thesis identified relationships among self-regulation, motivational structure and alcohol use. All three of the studies were conducted with university students. In Study Two, a manipulation technique was used to examine individuals' self-regulation and to clarify whether a technique for changing individuals' self-regulation causes their

motivational structure to become more adaptive and thereby reduce their alcohol consumption. Study Three aimed to discover whether a withholding response, impulsivity, self-regulation and memory capacity are related to one another and to drinking behaviour.

The present chapter discusses the findings of all three studies and the relationships among them, and it makes recommendations for future research.

Key Findings of the Three Studies

The primary aim of Study One was to identify relationships among self-regulation, motivational structure and alcohol consumption using different questionnaires. It was designed to demonstrate that self-regulation, motivational structure, and alcohol consumption are related to one another. To do this, Study One tested 105 students who participated as a requirement for their degree in psychology. Participants were asked to complete four questionnaires, which included the Personal Concern Inventory (Cox & Klinger, 2011), Alcohol Use Questionnaire (Cox, 2003) and Short Self-Regulation Questionnaire (SSRQ; Carey, Neal & Collins, 2004). Consistent with other studies (e.g., Timmer, Verhoff, & Colten, 1985; Viktor, 2009), in this study males reported drinking more alcohol than females. Total SSRQ scores were negatively correlated with weekly drinking indices. This means, consistent with the hypothesis of the study, that the higher participants were on self-regulation, the less alcohol they consumed. However, there was no relationship between PCI Adaptive Motivation and SSRQ scores, nor was there a relationship between SSRQ scores and PCI Adaptive Motivation and weekly drinking. Therefore, only typical drinking was correlated significantly with SSRQ scores, but typical drinking very closely approached significance. Thus, only the first hypothesis of the study was supported. Total SSRQ

scores were also negatively correlated with students 'atypical drinking, as was predicted. This means that as participants' degree of self-regulation *increased*, the amount of alcohol that they consumed *decreased*. This result is consistent with the results of Houben et al. (2011, 2012) and Sinha et al. (2011).

In summary, Study One measured relationships among self-regulation, motivational structure and alcohol use using different questionnaires. The results of the study did not support all of the main hypotheses. In particular, the results testing the fourth hypothesis were not consistent with the results of other studies (e.g., Logan, Olson, Lindsey, 1993; Shamloo, 2010). Recall that the fourth hypothesis was that motivational structure would partly mediate the relationship between self-regulation and the amount of alcohol consumed. It is possible that the interactions predicted from the theoretical accounts and published literature simply did not exist in the present sample. It is also possible that these effects existed, but that they were too subtle to be detected with the present design and sample size. The key result of Study One of the thesis is the finding of a strong relationship between self-regulation and alcohol consumption, which suggests (unlike what was previously considered) that stable a personality characteristic (self-regulation) is a more important determinant of university students' alcohol consumption rather than overall motivational structure. One might ask why this is? One reason could be that the sample was very homogenous, comprised of university students in a restricted age range. Furthermore, the participants in this homogeneous sample likely had very similar goals and concerns. Also, compared with the general population and particularly with people who become alcohol addicts, university students' motivational structure is likely to be mostly adaptive. In other words, I did not have a full range of adaptive/maladaptive

structure scores. This has implications for focusing specifically on students who are low in self-regulation, trying to help them improve their self-regulation and thereby to drink less.

The results of Study One led to Study Two, which tested whether experimental manipulations to change self-regulation would be effective in reducing students' excessive drinking. As presented in detail in Chapter Three, manipulations were developed to change individuals' self-regulation and to clarify whether the manipulations caused participants' motivational structure to become more adaptive and to reduce their alcohol consumption. Based on the results of Study One, it was reasonable to expect that experimental manipulations to increase self-regulation would be effective in reducing students' excessive drinking. As discussed in the literature review in Chapter One, it seems likely that a person's self-regulation could be changed by altering the person's perceived choices among options and the person's knowledge about how to attain a goal and by providing feedback about the person's performance and helping him or her to set goals for completing the task.

Accordingly, Study Two of the thesis tested (a) the effectiveness of an experimental technique (e.g., information enhancement and goal setting) for changing individuals' self-regulation; (b) whether the experimental manipulations would affect measures of participants' urges to drink; (c) whether participants' self-efficacy was related to their alcohol consumption and self-regulation; and (d) how procrastination would affect individuals' self-regulation. Therefore, the manipulations were used to examine individuals' self-regulation and to clarify whether any changes cause their motivational structure to become more adaptive.

The main purpose on Study Two was to examine the effects of a task that used Concept Identification Cards on participants' self-regulation. Eighty undergraduate psychology students

were recruited through the Student Participant Panel of the School of Psychology, Bangor University. Two types of instruments were employed. The first type included measures that were administered to identify changes in participants' self-regulation, motivational structure, self-efficacy, procrastination and urges to drink. Except for the alcohol consumption questionnaire (which was given only at the pre-test to confirm that each participant was a consumer of alcohol), these tests were given at baseline (pre-test) and again post-experimentally (post-test). The second type of instruments included those that the experimenter used to manipulate self-regulation in the experimental group.

As discussed in detail in Chapter Three, Study Two aimed to clarify relationships among self-regulation, motivational structure and alcohol use. The Short Self-Regulation Questionnaire (Carey et al., 2004), PCI (Cox & Klinger, 2004), and Alcohol Use Questionnaire (Cox, 2000) were administered to student drinkers. The results partially supported the first hypothesis. Total SSRQ scores were negatively correlated with students' atypical drinking, as was predicted. That is, as participants' degree of self-regulation increased, the amount of alcohol that they consumed decreased. However, the results that tested the fourth hypothesis are not consistent with the results of other studies (e.g., Logan, Olson, Lindsey, 1993; Shamloo, 2007). It is possible that the interactions predicted from the theoretical accounts and published literature simply did not exist in the present sample. It is also possible that these effects existed, but that they were too subtle to be detected with the present design and sample size.

The original contribution of Study Two is that it suggests that if one considers a particular goal that students are trying to achieve and help them to increase their self-efficacy (their

adaptive motivation), this can be very effective. It can even bring about a reduction in their urges to drink alcohol and presumably later a reduction in their actual alcohol consumption.

As discussed in Chapter Five, Study Three was designed to explore whether the relationships among the withholding response, impulsivity, self-regulation, and memory capacity were related to each other, and to participants' drinking behaviour. Study Three examined to extent to which alcohol consumption, self-regulation, impulsivity and memory capacity can influence inhibitory control. As explained in Chapter Five, 108 undergraduate psychology students were recruited through the Student Participant Panel of the School of Psychology, Bangor University. The participants were asked to complete three questionnaires. These included a measure of (a) alcohol consumption, (b) impulsivity, and (c) self-regulation. In addition, two computerised tasks were used to measure participants' behavioural impulsivity and memory capacity. The main aim of the study was to determine whether heavy and light drinkers would respond differently when the stimuli were alcohol-related versus when they were non-alcohol related. Moreover, it was hypothesized that participants who were heavy drinkers, low in self-regulation, high in impulsivity, and low in working memory capacity would perform more poorly than others on a Go/No Go task and to make more errors when the stimuli on Go/No Go trials were alcohol-related than when they were alcohol-unrelated. As discussed in detail in Chapter Five, the results of the study are consistent with the results of other studies, which have shown that impulsivity is important for understanding university students' alcohol use. For example, higher levels of impulsivity have consistently been related to greater alcohol use and risk-taking (Magid, MacLean, & Colder, 2007; Shin, Hong, & Jeon, 2012). Study Three also supported the results of other studies, which have shown that disinhibition is related to poor self-regulation, substance abuse, and

alcohol-related problems (Hanif, 2013). Moreover, the results support earlier findings showing a relationship between disinhibition and alcohol problems. For example, Goudriaan et al. (2006) used the Go/No Go and stop-signal tasks and found a deficit in inhibitory control in alcohol dependent individuals compared to controls.

As pointed out in Chapter Two, inhibitory control (a component of self-regulation) is the ability to stop, delay, or change an ongoing behaviour. The results of the Study Three are also consistent with several studies, which have shown that Go/No Go tasks can differentiate between alcohol-dependent individuals and controls, and between heavy and light social drinkers (Christiansen, Cole, Goudie, & Field, 2012; Goudriaan, Oosterlaan, de Beurs, & van den Brink, 2006). Study Three did not find a relationship between alcohol consumption and backward digit span as a measure of working memory capacity. This might be because alcohol selectively weakens certain parts of working memory (Saults et al., 2007), with impairment revealed when stimuli are presented sequentially, but not when they are presented in an array (Vallar & Baddeley, 1984).

In summary, Study Three achieved its major purposes by identifying relationships among the withholding response, self-regulation, impulsivity, and alcohol use. The results indicated that self-regulation was correlated with impulsivity; heavy drinkers were low in self-regulation and high in impulsivity. Heavy drinkers were poor in withholding responses to alcohol-related stimuli.
The original contribution of the Study Three is that this study points to the importance of stable personality/cognitive characteristics in university students' alcohol consumption. Students who were low in self-regulation, high in impulsivity, and low in working memory capacity

performed more poorly on the Go/No Go task when the stimuli were alcohol related. This suggests that attentional process (e.g. attentional bias) related to alcohol stimuli are especially important in students with these characteristics.

Conclusions

A negative relationship between alcohol consumption and self-regulation was found in the all three studies in this thesis. This is consistent with Carey, Carey, Carnrike, and Meisler (1990), Cox and Kinger (2004, 2011); and Jones (2011, 2012). The findings from Study One and Study Two in the thesis are partially consistent with the hypotheses tested in Chapter Three; that is, as participants' degree of self-regulation increased, the amount of alcohol that they consumed decreased. This might reflect a pattern of uncontrolled and disinhibited alcohol use like that which has previously been observed (Barnes, 1988, 2000; Conrod, 2000; Conrod et al., 2008; Cox, 1979; Cox et al., 2001; Cox & Klinger, 2004; Dawe & Loxton, 2004; Finn, 2002; Moeller & Dougherty, 2002; Mulder, 2002; O'Connor & Colder, 2005; Sher & Trull, 1994; Staiger et al., 2007). From a self-regulation perspective, *disinhibition* refers to any deficit in the ability to regulate one's own behaviour, whether it is responding impulsively to an internal or external reward without planning or considering the negative consequences of one's actions (Hanif, 2013, Moeller & Dougherty, 2002). Therefore, any inhibition deficits in self-regulatory processes may continue and accelerate the person's alcohol consumption. Hence, the self-regulation perspective is consistent with Cox and Klinger's motivational model of alcohol use (Cox, Klinger, 2004, 2011). That is, for some people drinking results in chemically satisfying changes in their moods, which might be positively reinforcing them because they experience an increase in positive mood and a reduction in negative mood (Cox & Klinger, 1988, 2004, 2011).

Although the results of the studies conducted for this thesis were not completely consistent with the theoretical approaches of Cox and Klinger's model, there is ample evidence to confirm that maintaining motivation through self-regulation is fundamental for initiating new or difficult behaviours. It is also important for persisting in the face of challenges, and withdrawing when continued effort would be ineffective (Dickson, 2006; Jones, 2010, 2011). People who are able to self-regulate successfully follow their goals; however, not all goals are positive or constructive. As a result, one might argue, for example, that the most successful offenders are skilled at self-regulation; they are cautious and talented at manipulating multiple tasks and making alternative plans as required. What seems necessary for self-regulation to produce adaptive and productive outcomes is for a person's goals to be consistent with those outcomes. Further developments in the definition of self-regulation that are consistent with adaptive motivational structure should address this concern, and assessment efforts that are focused on adaptive and productive outcomes should ensure that this additional element (adaptive motivational structure) is part of the assessment procedure.

As discussed in Chapter Two, according to the motivational model of alcohol use (Cox, Klinger, 2004, 2011), a person's decision whether or not to drink alcohol on any particular occasion is based on the affective change that the person expects to achieve by drinking compared with not drinking. The affective change could be related either to chemically changing the person's mood or to indirect, instrumental effects of drinking (or not), such as peer acceptance or disapproval. The decision to drink alcohol is made by adopting a particular motive for drinking. For instance, individuals may decide to drink because it provides them with a relaxed feeling when they meet a person of the opposite sex or it helps them to relax with they are anxious or depressed.

As discussed earlier, there is ample evidence to indicate that university students often drink more alcohol during holidays versus academic periods, thereby trying to experience positive affect. (DelBoca, Darkes, Greenbaum, & Goldman, 2004; Simons, Gaher, Oliver, Bush & Palmer, 2005). This type of drinking reflects enhancement motives for drinking. Such adolescents and young adults could be trained in how to be responsible drinkers when they experience either positive or negative affect.

As discussed in detail in Chapter Five, the purpose of Study Three was to explore whether relationships among the withholding response, impulsivity, self-regulation, and memory capacity were associated with one another, and to drinking behaviour. Although neuropsychological tasks purport to measure impulsivity directly under laboratory conditions, they are difficult to interpret because each task might measure several different cognitive processes. For example, although in Study Three an alcohol-related Go/No Go task was developed, this behavioural measure might reveal a variety of cognitive processes. For example, errors of commission on a Go-No Go task could reflect a failure at multiple levels of cognition, ranging from (a) an inability to learn or encode the response to the target (and an inability to code a withholding response to a non-target), to (b) problems with over activation of the representation of the response, to (c) a decrease in the capability to discriminate between the two kinds of responses that are required on the task (Perales, Verdejo-Garcia, Moya, Lozano, & Perez-Garcia, 2009).

Future Perspectives and Limitations

The results of this thesis research may have important implications for research, treatment, and interventions. There is a need to design interventions that provide alcohol-related, cognitive-behavioural training. These should enable excessive drinkers to develop an adaptive motivational

structure. There is initial evidence to show that coping skills training (that includes self-regulation procedures) can help reduce drinking among young adults (Conrod et al., 2000, Heller, Komar, & Lee, 2007). Self-regulation training as a general life skill and also alcohol- (or drug-) related self-regulation training for some people who are at risk of taking drugs or consuming alcohol could be incorporated into primary and secondary prevention programmes. Prevention and intervention work could also directly address ways to alter negative affect expectations about drinking alcohol, in that these beliefs in particular might enhance the risk for excessive alcohol use. On the other hand, healthy alternatives to consuming alcohol that have positive effects should also be addressed, particularly for student populations. According to Viktor (2009), students' drinking fluctuates over time; it increases substantially during the first week of the academic year, and then it decreases. In this study, the students' average weekly consumption remained stable during the remaining weeks of the assessment period; however, the study assessed students' alcohol consumption for a maximum of just eight weeks after the start of the academic term (Viktor, 2009). Longer-term assessments are needed to evaluate the enduring effects of new interventions that are developed.

Offering students healthy alternatives to drinking alcohol need to be emphasised, particularly during the first week of the academic year. However, to identify which healthy alternatives to drinking alcohol would be effective, additional, future research is needed. In future research, the motivational model of alcohol use might serve as the guiding theoretical framework for identifying healthy alternatives to excessive alcohol consumption. As discussed in Chapter Two, according to the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004, 2011), a person's decision to drink alcohol or not to drink is based on the positive and negative affective changes

that the person expects to achieve by drinking alcohol compared with not drinking alcohol. The expected affective changes might be related to either changing the person's mood chemically or changing it indirectly and instrumentally through the acquisition or loss of other value incentives in the person's life. An example of the latter might be peer acceptance or rejection as a consequence of the person's drinking behaviour.

One difficulty with research on self-regulation in general is that there is not a generally accepted unique definition or construct validity of self-regulation. Nor is there agreed-upon ways to measure self-regulation either by self-report or in the laboratory. Nevertheless, it is essential that alcohol-related and drug-related measures of self-regulation be used both for categorising dysfunctional behaviours and for directing future research in the field of addictive behaviours.

The target population for this thesis was limited to students who were mostly social drinkers. All of the participants were psychology students, so that generalizing the results of the current studies to (a) other kinds of students, (b) a non-student population, and (c) excessive drinkers needs to be considered in future research.

According to Cox and Klinger's motivational model (1988, 1990, 2004, 2011) drinking motives are defined as the final decision about whether or not to drink alcohol on a particular occasion; the resulting drinking motives arise in the final pathway to alcohol use or non-use. For some people, drinking alcohol becomes a goal, which means they value drinking alcohol positively, so they drink in order to obtain things that they value positively or to get rid of things that they value negatively (Klinger, 1977). Consequently, if individuals accomplish goals that bring them emotional gratification, they are unlikely to alter their maladaptive ways of attaining

their desired emotional state. In this regard, a self-regulation training programme would aim to help drinker develop an adaptive motivational structure. Developing such a training programme should be a major aim of future research. In accordance with this approach, Fadardi, Cox, Hosier & Klinger (2006) developed the Life Enrichment and Advancement Programme (LEAP), which is "a way to help people control their drinking by improving the quality of their life and increasing their happiness'' (Fadardi, Cox, Hosier, & Klinger, 2006, p. 6). These researchers emphasized that LEAP is a technique that helps individuals to change their mood states in a healthy way while reducing the need to drink and leading them to an enriched life.

In order for LEAP to be successful in helping people to cut down their drinking, participants in the LEAP intervention need to work to find new incentives to regulate their feelings as an alternative to consuming alcohol. From this point of view, individuals need to develop a satisfying lifestyle as a healthier alternative to drinking. Based upon the LEAP philosophy, there are three things that help people to develop a happier lifestyle. First, they need to recognize the reasons for their happiness and distress. Second, they need to find goals and activities as an alternative to drinking alcohol. Third, they need to improve the quality and quantity of their goals in order to increase their chances of successful achievements.

As was discussed in detail in Chapter Two, according to Brown (1998, p. 62) self-regulation as a complex capacity provides people with flexibility when they face changing circumstances. If they have the capacity to self-regulate, they are able to plan, guide and monitor their own behaviour. Therefore, consistent with LEAP, self-regulation training could be one way to help people develop a satisfying lifestyle without the necessity to use alcohol. However, as was pointed

out earlier, further research should be conducted to provide alcohol-specific and drug-specific self-regulation training.

Based upon the current UK Government's Alcohol Guidelines for Men and Women (Department of Health, Alcohol Guideline Review, 2016), the units recommended for men and women are the same. Both genders are advised not to drink more than 14 units of alcohol per week. However, greater consideration needs to be specified for young people, who may find it more difficulty to regulate their drinking. In other words, new strategies may needed to be developed for delaying the age of alcohol initiation and limiting the amount that young people drink. This would likely enhance their physical and psychological health and their well-being.

In this connection, some revision of the legal drinking age might need to be considered. For instance, in the United Kingdom it is legal for children between the ages of five and 16 years to drink alcohol at home or on other private premises. Nevertheless, it is advised that no one should drink before the age of 15 years (Department of Health, Alcohol Guideline Review, 2016, Gov.uk, website, 2016). Thus, legalizing drinking from the age of five years seems like a confusing paradox. Nevertheless, it must be recognized that drinking alcohol is an integral part of the British culture. Still, though, revising the legal drinking could be a useful key for new alcohol-use guidelines.

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APPENDICES

Appendix 1

Consent Form for Study One

I..... hereby agree to participate in a scientific investigation of Ph.D. Student Mr. **Mansour Bagheri**, under the supervision of Professor Miles Cox. The investigation and my part in the investigation have been fully explained to me and I understand this explanation. I will participate in an experiment that involves completing some questionnaires. The procedures of this investigation have been answered to my satisfaction.

I understand that all data will remain confidential with regard to my identity.

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

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

My responsibility is to participate actively and willingly and if I choose not to do so, I will exercise my right to withdraw. If I choose not to withdraw, I understand that I am expected to *participate actively*.
In the case of any complaints concerning the conduct of research, these should be addressed to Dr Charles Leek, Head of School, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

Date..... Participant's Signature

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

Date..... Experimenter's signature.....

Appendix 2

Participant Information Sheet for Study One

This research is designed to study the relationship between self-regulation, motivational structure and alcohol use. This study is very simple. The study will be conducted in a group setting. Therefore, it is very important to remain quiet and to turn off your mobile phone. Mansour Bagheri will distribute to the group envelopes containing a variety of questionnaires, and each person will be asked to complete each one in a predetermined order. This will last about 60 minutes. Before signing the consent form, during, and after the study, we will happy to try to answer any questions that you might have.

Your personal information will not be disclosed to third parties. Only numbers averaged across all participants will be included in any publications. You are free to withdraw your consent and terminate your participation at any time without penalty. By participating in this study you will learn more about research and questionnaire and will understand yourself better. On completion you will awarded 400 printer credits. The research only involves completing questionnaires, so there is no foresee risk. We will keep the data of this research confidential. Only the student researcher and his supervisor, Professor Miles Cox, will have access to the data.

In case of any complaints concerning the conduct of research, these should be addressed to Dr Charles Leek, Head of School, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

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

Appendix 3

Personal Concerns Inventory

(Short Research Version)

Instructions (Page 1)

Undoubtedly, you have concerns and aspirations about different areas of your life. You might have concerns about unpleasant things that you want to *get rid of*, *prevent*, or *avoid*. Or you might have aspirations about pleasant things that you want to *get*, *obtain*, or *accomplish*. You may also have in mind things that you would like to change, in order to resolve these concerns or realise your aspirations (i.e., GOALS that you want to reach). The following are examples of Life Areas in which many people have important concerns, aspirations, and goals:

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

- Relationships (with Partner, Family, Relatives, Friends, Acquaintances)

- Leisure and Recreation **- Smoking, Drinking, etc.**

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

- Self-changes **- Education**

Before going to the ANSWER SHEET, think carefully about each of these areas. **What are the things that concern you most in each area? What would you like to do about these concerns? That is, how would you like things to turn out?** Your answers to this question would indicate your GOALS for each Life Area. You might have more than one goal in a particular area; however, for the purposes of this questionnaire, you are asked to think about only YOUR MOST IMPORTANT GOAL in each Life Area.

(Continue on the next page)

Instructions (Page 2)

On the next page, please provide ratings for your most important goal in each Life Area. For each of the ratings, you should write a number from 0 to 10 to describe your views about each goal; these are Rating Dimensions for each concern, aspiration or goal as described below. 0 is for the least amount of the thing; 10 is for the greatest amount of the thing. For each Life Area in which you have a goal, be sure to fill in all the boxes before going on to the next Life Area.

Rating Dimensions for Each Concern / Aspiration / Goal
To Get: How much it is something that I want **to get?**

To Avoid: How much is it something that I want **to avoid**?

Control: How much **control** do I have in achieving it?

What To Do: How much do I know what steps to take to achieve it?

Chances if I Try My Best: If I try my best, how **likely** am I to achieve it?

Chances If I Do Nothing: If I do nothing, how **likely** am I to achieve it**?**

Happiness: How **happy** will I be if I achieve it?

Conflict: How **unhappy** will I be if I achieve it? (Achieving some goals can bring us difficulties.)

Sadness: How **sad** will I be if I **canNOT** achieve it?

Commitment: How **committed** do I feel to achieving it?

How Long: How long will it take to achieve it?

Please feel free to refer to these dimensions as frequently as you like

(Continue on the next page)

Answer Sheet

After each Life Area, rate your views about achieving your important goal in that area. For each dimension, write a number from **0** (the *least amount* of the thing) to **10** (the *greatest* amount of the thing). If you have a concern, aspiration, or goal in a Life Area, be sure to *fill in all the boxes for that area* before going on to the next Life Area.

Dimensions **Life Areas**	**To Get**	**To Avoid**	**Control**	**What To DO**	**Chances if I Try My Best**	**Chances If I Do Nothing**	**Happiness if achieve it**	**Conflict**	**Sadness if NOT achieve it**	**Commitment**	**How Long**
Home and Household Matters											
Finances											
Career and Employment											
Relationships (Partner, Family, Friends)											
Leisure and Recreation											
Love, Intimacy, and Sexual Matters											
Health and Medical Matters											
Self Changes											
Education and Training											
Religion and Spiritual Matters											
Smoking, Drinking, Drugs, etc.											
Any Other Life Area not Listed Above											

Continue with the next questionnaire

Appendix 4

SONA description for Study One

This research is designed to study the relationship between self-regulation, motivational structure and alcohol use. To participate in this study you must be a consumer of alcohol; however, the amount that you drink is not important. You might be a light, moderate, or heavy drinker. This study is very simple. The study will be conducted in a group setting. Researcher will distribute to the group envelopes containing a variety of questionnaires, and each person will be asked to complete each one in a predetermined order. This will last about 60 minutes and on completion, you will be awarded 400 printer credits.

Appendix 5

Alcohol Use Questionnaire

Participant No:
How often do you usually have a drink containing alcohol (e.g., beer, cider, stout, alcopop, wine, spirits)?

____ daily [365]
____ 3 or 4 times a week [186]
____ twice a week [104]
____ once a week [52]
____ 3 or 4 times a month [42]
____ twice a month [24]
____ once a month [12]
____ 3 or 4 times a year [3.5]
____ twice a year [2]
____ once a year [1]
____ never [0]

****

2. Think of the days when you have had an alcoholic beverage recently. On days when you drank, how much (in units of alcohol) did you usually drink in a day)?

//

//////////

Units of Alcohol

There is <u>one unit</u> of pure alcohol in:

-- 1/2 pint of ordinary strength beer, cider, or lager (containing 3.5 or 4% alcohol)

-- A small (4 oz.) glass of wine (containing 11 or 12% alcohol)

-- One pub measure of spirits (containing 40% alcohol)

There are <u>two</u> units of alcohol in:

-- One pint of ordinary strength beer, cider, or lager (containing 3.5 or 4% alcohol)

-- 1/2 pint or half a can of high strength beer or lager (containing 8 or 9% alcohol)

-- A large (8 oz.) glass of wine (containing 11 or 12% alcohol)

-- A large glass (double pub measure) of spirits (containing 40% alcohol)

-- A bottle (330 ml.) of lager or alcopop

//

//////////

Total Units You Usually Drank Per Day

(on Typical Drinking Days)

_ 0 (I never drink.)

____ 1	____ 5	____ 9	____ 13
____ 2	____ 6	____ 10	____ 14
____ 3	____ 7	____ 11	____ 15
____ 4	____ 8	____ 12	More than 15 units? How many?

_____

3. Think of days when you drank *more alcohol than usual*. On such days, how many units did you drink in a day?

Units Drunk Per Day on Atypical Drinking Days

____ 0 (I never drink.)

____ 1	____ 5	____ 9	____ 13
2	____ 6	____ 10	____ 14
3	7	11	____ 15
4	8	12	____ More than 15 units?
			How many? _____

4. About HOW OFTEN do you drink this larger-than-usual amount?

____ daily [365]
____ 3 or 4 times a week [186]
____ twice a week [104]
____ once a week [52]

____ 3 or 4 times a month [42]
____ never [0]
____ twice a month [24]

____ once a month [12]
____ 3 or 4 times a year [3.5]
____ twice a year [2]
____ once a year [1]

End of this questionnaire

Appendix 6

Short Self-Regulation Questionnaire (SSRQ)

Participant No

Please respond to the following questions by circling the response that best describes how you are. If you **STRONGLY DISAGREE** with the statement, circle **1**. If you **DISAGREE**, circle **2**. If you are **UNCERTAIN** or **UNSURE**, circle **3.** If you **AGREE**, circle **4**. If you **STRONGLY AGREE**, circle **5**. There are no right or wrong answers. Work quickly and don't think too long about your answers **.**

		Strongly Disagree	Disagree	Uncertain or Unsure	Agree	Strongly Agree
1.	I usually keep track of my progress toward my goals.	1	2	3	4	5
2.	I have trouble making up my mind about things.	1	2	3	4	5
3.	I get easily distracted from my plans.	1	2	3	4	5
4.	I don't notice the effects of my actions until it's too late.	1	2	3	4	5
5.	I am able to accomplish goals I set for myself.	1	2	3	4	5
6.	I put off making decisions.	1	2	3	4	5
7.	It's hard for me to notice when I've "had enough" (alcohol, food, sweets).	1	2	3	4	5
8.	If I wanted to change, I am confident that I could do it.	1	2	3	4	5

9. When it comes to deciding about a change, I feel overwhelmed by the choices.	1	2	3	4	5

	Strongly Disagree	Disagree	Uncertain or Unsure	Agree	Strongly Agree
10. I have trouble following through with things once I've made up my mind to do something.	1	2	3	4	5
11. I don't seem to learn from my mistakes.	1	2	3	4	5
12. I can stick to a plan that's working well.	1	2	3	4	5
13. I usually only have to make a mistake one time in order to learn from it.	1	2	3	4	5
14. I have personal standards, and try to live up to them.	1	2	3	4	5
15. As soon as I see a problem or challenge, I start looking for possible solutions.	1	2	3	4	5
16. I have a hard time setting goals for myself.	1	2	3	4	5
17. I have a lot of willpower.	1	2	3	4	5
18. When I'm trying to change something, I pay a lot of attention to how I'm doing.	1	2	3	4	5
19. I have trouble making plans to help me reach my goals.	1	2	3	4	5
20. I am able to resist temptation.	1	2	3	4	5
21. I set goals for myself and keep track of my progress.	1	2	3	4	5

	Strongly Disagree	Disagree	Uncertain or Unsure	Agree	Strongly Agree
22. Most of the time I don't pay attention to what I'm doing.	1	2	3	4	5
23. I tend to keep doing the same thing, even when it doesn't work.	1	2	3	4	5
24. I can usually find several different possibilities when I want to change something.	1	2	3	4	5
25. Once I have a goal, I can usually plan how to reach it.	1	2	3	4	5
26. If I make a resolution to change something, I pay a lot of attention to how I'm doing.	1	2	3	4	5
27. Often I don't notice what I'm doing until someone calls it to my attention.	1	2	3	4	5
28. I usually think before I act.	1	2	3	4	5
29. I learn from my mistakes.	1	2	3	4	5
30. I know how I want to be.	1	2	3	4	5
31. I give up quickly.	1	2	3	4	5

End of this questionnaire

Appendix 7

Debriefing Form for Study One

You participated in a study on the relationship between self-regulation, motivational structure and alcohol use. We are interested in determining relationships among these variables. The alcohol use questionnaire that you completed will be used to categorize participants according to how much alcohol they drink. We predict that heavy drinkers will be lower on self-regulation and lower on motivation than light drinkers.

In the case of any complaints concerning the conduct of research, these should be addressed to Dr Charles Leek, Head of School, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

Appendix 8

SONA Description for Study Two

This research is designed to determine how people perform differently on the task that involves concept formation skill, and how this skill is related to people's performance on a series of other measures. This study includes a series of measures, after completing measures; the experimenter will give you a task involving cards. You need to find the feature that is common across different cards. You may receive feedback about your performance on the task. Next, you will be asked to complete some additional measures. To participate in this study you should be a **consumer of alcohol**; however, the amount that you drink is not important. You might be a **light**, **moderate**, or **heavy drinke**r. The experiment will last about one hour. On completion of the study, you will be awarded 400 printer credits.

Appendix 9

Task Specific PCI

Participant No:

Your Age: _____ Your Gender (circle): M or F

Year at University (circle): First Second Third

Instructions

Undoubtedly, you have come across various types of "brain-teasers," such as three-dimensional shapes. This brief questionnaire asks about your *previous experience* and *familiarity* with this type of problem. It also asks about your views and feelings about such problems. For example, you might *like* brain-teasers and *enjoy* trying to solve them, or you might *dislike* them and try to *avoid* them. You may have views and feelings about your performance on this type of problem—for example, how happy or sad will you be if you can or cannot solve it.

Please continue with the next page, on which you are asked to rate your familiarity with this type of problem.

ANSWER SHEET (1)

The following is one type of brain-teaser:

Concept formation puzzles (e.g., finding the concept shown in a series of cards);

Components: Finding the important feature in a series of cards.

Feel free to refer to the definition as often as you like.

Rate your familiarity with this type of brain-teaser. Write a number from 0 (the *least amount* of familiarity) to 10 (the *greatest* amount of familiarity).

Table (A)

Name of brain-teaser	My familiarity with it:
Concept Formation: Finding Components	

Before going to the SECOND ANSWER SHEET, think carefully about this type of brain-teaser. How much experience have you had with this type of brain-teaser? What are the things that bother you or interest you most in trying to solve this kind of problem? How do you feel when you try to solve this type of problem?

Your answers to these questions will indicate your views about this type of brain-teaser.

On the next page, please provide ratings for this type of brain-teaser. To do so, imagine that you are about to solve this kind of problem. Please choose a number from ***0*** to ***10*** to describe your views and feelings about it. For example, ***0*** is for the least amount; ***10*** is for the greatest amount. Be sure to fill in all the boxes.

ANSWER SHEET (2)

Rating Dimensions

Liking: How much do I like trying to solve the problem?
Disliking: How much do I dislike trying to solve the problem?
Control: How much control do I have over finding the solution to the problem?
What To Do: To what extent do I know what steps to take to solve the problem?
If I Try My Best: If I try my best, how likely am I to solve it?
My Luck: How likely would I be to solve the problem through trial and error?
Joy: How happy would I be if I solved this type of problem?
Conflict: How unhappy would I be if I spent time and energy trying to solve it?
Frustration: How frustrated would I feel if I could NOT solve the problem?
Commitment: How committed do I be to finding the solution?
How Long: Compared to other people, how long would it take me to find the solution?

Feel free to refer to these dimensions as frequently as you like.

Table (B)

Problem / Dimensions		**Liking**	**Disliking**	**Control**	**What To DO**	**If I Try My Best**	**My Luck**	**Joy**	**Conflict**	**Frustration**	**Commitment**	**How Long**
Concept formation	*Components*											

Appendix 10

General Procrastination Questionnaire

Participant No: _____ Your Age: _____ Your Gender (circle): M or F

Year at University (circle): First second third

Instructions:
People may use the following statements to describe themselves. For each statement, decide whether the statement is ***uncharacteristic*** or ***characteristic*** of you using the following 5 point scale. Note that the 3 on the scale is Neutral – the statement is neither characteristic nor uncharacteristic of you. In the box to the right of each statement, fill in the number on the 5 point scale that best describes you.

Scale				
Extremely* Un*characteristic	***Moderately* Un*characteristic***	***Neutral***	***Moderately Characteristic***	***Extremely Characteristic***
1	***2***	***3***	***4***	***5***

Statements		
1.	I often find myself performing tasks that I had intended to do days before.	
2.	I do not do assignments until just before they are to be handed in.	
3.	When I am finished with a library book, I return it right away regardless of the date it is due.	
4.	When it is time to get up in the morning, I most often get right out of bed.	
5.	A letter may sit for days after I write it before mailing it.	
6.	I generally return phone calls promptly.	
7.	Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.	
8.	I usually make decisions as soon as possible.	
9.	I generally delay before starting on work I have to do.	
10.	I usually have to rush to complete a task on time.	
11.	When preparing to go out, I am seldom caught having to do something at the last minute.	
12.	In preparing for some deadline, I often waste time by doing other things.	
13.	I prefer to leave early for an appointment.	
14.	I usually start an assignment shortly after it is assigned.	
15.	I often have a task finished sooner than necessary.	
16.	I always seem to end up shopping for birthday or Christmas gifts at the last minute.	
17.	I usually buy even an essential item at the last minute.	
18.	I usually accomplish all the things I plan to do in a day.	
19.	I am continually saying “I’ll do it tomorrow”.	
20.	I usually take care of all the tasks I have to do before I settle down and relax for the evening.	

Appendix 11

Urges to Drink Questionnaire

Participant No: Your Age: _____ Your Gender (circle): M or F
Year at University (circle): First second third
Instructions: After each item, tick the appropriate box to indicate your feeling about having an alcoholic drink at the moment.

	Items	Strongly Agree	Agree	Mildly Agree	Indecisive	Mildly Disagree	Disagree	Strongly Disagree
1	All I want to do now is have a drink.							
2	I do not need to have a drink now.							
3	It would be difficult to turn down a drink this minute.							
4	Having a drink now would make things seem just perfect.							
5	I want a drink so bad I can almost taste it.							
6	If I had the chance to have a drink, I do not think I would drink it.							
7	I crave a drink right now.							

Appendix 12

Participant Information Sheet for Study Two

People show different levels of skill for doing any task. We are trying to determine how people perform differently on the task that involves concept formation skill, and how this skill is related to people's performance on a series of other measures.

This study includes a series of measures, after completing the measures; the experimenter will give you a task involving cards. You need to find the feature that is common across different cards. You may receive feedback about your performance on the task. Next, you will be asked to complete some additional measures. The experiment will last about one hour. Before and after the study, we will be happy to answer any questions that you might have.

Your personal information will not be disclosed to third parties. Only numbers averaged across all participants will be included in any publications. You are free to withdraw your consent and terminate your participation at any time without penalty. By participating in this study you will learn more about research and the questionnaires used, and you might come to understand yourself better. On completion of the study, you will be awarded 400 printer credits. The research involves completing questionnaires and solving some problems by a computerised task. We foresee very little, if any, risk. We will keep the data from this research confidential. Only the student researcher and his supervisor, Professor Miles Cox, will have access to the data.

In case you have any complaints concerning research, these should be addressed to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

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

Appendix 13

Debriefing Form for Study Two

"How do you feel after the experiment? I hope you enjoyed it. You probably know that many studies require experimental manipulation. The task in this study was designed to be difficult for many people. We are seeing how doing the task affects participants' self-regulation, urges to drink, and motivation. The results of this study will be used to develop procedures to help people with low motivation.

In case of any complaints concerning the research, these should be addressed to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

If you have experienced any distress while taking part in this research, you can contact The University Counselling Service in the Rathbone Building; Telephone 01248382024

Appendix 14

Invitation letter for Study Two

Dear Student,

Because you participated in the study of "Relationship between Self-Regulation, Motivational Structure and Alcohol Consumption", I would like to invite you to participate in another study, which is related to the study in which you took part. This research is designed to determine how different people perform on a task that involves concept-formation skill. The experiment will last about one hour. On completion of the study, you will be awarded ***400 printer credits***.

If you would like to take part in this study, you can find it listed on SONA. Look for the study entitled "**Students' Performance on a Concept-Identification Task**".

Regards,

Mansour Bagheri

Ph.D. Student

Appendix 15

Consent Form

I..... hereby agree to participate in a scientific investigation of PhD student Mr. **Mansour Bagheri**, under the supervision of Professor Miles Cox. The investigation and my part in the investigation have been fully explained to me and I understand this explanation. I will participate in an experiment that involves completing some questionnaires and working on two computerised tasks. The procedures of this investigation have been answered to my satisfaction. I understand that all data will remain confidential with regard to my identity. I understand that I am free to withdraw my consent and terminate my participation at any time without penalty. I understand that I may request a summary of the results of this study. My responsibility is to participate actively and willingly and if I choose not to do so, I will exercise my right to withdraw. If I choose not to withdraw, I understand that I am expected to *participate actively*.

In the case of any complaints concerning the conduct of research, these should be addressed to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

Date _____

Participant's Signature _____

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

Date..... Experimenter's signature...

Appendix 16

Participant Information Sheet for Study Three

People show different levels of skill in performing any task. We are trying to determine how people perform differently on a task that involves withholding responses on some trials, and how people's ability to do this is related to their performance on other measures.

This study includes a series of measures and tasks. First, you will be given some questionnaires related to your alcohol consumption and personality characteristics. Next, you will perform a computerised memory task, and then the experimenter will give you a task involving withholding some of the responses. On the last task, you will need to press the spacebar as quickly as possible whenever you see a picture, but do not press anything if the same picture appears twice in a row. The experiment will last about one hour. Before and after the study, we will be happy to answer any questions that you might have.

Your personal information will not be disclosed to third parties. Only numbers averaged across all participants will be included in any publications. You are free to withdraw your consent and terminate your participation at any time without penalty. By participating in this study you will learn more about research and the questionnaires used, and you might come to understand yourself better. On completion of the study, you will be awarded 400 printer credits. The research involves completing questionnaires and solving some problems by a computerised task. We foresee very little, if any, risk. We will keep the data from this research confidential. Only the student researcher and his supervisor, Professor Miles Cox, will have access to the data.

In case you have any complaints concerning research, these should be addressed to Mr Hefin Francis, School Manager, School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS.

If you have any questions about this study, please feel free to ask the researcher, Mansour Bagheri (m.bagheri@.bangor.ac.uk) or his supervisor, Professor Miles Cox (m.cox@bangor.ac.uk).

Appendix 17

SONA Description for Study Three

This research is designed to determine how people perform differently on a task that involves response withholding, and how this skill is related to their performance on a series of other measures. This study includes a series of measures and a computerised memory task. After completing the measures, the experimenter will give you a task involving pictures. You will need to press the spacebar as quickly as possible whenever you see a picture, but do not press anything if the same picture appears twice in a row. To participate in this study, you should be a **consumer of alcohol**; however, the amount that you drink is not important. You might be a **light**, **moderate**, or **heavy drinke**r. The experiment will last about one hour. On completion of the study, you will be awarded 400 printer credits.

Appendix 18

Barratt Impulsivity Scale

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and write your preference number on the right side of this page. Do not spend too much time on any statement. Answer quickly and honestly

Nb		1	2	3	4
		Rarely/Never	Occasionally	Often	Almost Always/Always
1	I plan tasks carefully.				
2	I do things without thinking.				
3	I make-up my mind quickly.				
4	I am happy-go-lucky.				
5	I don't "pay attention."				
6	I have "racing" thoughts.				
7	I plan trips well ahead of time.				
8	I am self controlled.				
9	I concentrate easily.				
10	I save regularly.				
11	I "squirm" at plays or lectures.				
12	I am a careful thinker.				
13	I plan for job security.				
14	I say things without thinking.				
15	I like to think about complex problems.				
16	I change jobs.				
17	I act "on impulse."				
18	I get easily bored when solving thought problems.				
19	I act on the spur of the moment.				
20	I am a steady thinker.				
21	I change residences.				
22	I buy things on impulse.				
23	I can only think about one thing at a time.				
24	I change hobbies.				
25	I spend or charge more than I earn.				
26	I often have extraneous thoughts when thinking.				
27	I am more interested in the present than the future.				
28	I am restless at the theater or lectures.				
29	I like puzzles.				
30	I am future oriented.				