SUBSTANCE USE AMONG YOUNG ADULTS IN MULTICULTURAL COMMUNITIES: RISK AND RESILIENCE FACTORS

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by

Elena Maria Andrioti

Supervisors:

Dr. Andrew Cooper

Dr. Alan Pickering

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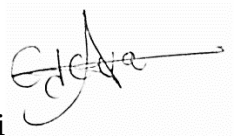
DECLARATION

I declare that the work presented in this thesis is my own. All studies and work detailed in the text of this thesis is novel and has not been previously submitted as part of the requirements of a higher degree.

Signed: Elena Maria Andrioti 

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ABSTRACT

Impulsivity-related personality traits have been found to be substantially related to increased substance use, while religiosity and spirituality have been shown to act as protective factors against substance use. This thesis aimed to study possible interactive effects of risk and resilience factors on young adult substance use behaviours in multicultural communities using samples from Western countries and the Middle East. A study of 245 UK university students found self-control to be significantly related to problematic alcohol and cannabis use. The study also identified sensation seeking and fun seeking as strong predictors of cannabis use. Some of these findings were replicated in a sample of 173 university students from Lebanon. The study found fun seeking to be significantly related to problematic alcohol use. A moderating effect of religiosity on the relationship between impulsivity and substance use behaviours was also identified. A study of 191 university students in the United Arab Emirates found urgency and lack of premeditation to be related to problematic dokha use. This study also identified a moderating effect of religiosity on the relationship between impulsivity and alcohol consumption. Lastly, negative urgency was shown to be related to shisha consumption in a study of 80 young adults residing in the United Arab Emirates. Religiosity was also shown to be a moderator of the relationship between impulsivity and shisha use. The cultural aspects of these findings was discussed in detail. The final study of the thesis considered how risk-taking behaviours can be associated with alcohol use among a group of young adults residing in the United Arab Emirates. These findings help to further

understand cultural differences in substance use behaviours, and contribute to theoretical models of risk for substance use disorders worldwide.

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CHAPTER 1

INTRODUCTION

Overview

The following introductory chapter will present key findings that have informed the work presented in this thesis. First, a discussion of the developmental category of emerging adults will underline why they are particularly vulnerable to substance use and abuse. Second, the substances of interest will be outlined, with explanation of key terms. A comparison between substance use behaviours in the Middle East region and Western societies will be made. Third, the concept of individual differences in personality variables that are associated with substance use behaviours will be introduced. Impulsivity, reward sensitivity, risk-taking and self-control will be defined and an overview of the literature regarding these factors will be discussed. Fourth, protective factors that are associated with reduced risk-taking behaviours such as substance use and abuse will be outlined. Religiosity, spirituality and mindfulness will be discussed and an overview of the literature concerning these factors will be discussed. Finally, the research plan in this thesis will be introduced by outlining the aims and research questions. The objective of this chapter is to give an overview of the current findings in this area of research and to show how the research presented in this thesis fills specific gaps in the field.

Substance Use among Young Adults

As they leave high school and begin to carve their paths to adulthood, university students spend a significant amount of time in a transitory developmental milestone that can be characterized as "emerging adulthood". The theory of emerging adulthood was proposed by Arnett (2000). The theory suggests the presence of a developmental stage called "emerging adulthood". It is the period of transition between adolescence and adulthood, and concentrates on late teens to mid-late twenties (Tanner & Arnett, 2009). It is during this developmental stage that individuals explore their identities (Arnett, 2004). Emerging adulthood is defined as the age of instability, focus on the self, feelings of in-between and possibilities (Arnett, 2004). During this period, individuals are typically still in the process of obtaining education and training, and choosing a specific career path (Arnett, 2000). Individuals after the age of thirty are typically settled into a more stable lifestyle and occupation (Arnett, 2000). Emerging adulthood is viewed as a time of change and uncertainty. Consequently, this developmental stage may be associated with a variety of risky behaviours such as substance abuse, engaging in risky sexual behaviours and even the experience of mental health disorders (Kirk & Lewis, 2013).

Substance use behaviours can be part of these experiences individuals may engage in to relieve their identity confusions and instability as they settle into adult life (Arnett, 2005). White, McMorris, Catalano, Fleming, Haggerty and Abbott (2006) suggest that alcohol intake and heavy drinking increase during emerging adulthood as opposed to adolescence (White et al., 2006). This increase can be associated with the fact that young adults tend to move out from their homes and go to college (White et al., 2006). One of the main dimensions of Arnett's theory is the feeling of "in-between" which indicates that individuals feel like they are in between adolescence and

adulthood (Arnett, 2000). This dimension was strongly related to increased substance use behaviours (Smith, Bahar, Cleeland & Davis, 2014).

"Substance use" is an activity where individuals consume specific substances to experience a desired effect. A variety of negative consequences can accompany these rewarding effects and lead individuals into cycles of dependence towards specific substances. Entering college is a transitory phase that can be very difficult for most students who are vulnerable and prone to engage in a variety of risky behaviours (Srivastava, Tamir, McGonigal, John & Gross, 2009; Mandracchia & Pendleton, 2015). A national survey on drug use and health among youth in the United States indicated that cannabis is the most common illicit substance consumed by young adults (Substance Abuse and Mental Health Services Administration, 2013). The rates of alcohol and tobacco use were also relatively high among American young adults as opposed to other substances (SAMHSA, 2013). Kosterman, Hawkins, Guo, Catalano and Abbott (2000) suggest that the risk of initiation to alcohol and cannabis spans through early adolescence until young adulthood. Current research studies across the world are closely examining young adults' initiation to engage in substance use behaviours to be able to set appropriate prevention strategies (Mason, Zaharakis & Benotsch, 2014).

The following thesis will primarily focus on three different substances: alcohol, cannabis and tobacco. Alcohol is a substance that is formed by the fermentation of yeast, starches and sugar and is absorbed into the bloodstream (National Institute on Drug Abuse [NIDA], n.d.). Alcohol consumption can have different effects on the human body. It has been shown to act as an anxiolytic, mood enhancing substance and sedative (Wallner & Olsen, 2008). Alcohol use was also shown to slow a person's reaction time, impair motor coordination and impair one's judgment (Wallner & Olsen, 2008). Large amounts of alcohol consumption may lead to loss of

consciousness as well as intoxication which could lead to nausea and vomiting (Wallner & Olsen, 2008). Alcohol is eliminated in the liver through its oxidation into acetaldehyde (Wallner & Olsen, 2008).

Cannabis is composed of dried leaves, stems, flowers and seeds from the Cannabis Sativa plant and is usually rolled into a cigarette or pipe to be smoked (NIDA, n.d.). To this date, findings regarding the effects of cannabis use remain inconsistent. Cannabis use varies a lot leading to unpredictable pharmacological and psychological effects due to the potency of active ingredients including the tetrahydrocannabinol (THC) and cannabinoids content (Potter, Clark & Brown, 2008). Cannabis use has been shown to affect memory. When compared to control groups, cannabis users showed alteration in brain activity in the left superior parietal cortex region involved in working memory (Jager, Kahn & Van Den Brink, 2008). Prolonged cannabis use has also been shown to be associated with impaired verbal learning and memory among young users (Solowij, Jones, Rozman, Davis, Ciarrochi, Heaven , Lubman & Yucel, 2011). There is also some evidence suggesting a correlational link between cannabis use behaviours and psychosis or psychotic episodes but the findings are still inconsistent and more research is needed to draw causal links between both variables (Arseneault, Cannon, Poulton, Murray, Caspi & Moffitt, 2002).

Tobacco contains nicotine which stimulates the central nervous system as it releases the hormone epinephrine when entering the bloodstream (NIDA, n.d.). There are a variety of different tobacco products. This thesis will discuss cigarette, shisha and dokha smoking. All of these substances will be described in the following chapters. When inhaled in the form of a cigarette, nicotine is carried into smoke particles to the lungs (Benowitz, 2009). The smoke particles then make their way to the brain causing the release of various neurotransmitters including dopamine (Benowitz, 2009). Dopamine release results in the signaling of a pleasurable experience which

reinforces the effect of nicotine consumptions (Benowitz, 2009). Repeated exposure to nicotine desensitizes receptors in the brain needing increased amounts of nicotine to get the same desired effect, also known as tolerance (Benowitz, 2009). Nicotine withdrawal has been shown to lead to various undesirable experiences such as negative emotional states, anxiety symptoms and increased stress which in turn lead to relapse and reuse of the substance (Benowitz, 2009). Moreover, the main constituent alkaloid in dokha is nicotine (John & Muttappallymyalil, 2013). Dokha is available in different strengths and flavours smoked through a pipe called the midwakh (John & Muttappallymyalil, 2013). The midwakh bowl can be filled with 0.5 grams of dry dokha tobacco for each use (John & Muttappallymyalil, 2013). The dokha strengths range from mild to strongest alluding to the strongest experience of a buzz or head spin (John & Muttappallymyalil, 2013). Dokha stimulates cardiac contractility and constriction of blood vessels causing a temporary rise of the heart rate and arterial blood pressure to produce the desired pleasurable effect (John & Muttappallymyalil, 2013).

The thesis will focus on cross-cultural research including studies conducted in the UK, Lebanon and the UAE. To this date, there is a gap in the literature examining risk and resilience factors among young populations in the Middle East and Gulf region. The main aim of the thesis is to examine these variables using the same instruments across different samples and cultural groups. The data from the UK will serve as a frame of reference representing a Western society in parallel with the findings from Lebanon and the UAE. The reasoning behind that is that culture may moderate the relationships between these factors and substance use behaviours. For instance, the relationships between impulsivity traits and the use of substances could become larger in cultural environments where substance use is more socially disapproved of.

The United Kingdom

According to the World Health Organization's report on alcohol and health that was published in 2014, the worldwide consumption of alcohol in 2014 was equal to 6.2 litres of pure alcohol per person aged 15 years or older (World Health Organization [WHO], 2014). Findings also indicate that approximately 3.3 million deaths in 2012 were attributed to alcohol consumption (WHO, 2014). Worldwide consumption differs greatly, with the European Region reporting the highest alcohol-attributable deaths (WHO, 2014). In the United Kingdom, heavy episodic drinking can be attributable to 28% of the entire population or 33.4% of the drinkers' population (WHO, 2014). Heavy episodic drinking is characterized by consuming a minimum of 60 grams of alcohol at least once in the past thirty days (WHO, 2014). The UK chief medical officers report that consuming more than 14 units of alcohol per week, equivalent to 1 litre of alcohol per week is considered to be problematic alcohol use (Chief Medical Officer, 2016).

Prevalence rates also indicate that 11.1% of the United Kingdom population met the criteria for alcohol use disorder, while 5.9% of the population met the criteria for alcohol dependence (WHO, 2014). Robinson, Jones, Christianson and Field (2014) underlined the impact of heavy drinking amongst university students in the United Kingdom. Results showed that about 27% of the sample reported typical drinking sessions of more than 6 drinks (Robinson et al., 2014). Findings also suggest that gender and age both predict alcohol use. Male students and undergraduate students engage in more problem drinking behaviours than their female and postgraduate peers (Robinson et al., 2014).

In 2012, cannabis was the primary drug of abuse for 21.5% of the United Kingdom population being treated for drug problems. 22.5% of the population reported having ever used cannabis in 2012, while 18.6% reported having used cannabis in the past year and 10.2% reported

having used cannabis in the past month (United Nations Office of Drug and Crimes [UNODC], 2015). More recent national statistics findings from the Crime Survey for England and Wales indicate that about 8.8% of adults aged 16 to 50 report having used an illicit drug in the past year (Crime Survey for England and Wales [CSEW], 2014). This proportion nearly doubles when we only consider individuals aged 16 to 24 years old, with 18.9% of young adults reporting having used illicit substances in the past year (CSEW, 2014). Cannabis is the most commonly used substance with approximately 15.1% of young adults between the ages of 16 to 24 having used cannabis during the past year (CSEW, 2014). Prevalence rates also indicate that 6.6% of young adults report using substances frequently (CSEW, 2014). Findings also suggest that there are significant gender differences in substance use behaviors where males report using drugs significantly more than females (CSEW, 2014).

In 2013, the Health and Social Care Information Centre reported that eighty thousand deaths were attributable to smoking cigarettes in England (HSCIC, 2016). Data from 2014 report that 19% of the adult population in England currently smoke and that men are more likely than woman to smoke cigarettes (HSCIC, 2016). The statistics bulletin also notes that young adults aged 25 to 34 years old are the most likely to smoke (HSCIC, 2016).

The annual report of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) indicated that, in the United Kingdom, a total of 100 456 individuals entered treatment for substance abuse in 2014 (European Monitoring Centre for Drugs and Drug Addiction [EMCDDA], 2014). 35 007 of these individuals were entering treatment for the first time (EMCDDA, 2014). Moreover, in 2013, there were 1946 drug-related deaths in the region, 16.8% higher than the year 2012 (EMCDDA, 2015). A variety of different action plans and strategies

have been set forth by the government of the United Kingdom to reduce the harms related to substance use behaviours.

The Middle East Region

The Middle East region is composed of a number of countries that differ greatly in terms of culture, values, beliefs, economic status, political systems and ways-of-life. It is an unstable part of the world where political and religious ideas have been creating barriers to the countries' advances in various domains. Substance use and related problems are increasingly becoming a serious public health concern in the region. The thesis will focus on two different Middle Eastern countries: Lebanon and the United Arab Emirates (UAE). Lebanon is a nation neighbouring Syria and Israel and lying on the Eastern end of the Mediterranean Sea. It is a country fragmented by different cultural, political and religious subgroups. As a result, Lebanon has been experiencing instability for the past couple of decades as the political parties involved are unable to find common ground. TheUAE , also part of the Middle Eastern umbrella, is wedged between both the Gulf of Oman and the Persian Gulf. As opposed to Lebanon, the country has witnessed stability and growth since the unification of the seven Emirates in December 1971, and has since been governed by the same Royal Families who hold all key governmental positions. It is a wealthy country that holds a significant economic advantage as it is a transit point for world crude oil. Trends in psychoactive drug use in Lebanon and in the UAE differ greatly.

Overall, the Lebanese population still labels substance use and misuse as a taboo topic ((Ministry of Public Health [MOPH], 2015). Illicit substance use in Lebanon is classified as a major criminal offence. Research studies in the area remain scarce as opposed to data based on Western societies. Nevertheless, there are a couple of studies in the literature that shed some light on the substance use issue in Lebanon. Karam, Maalouf and Ghandour (2004) conducted a study

in two phases to compare patterns of alcohol use and abuse among university students in Lebanon. The preliminary findings of 1991 were significantly lower than results shown in 1999 (Karam et al., 2004). Alcohol lifetime use increased from 49.2% in 1991 to 70.8% in 1999 (Karam et al., 2004). Alcohol abuse as per the DSM IV guidelines increased from 2.8% in 1991 to 9.1% in 1999, while alcohol dependence increased from 2.9% in 1991 to 5.3% in 1999 (Karam et al., 2004).

Naja, Haddad, Baddoura and Baddoura (2000) suggested that the use of benzodiazepines among the Lebanese population is particularly high, with 9.6% of the population reported ever having used these psychoactive drugs. Benzodiazepine use in Lebanon is particularly high among women and individuals who have experienced negative life events (Naja et al., 2000). Reports from the United Nations note that 6% of the Lebanese population reported ever using cannabis in 2009 (UNDOC, 2015). Karam, Ghandour, Maalouf, Yamout and Salamoun (2010) examined rates of substance use behaviours among Lebanese young adults. Their findings underline significant gender differences between university students. Males tend to consume more cigarettes, alcohol, cannabis, heroin, cocaine and ecstasy as opposed to females (Karam et al., 2010). However, trends differ for the use of amphetamines, stimulants, barbiturates and tranquilisers as the use is significantly higher for females groups as opposed to males (Karam et al., 2010). Their findings indicate that about 70% of the university students reported ever having tried alcohol (Karam et al., 2010). More importantly, 12.9% of the sample reporting alcohol use fit the criteria for alcohol abuse as per the DSM-IV guidelines (Karam et al., 2010). Results also indicated that 24.5% of regular smokers were heavy smokers, consuming more than 20 cigarettes per day (Karam et al., 2010). Lifetime use of cannabis was as high as 8.8% for university students in Lebanon (Karam et al., 2010). Moreover, Ghandour, El Sayed and Martins (2011) also noted that a significant number of students attending private universities in Lebanon abuse nonmedical prescription drugs such as

pain relievers, sleeping pills and anti-anxiety pills (Ghandour et al., 2011). Salameh, Rachidi, Al-Hajje, Awada, Chouaib, Saleh and Bawab (2014) conducted a similar study to investigate alcohol and cannabis use behaviours among samples of university students in Lebanon. Their findings suggest that 12.3% of the sample reported having used cannabis in their lifetime, while 20.9% reported having ever used alcohol (Salameh et al., 2014).

The findings above mainly discuss alcohol, cannabis and other illicit substances. Another substance use trend specific to the Middle East region is the variations of tobacco use. For instance, the *hookah* is a water pipe that has been used to smoke tobacco for centuries. The hookah works by connecting tobacco and charcoal placed on a bowl covered in kitchen foil to a water base by a pipe. When a person smoking the hookah inhales, the smoke will pass through the waterpipe bubbling through the water in the bowl and is finally carried to the smoker through the tube (WHO, 2009). According to Aljarrah, Ababneh and Al-Delaimy (2009), hookah smoking originated in India in the 15th century (Aljarrah et al., 2009). It finally reached Middle Eastern societies in the 19th century and was widely used by women (Aljarrah et al., 2009). Hookah smoking is also known as *water pipe*, *shisha*, *narguile*, *hubble-bubbly*, *argeela*, *arghileh*, *sheesha*, *okka*, *kalian*, *ghelyoon*, *ghalyan*, *boury* and *gouza* (Aljarrah et al., 2009). Nowadays, hookah smoking is available in different mixtures often including fruit extracts. It is very easily accessed in café lounges and restaurants in Middle Eastern societies. Hookah smoking is now considered a culture, as it is a social habit that accompanies lunch, dinner or simply a way to spend time with friends and family. Prevalence rate studies in Lebanon indicate that 21.1% of university students report using hookah exclusively, while 11.3% of students report using both hookah and cigarettes (Tamim, Terro, Kassem, Ghazi, Khamis, Hay & Musharrafieh, 2001). Using hookah is more prevalent among male students and among older students (Tamim et al., 2001). Hookah consumption also appears to be

associated with risky behaviors such as heavy drinking and engaging in extreme weight loss measures (Tamim et al., 2001).

Substance use in the UAE is a particularly sensitive topic due to the social stigma associated with dependence on illicit substances. The UAE's population is comprised of nationals and a wide variety of expatriates from all over the world. Government laws and regulations stress the sanctions related to substance use in the area. Any consumption of an illicit substance will result in repatriation of expatriates residing in theUAE. The limited facilities available for substance use disorder treatments are only accessible to nationals. Elkashef, Zoubeidi, Thomas, Al Hashmi, Lee, Aw, Blair, Al Arabi, and Alghafri (2013) stress the fact that the lack of statistics in the Middle East region does not necessarily mean that substance use is less prevalent but may be related to religious influences and strict laws associated with the supply of substances. The researchers also emphasize the confidential way in which substance use disorders are dealt with which may affect research that can explore factors that may contribute to these behaviours in the region (Elkashef et al., 2013). A recent study conducted in the National Rehabilitation Centre of Abu Dhabi examined these patterns of behaviour within inpatient males diagnosed with substance use disorder as per the DSM V guidelines (Alblooshi, Hulse, El Kashef, Al Hashmi, Shawky, Al Ghaferi & Tay, 2016). The findings suggest that 62.4% of the individuals were young adults aged 18 to 30 and the most common combination of substances was a mixture of alcohol, opioids, cannabis and prescription drugs and tranquilizers (Alblooshi et al., 2016).

Another important trend among university students in the UAEinvolves legal substances derived from tobacco leaves (Jayakumary, Jayadevan, Ranade & Mathew, 2010). The midwakh is a small pipe of Arabian origins that is used to smoke dokha (Jayakumary et al., 2010). Dokha originates from Iran and is a mixture of tobacco with aromatic leaves and black herbs (Jayakumary

et al., 2010). It is very commonly used in the UAEand can be found in shopping malls and tobacco centres or smoking shops, mini marts and gas stations across the country. It was traditionally smoked by Bedouins and sailors, and has spread to the entire population. The word dokha is an Arabic term for dizziness. The idea is that smoking the substance will result in light-headedness. The subsequent effect depends on the consistency of the tobacco as there are different mixtures available ranging from light to very strong assortments. The smoking habit has grown in popularity and is now available in a variety of different flavours (Jayakumary et al., 2010). The variety of pipe styles that have been created which differ in forms, colours and can even be personalized have increased the attractiveness of the smoking behaviour.

Preliminary studies examining the patterns of dokha use among university students in Ajman, UAEindicated significant gender differences, with 30.4% of the male participants reporting habitual dokha use as opposed to only 5.1% of female participants (Jayakumary et al., 2010). Similarly, Al-Houqani, Ali and Hajat (2012) conducted a study to define the scope of the tobacco problem in the UAE (Al-Houqani et al., 2012). Their findings suggest that the most common form of tobacco consumption is cigarette smoking (77.4%), followed by dokha smoking (15%), hookah smoking (6.8%) and cigar smoking (0.66%) (Al-Houqani et al., 2012). Gender differences support the findings by Jayakumary and colleagues (2010), suggesting that males consume significantly more dokha than females (Al-Houqani et al., 2012). Smokers consume dokha about 12.1 times a day on average and report that one week's supply of dokha will cost about three US dollars, as opposed to twenty-one US dollars for one week's supply of cigarettes (Al-Houqani et al., 2012).

Crookes and Wolff (2014) supported the above findings by examining the prevalence rates of dokha among high school students in Dubai, UAE (Crookes & Wolff, 2014). Their results

underlined that current regular use of any tobacco product was as high as 23.4% in the sample and was significantly more prevalent for males (Crookes & Wolff, 2014). Analyses indicated that more than half of the tobacco users (54.8%) were consuming dokha as opposed to 23.0% consuming cigarettes and 22.2% consuming hookah (Crookes & Wolff, 2014). These results are different than those noted by Al-Houqani and colleagues (2012) and may be due to the fact that the mean age is relatively younger in the following sample. The findings thus suggest that dokha smoking seems to be more prevalent for teenagers and young adults as opposed to older adults. The age of first onset of use was as young as 14.2 on average (Crookes & Wolff, 2014). Consumption habits of current smokers were close to approximately 6.4 pipes of dokha per day and 5.6 cigarettes per day (Crookes & Wolff, 2014). Moreover, a similar study was conducted by Al Shemmari, Shaikh and Sreedharan (2015) investigating smoking habits among secondary school students in Ajman, UAE(Al Shemmari et al., 2015). Their findings suggested that 36% of the sample reported ever having used dokha, while 24% of the students were current dokha users (Al Shemmari et al., 2015). The researchers also noted that 21% of the smokers reported using dokha exclusively, while 30% reported using both dokha and cigarettes and 40% reported smoking dokha, cigarettes and hookah (Al Shemmari et al., 2015).

Vupputuri, Hajat, Al-Houqani, Osman, Sreedhan, Ali, Crookes, Zhou, Serhman and Weitzman (2014) stress the need for significant prevention measures in the Middle East region and more importantly in the Arabian Gulf region, including the UAE (Vupputuri et al., 2015). The researchers underline the fact that dokha remains an under-reported and understudied alternative tobacco product or ATP (Vupputuri et al., 2014). The potential emergence of dokha use in the West is also discussed with an emphasis on merchandise items currently marketing dokha use in the West as a trendy pastime (Vupputuri et al, 2014). The authors also mention the unavoidable

effects of immigration and globalization which has already lead to dokha retailers across the United States of America (Vupputuri et al., 2014). Shaikh, Sreedhan and Osman (2014) noted that dokha use can lead to an increase in systolic blood pressure, heart rate and respiratory rate coupled with a strong sensation of light headedness (Sreedhan & Osman, 2014). There is a definite need for more investigation of this form of alternative tobacco product and the adverse effects on a person's health.

Personality Traits and Substance Use

Previous findings have categorized risk and resilience factors related to risky behaviours in children into five domains to develop effective prevention programs (Durlak, 1998). The five domains include a child's community, school, peers, family and individual traits. The following part of the chapter will discuss personality traits including trait impulsivity and self-control belonging to the individual category of risk factors.

Impulsivity

Theorists have included the concept of impulsivity as a major construct in models of personality that aim to predict our behaviours. Eysenck and Eysenck (1977) incorporated the construct in their theory of personality and several revisions of their work have modified the understanding and terminology of impulsivity by breaking it down into different subparts (Whiteside & Lynam, 2001). Theories about temperament have also included impulsivity as a significant construct to consider alongside traits such as emotionality and sociability (Buss & Plomin, 1975, as cited in Whiteside & Lynam, 2001). In the field of substance use behaviours, researchers have long sought to pinpoint what factors can contribute to the likelihood of engaging in the consumption of a variety of substances. Impulsivity is a personality construct that has been widely researched in the field of addiction as a risk factor that could trigger the potential use of

harmful licit and illicit substances. A variety of different definitions describe the term impulsivity in the field of personality. According to De Wit (2009), impulsivity is a multi-dimensional construct including a tendency to engage in maladaptive behaviours (De Wit, 2009). The term impulsivity can be related to impaired decision-making and behavioural inhibition (De Wit, 2009). The following definition underlines the fact that the more one behaves in an impulsive way, the less likely this person is to carefully measure the consequences that may follow a specific decision or behaviour. Moreover, Shin and Chung (2013) defined impulsivity as an individual's "tendency to act on the spur of the moment without proper regard as to the consequences of their actions" (Shin, Chung & Jeong, 2013, p. 39). These researchers underlined the robust findings considering impulsivity as a risk factor for substance use behaviours. Their findings highlight the association between impulsivity and substance use amongst young adults and suggest that the relationship is stronger for illicit substances such as cannabis or cocaine, as opposed to alcohol (Shin & Chung, 2013).

More recent findings suggest that individuals with high impulsive traits seem to display low tonic dopamine levels which affect mesolimbic functioning (Zisner & Aimee, 2016). The following neurological findings explain why individuals may constantly search for new rewards (Zisner & Aimee, 2016). Fernie, Peeters, Gullo, Christiansen, Cole, Sumnall and Field (2013) stated that impulsive adolescents were significantly more likely to consume alcohol than other participants (Fernie et al, 2013). Impulsivity was also shown to negatively affect treatment outcomes of individuals with substance use disorders (Lorre, Lundhal & Ledgerwood, 2015). Trait impulsivity seems to be associated with greater alcohol use, misuse and urges to drink (Joos, Goudriaan, Schmaal, Witte, Brink, Sabbe, & Dom, 2013; Garofalo & Velotti, 2015; Di Nicola et al., 2015). Similarly, the trait also seems to be associated with risky cannabis use (Lyvers, Jamieson

& Thorberg, 2013; Blanco, Rafful, Wall, Ridenour, Wang & Kendler, 2014). The relationship between impulsivity and substance use, including legal and illegal substances, is evident.

In contemporary models of personality, researchers have used a variety of different ways of conceptualising and measuring a person's impulsivity and examine how individual differences can be related to the likelihood of consuming and abusing alcohol, cannabis and other substances. Recent findings suggest breaking down the concept into different facets measuring ways in which individuals may exhibit impulsive behaviours. These personality constructs were designed to assess an individual's train of thought when presented with different scenarios that they may encounter in their day-to-day lives.

Gray's personality theory sketched two behavioural systems that influence a person's personality (Carver & White, 1994). The behavioural inhibition system (BIS) inhibits behaviours in the presence of punishing stimuli and according to Gray; sensitivity to the BIS leads to increased proneness to anxiety (Carver & White, 1994). On the other hand, the behavioural activation system (BAS) responds to feelings of hope, elation and happiness; sensitivity to the BAS leads to increased proneness to engage in goal-directed behaviours and experience positive feelings (Carver & White, 1994). Carver and White (1994), built on Gray's theoretical framework and developed the BIS-BAS scales to examine a person's sensitivity to these systems (Carver & White, 1994). The researchers identified three BAS-related scales, including drive, fun-seeking or impulsivity and reward responsiveness as opposed to only one BIS-related scale (Caver & White, 1994). There is strong evidence for the utility of the fun seeking subscale of the BIS BAS scale as a self-report measure of impulsivity. Evidence suggests that the drive component of the BAS measure is related to an increased desire to drink alcohol (Franken, 2002). Moreover, all dimensions of the BAS seem to be related to substance use behaviours (Knyazev, 2004). The more an individual scores

high on the BAS scales the more he / she is likely to engage in risky behaviours including substance use and misuse (Knyazev, 2004).

Similar findings suggest that individual differences in BIS/BAS can contribute to differences in substance use behaviours (Simons, Dvorak & Lau-Barraco, 2009). A combination of high BIS and low BAS scores is significantly related to low usage of alcohol and cannabis, while a combination of low BIS and high BAS scores is associated with high consumption of these substances (Simons et al., 2009). When examining alcohol use behaviours among college students, it seems that the drive and fun-seeking components of the BAS are positively related to increased harmful alcohol use (Yen, Ki, Yen, Chen & Chen, 2009). Fun-seeking is the component of the BAS that is related to impulsive behaviours and also seems to be associated with internet addiction (Yen, 2009). The fun-seeking component of the BAS was also related to drug use disorders as per the Diagnostic and Statistical Manual (DSM IV) criteria (Johnson, Turner & Iwata, 2003). A specific significant relationship between the fun-seeking subscale and alcohol use disorders was also noted (Johnson et al., 2003). Consistent with the above findings, the fun-seeking subscale of the BAS was positively correlated with increased alcohol and drug use among undergraduate university students (Voigt, Dillard, Braddock, Anderson, Sopory, & Stephenson, 2009). Unexpectedly, findings also suggested that the reward responsiveness subscale was a protective factor against substance use (Voigt et al., 2009). The researchers noted that this relationship may be due to the fact that reward responsiveness is related to long-term decision making and consequences, while fun-seeking accounts for short-term effects (Voigt et al., 2009).

Another widely used self-report measure of impulsivity is the UPPS-P scale. Whiteside and Lynam (2001) examined impulsivity and attempted to understand the personality trait by describing all facets that may be related to the impulsivity term (Whiteside & Lynam, 2001). The

researchers underlined the various inconsistencies in conceptualizing the impulsivity construct and wanted to bring some clarity to our understanding of the trait (Whiteside & Lynam, 2001). To do so, they conducted a study with 437 undergraduate students in the United States. They ran an exploratory factor analysis using 17 commonly used impulsivity scales alongside the five-factor model's NEO-PI-R (Whiteside & Lynam, 2001). The content analysis identified four facets measured by 45 items (Whiteside & Lynam, 2001). Urgency is the first facet of impulsivity and is characterized by a tendency to experience strong impulses when experiencing negative emotions (Whiteside & Lynam, 2001). The second facet of impulsivity deals with lack of premeditation which suggests that individuals who are not able to think about the consequences of their actions are more likely to act on spur of the moment (Whiteside & Lynam, 2001). Lack of perseverance, the third facet of impulsivity, is characterized by an inability to remain focused on tedious tasks (Whiteside & Lynam, 2001). Lastly, sensation seeking is the fourth facet of impulsivity which deals with a tendency to engage in activities that can be dangerous and involves taking risks (Whiteside & Lynam, 2001). Criteria representing the four facets described above thus made up the first version of the UPPS scale.

The more recent version of the UPPS, namely the UPPS-P, was developed by Cyders, Smith, Spillane, Fishwe, Annus and Peterson (2007) who discussed the significance of integrating positive urgency as a fifth facet of impulsivity (Cyders et al., 2007). Their findings suggest that positive urgency, or the tendency to act rashly in response to positive affect, helps explain risky behaviour (Cyders et al., 2007). The researchers added 14 positive urgency items to the UPPS scale and demonstrated that the trait correlates with risky behaviours such as potential problem drinking (Cyders et al., 2007).

Recent findings using the UPPS scale to measure impulsivity suggest that most of the facets are related to substance use behaviours. Billieux, Van der Linden and Censchi (2007) examined the relationship between facets of impulsivity and nicotine cravings and consumption (Billieux et al., 2007). Their findings suggest that the tendency to feel strong impulses or "urgency" significantly predicts tobacco cravings (Billieux et al., 2007). Treloar, Morris, Pedersen and McCart (2012) also underlined the significant relationship between all of the facets of impulsivity and alcohol use (Treloar et al., 2012). Results suggest that the more an individual scores highly on impulsivity traits, the more he/she is likely to engage in alcohol use behaviours (Treloar et al., 2012). Impulsivity was also shown to be related to increased alcohol related harms, risky drinking and frequency of intoxication among adolescents and young adults (Little, Hawkins, Sanson, O'Connor, Toumbourou, Smart & Vassalo, 2013).

Urgency seems to be the trait most strongly correlated with engaging in risky behaviours due to the influence of alcohol such as drinking and driving (Treloar et al., 2012). Similarly, Stautz and Cooper (2014) noted a direct association between the urgency traits and problematic alcohol use among adolescents in the United Kingdom. The more an individual scores highly on urgency measures, the greater risk of engaging in problematic alcohol use (Stautz & Cooper, 2014). Also, positive urgency was notably the strongest predictor of alcohol problems (Stautz & Cooper, 2014). Gray and MacKillop (2014) supported the above findings and highlighted the significant correlation between all facets of impulsivity and alcohol misuse (Gray & MacKillop, 2014). Moreover, Kiselica, Echevarria and Borders (2015) investigated the contributions of impulsivity facets to drinking outcomes (Kiselica et al., 2015). Their results indicated that sensation seeking was the best predictor of alcohol use (Kiselica et al., 2015). Confirming the results from Treloar and colleagues (2012), urgency was the best predictor of alcohol related problems and risky

behavior (Kiselica et al., 2015). Premeditation was also a predictor of alcohol use and drinking outcomes (Kiselica et al., 2015).

Self-control

When studying impulsivity, it is important to consider the related construct of self-control. Individuals differ greatly in their capacity for self-control. The trait has been shown to be strongly related to impulse control problems and is considered to be part of the impulsivity umbrella (Tangney, Baumeister, & Boone, 2004). Self-control is a personality variable that can be defined as the ability to modify one's inner responses, interrupt undesired behavioural tendencies and refrain from acting on them (Tangney et al., 2004). Five domains of self-control have been identified namely: controlling emotions, controlling thoughts, controlling impulses, regulating behaviour and performance and breaking habits. (Tangney et al., 2004). One study reported that individuals with high self-control tend to have lower impulse-control problems such as alcohol misuse (Tangney et al., 2004). These findings are in line with previous reports stating that high levels of self-control have been shown to be associated with lower levels of impulsivity (Patock-Peckham, Cheong, Balhorn & Nagoshi, 2001). More recent studies support the link between impulsivity and self-control. Attempting to facilitate self-report measures of impulsivity for the purpose of research, Morean, DeMartini, Leeman, Pearlson, Anticevic, Krishnan-Sarin and O'Malley (2014) underlined the importance of examining impulsivity and self-control scales in understanding substance use and abuse. Pokhrel, Sussman and Stacy, (2014) showed that self-control is a unique construct that does not overlap with impulsivity and that low levels of self-control are strongly associated with adolescent substance use. Impulsivity and self-control thus seem to be opposing personality constructs.

Findings suggest that high self-control is associated with better outcomes in various domains such as higher self-esteem, less binge eating problems, less alcohol use and higher grade point average (Tangney et al., 2004). On the other hand, low self-control is considered to be a significant risk factor of personal and interpersonal problems and can lead to substance use and other risky behaviours (Tangney et al., 2004). High self-control was shown to be related to a reduced risk of substance use behaviours such as tobacco, alcohol and cannabis as well as more control over amount of alcohol consumed and manners of drinking (Wills, Ainette, Stoolmiller, Gibbons & Shinar, 2008; Pearson, Kite & Henson, 2013; Gerich, 2013). The more an individual scores highly on self-control measures, the less we identify alcohol-related problems (Lindgren, Neighbors, Westgate & Salemink, 2013). Low self-control seems to be significantly correlated with alcohol abuse as opposed to moderate consumption (Visser, Winter, Veenstra, Verhulst, & Reijneveld 2013). Trait self-control thus appears to be a personality variable that is needed to consume reasonable amounts of alcohol (Visser et al., 2013). Evidence also suggests that trait self-control acts as a moderating factor between the relationship of perceived peer drinking and one's alcohol consumption (Robinson, Jones, Christiansen & Field, 2015). The belief that one's peers consumed heavy amounts of alcohol was strongly associated with personal binge drinking episodes; this relationship was significantly stronger for individuals with low self-control (Robinson et al., 2015). This topic will be covered in greater detail in Chapter 2.

Risk-taking behaviours

Risk-taking behaviours overlap greatly with the concept of impulsivity (Lejuez, Read, Kahler, Richards, Ramsey, Stuart & Brown, 2002). Leigh (1999) defined the concept of taking risks as a process of probability and harm. The study examined the link between individuals' risk taking tendencies and alcohol consumption among young adults (Leigh, 1999). The analysis and

theoretical framework discussed in the paper suggest the need to develop new ways to measure risk-taking behaviours as it is a distinct construct that accounts for problematic behaviour such as substance use and misuse (Leigh, 1999). Lejuez and colleagues (2002) addressed this issue and developed a computerized behavioural task, the Balloon Analogue Risk Task (BART), measuring risk-taking behaviours that are similar to real world situations. The researchers noted that the BART measure was significantly related to self-report measures examining similar constructs such as impulsivity and sensation seeking (Lejuez et al., 2002).

A combination of self-report measures and a behavioural task like the BART could therefore potentially give us a clearer outline of an individual's likelihood of engaging in real world risky behaviours. Findings suggest that smoking and a person's performance on the BART are significantly related in a sample of adult participants (Lejuez, Aklin, Jones, Richards, Strong, Kahler, & Read, 2003). The results show that smokers score higher than nonsmokers on all variables of the BART, namely the accumulated earnings, the adjusted average pumps (pumps on the balloons which did not explode) and the total explosions (number of balloons which exploded; Lejuez et al., 2003). Similarly, the BART was shown to be positively associated with substance use behaviours along with a variety of other risky behaviours beyond the findings provided by self-report measures of personality and risk-related constructs among a group of young adults (Aklin, Lejuez, Zvolensky, Kahler & Gwadz, 2005). Lejuez, Aklin, Daughters, Zvolensky, Kahler and Gwadz (2007), supported the above findings by examining the relationship between the BART-Y (an adaptation of the BART for adolescents excluding monetary rewards) and alcohol use. The study showed that adolescents who took more risks on the BART reported engaging in more problematic behaviours such as high alcohol consumption (Lejuez et al., 2007). Impulsivity measures were also strong predictors of problematic behaviours, yet when the self-report scales

were controlled for in statistical analyses, the BART results still generated positive associations which indicates that this distinct measure of disinhibition can generate useful results (Lejuez et al., 2007). This topic will be covered in greater detail in Chapter 5.

Religiosity/Spirituality

As mentioned above, risk and resilience factors have been categorized into various domains that can guide prevention strategies (Durlak, 1998). Overall religiosity and spirituality, fall under the individual category of protective factors and have been shown to predict lower substance use behaviours in the current literature. The following part of the chapter will discuss the concepts of religiosity and spirituality as potential variables contributing to the well-being of individuals. Findings suggesting that religious and spiritual associations are negatively related to substance use and other risky behaviours will be discussed. Finally, an overview of the interaction between religiosity and impulsivity predicting substance use behaviours will be discussed.

Religiosity and spirituality concepts

Religiosity is a construct that can be defined and interpreted in many different ways. Generally, this multifaceted term involves a variety of constructs such as beliefs, behaviours, values, attitudes and rituals that are specific to one's religious affiliation and culture. We can define religiosity as one's association with a specific faith about a divine power (Reich, Oser, & Scarlett, 1999). Religiousness is a synonymous term that is also being used in the literature referring to similar associations as with religiosity. This dissertation includes studies that were conducted in different societies where religious affiliations, culture and sets of values and beliefs differ greatly. For the purpose of our analysis, we use the term religiosity to refer to the extent to which a person considers himself to be religious and practices his religious beliefs on a daily basis. On the other hand, spirituality is a construct that has been researched alongside religiosity due to the similarity

of both constructs. It can be defined as an "intrinsic human capacity for self-transcendence, in which the self is embedded in something greater than the self, including the sacred" (Benson, Roehlkepartain & Rude, 2003, p.205).

There is a growing consensus in the literature that religiosity and spirituality have been associated with less substance use behaviours. Both dimensions have been examined separately in the fields of physical and mental health issues (Fetzer Institute, 1999). Following a large conference including a variety of researchers and professionals in the field in 1995, the Fetzer Institute noted that religiosity and spirituality variables need to be examined further. The researchers underlined the fact that we cannot combine religiosity and spirituality into one single scale and that dimensions of both these constructs need to be examines separately (Fetzer Institute, 1999). Subsequently, a group of researchers conducted a detailed meta-analysis of available scales and studies investigating the constructs of religiosity and spirituality to identify a number of subscales or domains that could be used in future research studies (Fetzer Institute, 1999). The group at the Fetzer Institute and National Institute on Aging identified key domains of religiousness and spirituality that can help us identify the extent to which individuals are religious and spiritual and use these values when making day-to-day decisions (Fetzer Institute, 1999). The domains include daily spiritual experiences, values and beliefs, private religious practices, forgiveness, religious and spiritual coping, religious support, commitment, organizational religiousness and religious preference (Fetzer Institute, 1999). The development of the brief multidimensional measurement of religiousness and spirituality (BMMRS) was therefore created to allow researchers to examine the extent to which these variables can affect people's lives and play a role in health outcomes (Fetzer Institute, 1999).

Religiosity and spirituality lead to less substance use behaviours

Findings suggest that the extent to which individuals consider themselves to be religious or not is a stronger indicator of substance use behaviours than the actual religious affiliation of the individual (Peltzer, Malaka & Phaswana, 2002). Low scores on religiosity scales among university students were associated with greater alcohol consumption, tobacco use, binge drinking, cannabis use and the likelihood of having a drinking or substance use problem (Peltzer et al., 2002). Similarly, a person's religiosity was found to be related to lower lifetime alcohol, cigarette and cannabis use (Marsiglia, Kulis, Niery & Parsai, 2005). The relationship is similar with frequency of recent alcohol and cigarette use (Marsiglia et al., 2005). Young adults who considered themselves to be religious were less likely to engage in substance use behaviours as opposed to non-religious youth (Marsiglia et al., 2005).

Sinha, Cnaan and Gelles (2007) support these findings by showing that adolescents who participate in religious activities and perceive religion as a significant part of their lives were less likely to report cigarette, marijuana or alcohol use. Moreover, self-reported significance of religion among university students was shown to be inversely associated with drug use (Degenhardt, Chiu, Sampson, Kessler & Anthony, 2007). Students who noted that religion was less important to them were more likely to have used alcohol, tobacco, cannabis, cocaine and extra medical drugs (Degenhardt et al., 2007). Similarly, alcohol, cannabis and nicotine use among high school students in Hungary were significantly more prevalent with low-religiosity students (Kovacs, Piko & Fitzpatrick, 2011). Low religiosity was shown to be associated with increased risky and unhealthy behaviours among adolescents. (Pitel, Geckova, Kolarcik, Halama, Reijneveld, & Van Dijk, 2012). Young people who scored high on religiosity measures reported less nicotine use, alcohol consumption and cannabis use behaviours (Piter et al., 2012).

Similar findings suggest that both spirituality and religiosity were shown to be associated with less underage alcohol usage, less marijuana consumption and less smoking behaviours among adolescents and emerging adults (Yonker, Schnabelrauch & Dettaan, 2012). This meta-analysis underlined the overall effect of religiousness and spirituality as protective factors in the field of risky behaviours and substance use (Yonker et al., 2012). Individuals who scored high on spirituality and religiosity measures also reported increased self-esteem and overall well-being (Yonker et al., 2012). Supportive evidence underlined the association between religious values and alcohol consumption (Neighbors, Brown, Dibello, Rodriguez & Foster, 2013). Findings suggest that the more individuals feature having strong religious values the less they engage in frequent drinking episodes and report less drinks per week and less quantities of drink during typical drinking sessions (Neighbors et al., 2013). In line with these findings, religiosity has been shown to reduce consumption of tobacco, heavy drinking, prescription drug misuse, cannabis and other illicit substances (Ford & Hill, 2012). Public religious activities also seem to be related to substance use behaviours. Frequent attendance at religious activities was associated with less alcohol use and abuse as well as tobacco use and a combination of alcohol and tobacco consumption (Lucchetti, Peres, Lucchetti & Koenig, 2012). Religious attendance was also associated with significantly less alcohol consumption per week (Lucchetti et al., 2012). Similar findings have shown that greater frequency of church attendance is related to lower odds of being diagnosed with an alcohol use disorder (Borders & Booth, 2013).

In line with these findings, evidence also suggests that high spirituality can have a significant impact on the likelihood of engaging in substance use behaviours. Studies have shown that low spirituality may be associated with greater substance use behaviours (Debnam, Milam, Furr-Holden & Bradshaw, 2016). Moreover, recent trends have examined both religiosity and

spirituality traits. Findings suggest that spirituality and meaningful faith are associated with less adolescent harmful alcohol use (Delva, Andrade, Sanhueza & Han, 2015). High scoring religious and spiritual profiles lead to less alcohol consumption among college students in the United States (Katho & Sgoutas-Emch, 2016). Religiosity and spirituality have also been shown to be negatively associated with other substances, such as cannabis and other illegal substances (Gmel, Mohler-Kuo, Dermota, Gaume, Bertholet, Daeppen & Studer, 2013).

Mindfulness and substance use behaviours

Recently, the mindfulness construct has also emerged in the literature related to substance use behaviours. The term has been widely researched in philosophical, spiritual and psychological works. According to the German-born monk Nyanaponika Thera, mindfulness is a term that has its roots in Buddhism practices. He defines mindfulness as watching one's steps in a given situation, attending to facts of surrounding perceptions and stated that mindfulness leads to a mental clarity where the mind deals with current thoughts, moods and emotions and refrains multiple thoughts to coexist at once (Thera, 1972). Mindfulness is a form of consciousness and alertness of an individual's current state of mind. Brown and Ryan (2003) conceptualized the term and developed a scale incorporating fifteen items that can allow researchers to examine the trait further. The mindful attention awareness scale (MAAS) has allowed researchers to assess mindful states of individuals during daily experiences (Brown & Ryan, 2003). The scale measures a person's presence or absence of attention and awareness during different scenarios (Brown & Ryan, 2003). Findings suggest that the MAAS is associated with positive emotional states, an enhanced awareness of the self, significantly lower mood disturbances and lower stress levels (Brown & Ryan, 2003).

Moreover, various facets of mindfulness were shown to be related to less alcohol use and abuse. Individuals who are able to act with awareness and focus on a specific activity seem to be less likely to engage in heavy alcohol consumption (Fernandez, Wood, Stein & Rossi, 2010). The ability to identify and label one's thoughts and feelings, a characteristic that is particular to meditation was also associated with a reduced amount of alcohol use (Fernandez et al., 2010). A recent meta-analysis suggested that there is a negative relationship between mindfulness and substance use behaviours, particularly for alcohol and nicotine (Karyadi, VanderVeen & Cyders, 2014). However, the relationship was not apparent for cannabis (Karyadi et al., 2014). In line with those findings, evidence suggests that trait mindfulness seems to be associated with less problematic alcohol use samples of university students residing in the United States (Karyadi & Cyders, 2015; Vinci, Spears, Peltier, & Copeland, 2016). Contrary to the above findings regarding cannabis use, Robinson, Ladd and Anderson (2014) found that mindfulness predicted lower lifetime alcohol and cannabis use among high school students in the United States. The literature examining the relationship between mindfulness and cannabis remains scarce. Nevertheless, a wide range of studies have investigated the effectiveness of mindfulness-based therapeutic techniques to reduce substance use behaviours. The findings suggest that mindfulness-based interventions are effective in reducing cannabis use, cannabis dependence and consumption of other substances such as cocaine, alcohol, cigarettes or amphetamines (de Dios, Herman, Britton, Hagerty, Anderson & Stein, 2012; Dakwar & Levin, 2013; Chiesa & Serretti, 2014).

Interplay of impulsivity and religiosity

This chapter has discussed evidence supporting the distinct effects of impulsivity and religiosity on substance use behaviours. Until now, we have shown that impulsivity, on its own,

can impact consuming specific substances. On the other hand, we have seen that increased religiosity can protect individuals from engaging in these risky behaviours. However, there is currently a dearth of research examining the ways in which both of these factors might interact. In analysing impulsivity and religiosity factors together, there are different possible outcomes we could expect to see. Firstly, the factors might act in an additive manner, such that both impulsivity and religiosity factors might have significant, but separate, effects on substance use outcomes. On the other hand, analysing both variables together could reduce the effect of one or both factors. This reduction might occur if one factor has a stronger association with substance use behaviours than the other, which will therefore override the association found when the factor is observed exclusively. Lastly, religiosity might interact with impulsivity to influence substance use behaviours. Evidence suggests that religiosity can influence the relationship between impulsivity and substance use. For example, a study by Galbraith and Conner (2005) found a moderating effect of religiosity on the relationship between the sensation seeking facet of impulsivity and cannabis use, whereby high religiosity led to a reduced association between sensation seeking and cannabis use.

These issues form the core of the thesis. The programme of research to be described considers the ways in which trait impulsivity and religiosity might act together to affect individual substance use outcomes. The more we understand risk and resilience factors related to substance use behaviours in young adult populations, the more we will be able to lead prevention measures and strategies in the right direction. This issue is far from being resolved in cross-cultural communities and Eastern societies. It is hoped that the work presented in this thesis can contribute to the resolution of substance use issues among young populations.

Aims and Research Questions

The overall goal of this thesis is to examine individual differences and attitudes towards young adult substance use in multicultural communities. Risk and resilience factors related to substance use behaviors will be examined. The thesis will explore four broad aims:

1. To explore patterns of substance use in Middle East communities (Lebanon and the UAE) and to understand what the common uses in the region are, while also comparing these findings to patterns of use in Western societies (specifically, the United Kingdom). We will also focus on substances that are specific to the Middle East region: dokha and shisha.
2. To examine relationships between impulsivity-related personality traits, self-control traits, and risk-taking behaviours linked to substance use.
3. To explore the protective effect of religiosity, spirituality and mindfulness linked to substance use behaviours.
4. To investigate the role of religiosity in moderating the relationship between impulsivity-related traits and substance use, and to link findings to current understandings of risk and protective factors related to substance use behaviours.

The programme of research will begin with an attempt to outline the role of impulsivity-related traits in emerging adults' substance use behaviours. Impulsivity has been widely researched as a personality variable predicting substance use outcomes among young groups of adults in Western communities. It is well established that religiosity is associated with less substance use outcomes among young people as well. What is not clear yet is whether or not the interaction of both factors of religiosity and impulsivity can have a distinct effect on substance use behaviours among populations in the United Kingdom. Chapter 2 addresses these issues with a focus on alcohol and cannabis use, investigating the following research questions:

(i) Do separate impulsivity-related personality traits show different relationships with young adults' alcohol and cannabis use behaviours?

(ii) Do religiosity, spirituality and mindfulness factors protect young adults from engaging in substance use behaviours? Are there any differences across religious affiliation?

(iii) Does religiosity moderate the relationship between impulsivity-related traits and alcohol and cannabis use?

The first study conducted with a Middle Eastern sample is reported in Chapter 3. This study aims to address an important gap in the literature regarding generalizability of results found in Western samples (specifically in the United States of America). This study tackled the first overall aim of the thesis, using a comparison sample of participants recruited from Beirut, Lebanon. The study has similar aims to the one presented in the second chapter. It attempts to outline patterns of use in Lebanon in parallel with the findings from the United Kingdom. The following research questions are addressed:

(i) Does impulsivity predict alcohol and cannabis use behaviours in a sample of university students in Lebanon?

(ii) Does religiosity protect young adults from engaging in substance use behaviours? Are there any differences between religious affiliations?

(iii) Does religiosity moderate the relationship between impulsivity-related traits and alcohol and cannabis use?

Chapter 4 seeks to explore the use of dokha in the UAE. The study examines dokha, nicotine and alcohol use among university students in Dubai. Impulsivity-related traits are also included to investigate the possibility of finding specific traits that are related to the different substances in the region. The chapter also explores the extent to which individuals consider

themselves to be religious and the interplay between religiosity and impulsivity is also examined in relation to substance use behaviours. The following questions are investigated:

(i) What are the patterns of dokha, nicotine and alcohol use in a sample of university students in the UAE?

(ii) Do impulsivity-related personality traits predict dokha, nicotine and alcohol use?

(iii) Does religiosity protect young adults from engaging in substance use behaviours? Are there any differences between religious affiliations?

(iv) Does religiosity moderate the relationship between impulsivity-related traits and dokha, nicotine and alcohol use?

Chapter 5 addresses the overall aims of the thesis with a specific focus on a sample of participants from the UAE. The chapter covers two different studies conducted with the same participants. The first study focuses on the use of shisha. The study also reported individuals' attitudes and beliefs towards substance use. Impulsivity-related traits and religiosity were also assessed. The following questions are addressed:

(i) What are the patterns of shisha use in the UAE? Do smokers have any false beliefs about the adverse effects of the substance?

(ii) Do impulsivity-related personality traits predict shisha use?

(iii) Is religiosity a protective factor for shisha use, and does it moderate the relationship between impulsivity and shisha use?

The second study focuses on the participants' alcohol consumption and performance on the BART behavioural task. The following questions are addressed:

(i) Do risk-taking traits as measured by the BART predict alcohol use?

(ii) Does religiosity protect young adults from engaging in alcohol use? Are there any differences between religious affiliations?

(iii) Does religiosity moderate the relationship between personality-related traits (impulsivity and risk-taking behaviours) and alcohol use?

CHAPTER 2

SUBSTANCE USE IN A SAMPLE OF YOUNG ADULTS IN THE UNITED KINGDOM: THE ROLE OF IMPULSIVITY-RELATED PERSONALITY TRAITS AND RELIGIOSITY

Overview

This chapter begins with a summary of studies that have examined substance use behaviours in the United Kingdom. We will focus on studies that have assessed impulsivity-related traits, and alcohol and cannabis use in young adult samples, as well as studies that have assessed religiosity, spirituality and mindfulness in association with substance use behaviours. It then goes on to report a study of 245 young adults residing in the United Kingdom. These participants completed self-report measures of impulsivity-related traits, self-control, mindfulness, spirituality, religiosity and their alcohol and cannabis use. Hierarchical regression analyses indicated that self-control accounted for significant variance in problematic alcohol and cannabis use scores. Furthermore, sensation seeking (UPPS facet) and fun seeking (BAS subscale) were positively associated with cannabis use. High religiosity was associated with less alcohol and cannabis use behaviours. There were no significant findings when examining the interplay of both impulsivity and religiosity measures on substance use behaviours. Mindfulness and spirituality measures were not related to alcohol and cannabis use in our sample.

Introduction

The first part of this chapter provides an overview of relevant studies that have examined substance use behaviours among university students and young adults in the United Kingdom. We will also include studies discussing the significant relationship between impulsivity-related traits and alcohol and cannabis use using the multi-component approach to impulsivity outlined in the first chapter. Studies including religiosity and similar measures will also be discussed.

Substance use in young adult populations in the United Kingdom

Substance use amongst university students is a persistent social issue. Data from earlier studies found that a large number of university students across the United Kingdom drank alcohol above sensible limits (1–14 units per week for women, and 1–21 units per week for men), and that 15% of the sample reported hazardous drinking (36 or more units per week for women and 51 or more for men) (Webb & Ashton, 1996). The study also found that 20% of the sample reported regular use of cannabis (Webb & Ashton, 1996). More recent studies support the particularly high levels of heavy drinking in higher education in the United Kingdom (Gill, 2002). Craigs, Bewick, Gill, O'May and Radley (2011) supported these findings by stating that most university students in the United Kingdom consume alcohol in a hazardous way as per the National recommendations of weekly drinking behaviours in the UK (above 14 units per week). Similarly, Robinson, Jones, Christiansen and Field (2014) found that 27% of a sample of university students in the United Kingdom consumed more than six drinks when drinking alcohol. Bennett and Holloway (2014) underlined the need for more substantial research investigating substance use problems amongst university students in the United Kingdom. The authors underlined a variety of research studies examining substance use behaviours amongst school children and stated that there is a need for more research within the college student population (young adults over the age of 18) (Bennett &

Holloway, 2014). The study found that 40% of students reported consuming one or more illicit drugs over the course of their lifespan, while one fourth had done so in the past year (Bennett & Holloway, 2014). Moreover, recreational drugs were the most common substances used with cannabis being the most popular recreational drug used within the sample of UK university students (Bennett & Holloway, 2014). Results suggested that 40.2% of the students had used cannabis over the course of their lifespan, and 21.0% had used cannabis over the past year (Bennett & Holloway, 2014). The above findings underline the importance of understanding risk factors that can lead to hazardous drinking and the use of illegal substances amongst the population of university students in the United Kingdom, and in young adults in the community more generally.

Impulsivity-related traits and young adult alcohol and cannabis use

There is a substantial amount of evidence suggesting that impulsivity-related traits can predict the substance use behaviours of young adults. These findings mainly underline the role of personality traits in developing alcohol dependence, cannabis dependence or other addictive behaviours (Donadon & Osório, 2016; Rodríguez, 2015). Nevertheless, to this date, there is still a gap in the literature examining which specific facets of impulsivity can be related to particular substances. Most findings to this date suggest that each of the impulsivity facets, as measured by the UPPS-P, can play a different role in predicting licit and illicit substance use behaviours during young adulthood (Shin & Chung, 2013). A recent study conducted in the United States of America recruited 256 young adults (aged 18-25) who were given a variety of self-report measures examining impulsivity traits and licit and illicit substance use (Shin & Chung, 2013). The findings suggest that impulsivity seems to be more related to illicit substances, such as cannabis use, than alcohol consumption (Shin & Chung, 2013). Results also showed that the lack of premeditation

and sensation seeking facets of impulsivity were the strongest predictors of substance use behaviours (Shin & Chung, 2013).

Lack of premeditation consistently shows positive associations with substance use behaviours (Shin & Chung, 2013; VanderVeen, Cohen & Watson, 2013; Jones, Chryssanthakis & Groom, 2014). In a study examining 40 university students in the USA, smoking cigarettes and binge drinking behaviours were both associated with an increased lack of premeditation (VanderVeen et al., 2013). In line with these findings, sensation seeking, urgency and lack of premeditation show positive associations with the quantity of alcohol consumed (Jones et al., 2014). The study was conducted with a sample of 400 university students in Nottingham, United Kingdom (Jones et al., 2014). The students were given online self-report measures examining their alcohol use as well as the UPPS scale to study trait-impulsivity (Jones et al., 2014). Findings suggested that university students in the UK typically consume more than 5 to 8 units on one single occasion (Jones et al., 2014). Moreover, personality differences were predictors of increased alcohol use and abuse (Jonet et al., 2014). Sensation seeking, urgency and lack of premeditation were associated with increased alcohol use as well as risky behaviours associated with the consumption of alcohol (Jones et al., 2014).

A meta-analysis that examined the relationship between impulsivity traits of the UPPS and alcohol use found that the different facets of impulsivity are related to different alcohol use outcomes (Coskunpinar, Dir & Cyders, 2013). The study included 96 studies with a sample mean of 397.6 and a mean age of 21.66 (Coskunpinar et al., 2013). The study noted that all facets of impulsivity predicted drinking frequency, while lack of perseverance predicted drinking quantity and negative and positive urgency predicted drinking problems (Coskunpinar et al., 2013). The results showed how different UPPS-P traits related to general alcohol use among all studies included in the meta-

analysis (Coskunpinar, Dir & Cyders, 2013). The effect sizes for the prediction of alcohol quantity were $r = .17$ ($p < .001$) for negative urgency and $r = .32$ ($p < .001$) for lack of perseverance (Coskunpinar, Dir & Cyders, 2013). The effect sizes for the prediction of alcohol problems were of $r = .34$ ($p < .001$) for negative urgency and $r = .34$ ($p < .001$) for positive urgency.

As shown in the first chapter, there are various different scales that seek to measure impulsivity-related traits. In the field of substance use, particularly alcohol and cannabis consumption research, one of the most widely used scales is the BIS/BAS self-report measure described in chapter 1. Consistent with Gray's (1981) theory of personality, Knyazev (2004) found that dimensions of the BAS scale predict substance use and risky behaviours. Higher levels of BAS seem to increase adolescents' use of substances like tobacco and cannabis (Van Leeuwen, Creemers, Verhulst, Ormel, & Huizink, 2011). A recent study examined the reliability and validity of the BIS BAS scales, among other measures of impulsivity, using exploratory and confirmatory factor analysis (Morean et al., 2014). The psychometric evaluation indicated that the fun subscale of the BAS was the strongest predictor of impulsive behaviour, and was associated to binge drinking and smoking (Morean et al., 2014). The only dimension of the BAS scale that was not associated with impulsivity was the reward responsiveness measure (Morean et al., 2014). A study examining the relationship between the BIS BAS scales and risky behaviours among 976 undergraduate students in the USA used an online survey including self-report measures (Voigt, Dillard, Braddock, Anderson, Sopory & Stephensen, 2009). The study found that the fun subscale was positively associated to various risky behaviours including alcohol use, drug use and tobacco use (Voigt et al., 2009). The study also reported that the reward responsiveness subscale of the BAS had an opposing effect and was a protective factor against risky behaviours such as alcohol consumption drug use and tobacco use (Voigt et al., 2009).

As discussed in chapter 1, self-control is a personality trait that is related to the impulsivity constructs. Individuals differ greatly in their capacity for self-control. Tangney, Baumeister and Boone (2004) conducted 2 studies including 351 and 255 undergraduate students in the USA. The students were given various self-report measures including the self-control scale (Tangney et al., 2004). The study found that individuals with higher self-control tended to have lower impulse-control problems such as binge eating, alcohol abuse and mental health problems (Tangney et al., 2004). Results also showed that high self-control is associated with better grades and academic performance (Tangney et al., 2004).

Similar findings suggest that high self-control can be related to a reduced risk of substance use behaviours such as tobacco, alcohol and cannabis, as well as more control over amount of alcohol consumed and manners of drinking (Wills, Ainette, Stoolmiller, Gibbons & Shinar, 2008; Pearson, Kite & Henson, 2013). 1767 high school students in the USA were given self-report questionnaires examining variables including substance use behaviours and self-control (Wills et al., 2009). Findings suggested that adolescents with increased self-control reported significantly lower substance use behaviours at various intervals of time during the academic school year (Wills et al., 2009). A similar study conducted with 310 undergraduate university students in the USA were given similar measures to examine the effect of self-control on substance use behaviours (Pearson et al., 2013). Findings suggested that lower self-control was a significant risk factor leading to the increased likelihood of engaging in alcohol, cannabis and tobacco consumption (Pearson et al., 2013).

Given the evidence that self-control seems to protect individuals from engaging in risky behaviours and may lead to a healthier and happier life, it is important for us to understand what may lead to individual differences that could increase or decrease self-esteem. Rounding, Lee,

Jacobson, and Ji (2012) found an interesting link between religiosity and self-control. High religiosity seems to encourage personality traits related to self-control (Rouding et al., 2012). From this research, we understand that religiosity can be an important variable to examine when investigating the link between personality differences and substance use behaviours.

Religiosity, spirituality and mindfulness and young adult alcohol and cannabis use

As discussed above, alcohol and cannabis use among university students in the United Kingdom remains an important public health concern. It is necessary to identify factors that are associated with lower substance use behaviours. As mentioned in the first chapter, religiosity and spirituality constructs have been shown to be potential protective factors of substance use behaviours among young adult populations. Ford and Hill (2012) examined the extent to which religiosity can protect young adolescents from engaging in substance use behaviours. The study used state-based sampling through the National Survey on Drug Use and Health and were able to receive 17, 727 responses from teenagers across the United States of American (Ford & Hill, 2012). Their findings suggest that high religiosity is associated with significantly lower rates of tobacco use, heavy drinking, prescription drug misuse, cannabis use and the use of other illicit substances (Ford & Hill, 2012). In line with those findings, a recent study conducted by Mason, Schmidt and Mennis (2015) examined the dimensions of religiosity as measured by the BMMRS discussed in chapter 1, alongside substance use behaviours, among adolescents receiving primary care services in Philadelphia, USA. 301 adolescents were given self-report questionnaires including substance use and religiosity measures (Mason et al., 2015). Findings suggested that high religious support and social religiosity both predicted lower tobacco and cannabis use behaviours (Mason et al., 2015). Proximity to religious institutions was also shown to be related to significantly less alcohol use among young individuals (Mason et al., 2015). Similar findings

were noted in a study conducted with an older sample of university students in Washington University, USA (Luk, Emery, Karyadi, Patock-Peckham & King, 2013). The study included 550 Caucasian American students and 289 Asian American students and attempted to examine whether or not there were racial differences in religiosity as a protective factor for substance use behaviours (Luk et al., 2013). The students were given a computerized survey including the BMMRS and self-report scales for substance use (Luk et al., 2013). Findings suggested that overall religiosity is a protective factor for cannabis use among Asian Americans only; while religiosity is a protective factor for alcohol use among Caucasian Americans only (Luk et al., 2013). The results suggest that culture and race may affect whether or not religiosity can act as a protective factor for substance use behaviours among young adult populations.

As shown in the first chapter, recent trends have examined the constructs of religiosity and spirituality together as protective factors for substance use behaviours. Nevertheless, some findings suggest that spirituality as a construct on its own can generate potentially interesting findings. The BMMRS gives us an indication of the extent to which a person considers himself to be spiritual. Nevertheless there are many other measures focusing on various aspects of spirituality that are not included in the BMMRS. Leigh, Bowen and Marlatt (2005) examined the extent to which spirituality can be related to substance use behaviours. The study included 196 undergraduate students from the USA who were administered self-report questionnaires including a separate scale measuring spirituality, namely, the spirituality assessment scale (Leigh et al., 2005). Findings suggested that increased scores on the spirituality assessment scale were significantly related to lower alcohol use, binge drinking and cigarette smoking behaviours (Leigh et al., 2005). In line with these findings, a recent study examined the relationship between spirituality and alcohol and cannabis use (Giordano, Prosek, Daly, Holm, Ramsey, Abernathy, &

Sender, 2015). 310 undergraduate students in the USA were given paper-based surveys including a variety of self-reported measures of which the spirituality assessment scale and substance use screening scales (Giordano et al., 2015). Findings suggested that spirituality was negatively associated with both alcohol and cannabis use (Giordano et al., 2015).

As mentioned in chapter 1, another important theme that has recently emerged in the literature is the examination of mindfulness in relation to substance use behaviours. In fact, recent findings have suggested that mindfulness-based treatments can have beneficial effects on patients who suffer from substance use disorders (Brewer, Bowen, Smith, Marlatt & Potenza, 2010). In line with those findings, a study conducted with 315 adults seeking treatment for substance use disorders in the USA underlined the fact that these patients scored significantly lower on the mindfulness attention awareness scale (MAAS) than comparison groups (Dakwar, Mariani & Levin, 2011). Findings also suggested that there is a negative relationship between mindfulness and alcohol use (Fernandez, Wood, Stein and Rossi, 2010). The study examined the responses of 316 young adults residing in the USA (Fernandez et al., 2010). The authors also emphasized the beneficial effect that mindfulness-based techniques can have on patients suffering from substance use disorders (Fernandez et al., 2010). Mindfulness was also shown to be significantly associated with less alcohol use among a sample of 210 undergraduate students in the USA (DeWall, Pond Jr, Carter, McCullough, Lambert, Fincham & Nezlek, 2014).

The moderating role of religiosity in the relationship between impulsivity-related traits and alcohol and cannabis use

As mentioned in the first chapter, recent trends in the literature have started to focus on specific factors that could influence the relationship between impulsivity and substance use behaviours. De Wall and colleagues conducted a series of 7 studies examining the extent to which

religiosity and self-control can interact to predict lower alcohol use and drug use (De Wall et al., 2014). The first study described in the paper examined the association between religiosity and alcohol consumption among 460 undergraduate students in the USA (De Watt et al., 2014). Findings suggested that increased prayer and overall religiosity were associated with lower levels of alcohol consumption on subsequent days (De Watt et al., 2014). The second study described in the paper included the concept of self-control as a possible mediator of the relationship between religiosity and alcohol consumption (De Wall et al., 2014). 582 undergraduate students were given self-report questionnaires and findings suggested that religiosity was associated with increased self-control, which in turn led to less alcohol use behaviours (De Wall et al., 2014). The third study replicated the previous findings by substituting self-report measures of self-control with a behavioural task (De Wall et al., 2014). 327 undergraduates completed the study and the results supported the mediating role of self-control influencing the relationship between religiosity and alcohol consumption (De Wall et al., 2014). The fourth study extended the above findings by measuring alcohol consumption six weeks later to examine whether or not findings were consistent over time (De Wall et al., 2014). The researchers noted that the more individuals (N=971) were religious, the higher they scored on self-control scales and the lower their alcohol consumption was over time (De Wall et al., 2014). The fifth study was described in the paragraph above, and included mindfulness as a protective factor against religiosity. Finally, the sixth and seventh studies sought to expand the findings to the older adult population, while including a drug use questionnaire as well (De Wall et al., 2014). The results show that we can generalize the findings to older populations and to different cultural backgrounds (Americans and Asian countries were included), and that religiosity and self-control could also be strong predictors of illegal drugs as well (De Wall et al., 2014). This paper suggested it would be fruitful to examine these relationships

in a broader set of cultural and religious contexts, and greatly influenced the work presented in this thesis.

To date, there is a dearth of research examining religiosity as a moderator of the relationship between impulsivity and substance use behaviours. Nevertheless, our knowledge of the separate effects of impulsivity and religiosity on substance use behaviours can provide enough plausibility to examine the interaction between both variables. Galbraith and Conner (2015) were the first researchers to conduct a study examining the effect of religiosity as a moderator of the relationship between impulsivity and substance use behaviours. The study was briefly mentioned in the first chapter of this thesis. 514 university students in the USA completed online surveys including self-report questionnaires (Galbraith & Conner, 2015). The study focused on sensation seeking as an indicator of participants' impulsivity (Galbraith & Conner, 2015). Results suggested that sensation seeking was strongly associated with increased levels of alcohol consumption and cannabis use, while religiosity was negatively associated with substance use behaviours (Galbraith & Conner, 2015). As for moderation analyses, results indicated that the interaction between religiosity and sensation seeking was a strong predictor of cannabis use only – high religiosity protected individuals from consuming cannabis despite their scores on the sensation seeking scale (Galbraith & Conner, 2015). Similar findings were not underlined for alcohol consumption (Galbraith & Conner, 2015).

The current study

The aims of this study are: (a) to examine rates of alcohol and cannabis use among college students in the United Kingdom; (b) to examine associations between impulsivity-related traits and aspects of alcohol and cannabis use; (c) to test whether facets of impulsivity account for unique variance in alcohol and cannabis and are risk factors related to substance use behaviours as shown

in the literature; (d) to examine potential protective factors related to alcohol and cannabis consumption: religiosity, spirituality and mindfulness, and investigate whether or not these traits are associated with substance use; (e) to examine the moderating effect of religiosity on the relationship between impulsivity traits and substance use. It is hypothesized that impulsivity-related traits will be associated with higher substance use in the sample. Secondly, we expect self-control religiosity, spirituality and mindfulness to be inversely associated with alcohol and cannabis use behaviours among a sample of college students in the United Kingdom. For the moderation analyses, our study will attempt to expand Galbraith and Conner (2015)'s findings described above. It is predicted that participants who are highly religious would show weaker associations between impulsivity and substance use behaviours.

Method

Participants

Participants (N=245) were young adults residing in the United Kingdom. The sample was 68.2% female and ranged in age from 18 to 30 years old with a mean of 21.74 (SD=3.55). 46.9 % of the participants in this sample reported having obtained a high school degree or equivalent, followed by 36.3% who reported having obtained a bachelor's degree, 5.3% having obtained a master's degree and 1.6% reported obtaining a doctoral degree. The rest of the participants noted that they have obtained professional degrees or other diplomas that were not listed. Data regarding marital status indicated that 86.5% of the sample were single, 8.2% of the sample were in another relationship status not listed in the questionnaire, 4.9% were married and 0.4% preferred not to respond to this question. As for ethnicity, data showed that 68.2% of the sample was white/Caucasian, 9.0% was Asian, 6.9% was black, 5.7% was multiracial, 4.1% of the reported having other origins, 2.4% was Indian, 2.1% was Arab, 1.2% was Chinese and 0.4% preferred not

to specify their ethnic origin. Religious affiliation data indicated that 53.3% of the participants were not affiliated to any religion, 25.4% are Christians, 13.9% are Muslims, 4.9% reported being affiliated to other religions, 1.2% are Jewish, 0.8% are Buddhists and 0.5% are Hindus. Lastly, data regarding socioeconomic status indicated that 31.4% of the participants did not generate any income, while 28.6% generated approximately £10 000 to £30 000 per annum, 26.1% generated less than £10 000 per annum, 9.4% preferred not to indicate what their socioeconomic status was, 4.1% generated approximately £30 000 to £70 000 per annum and 0.4% generated more than £70 000 per annum.

Measures

Demographics

Demographic information in the online questionnaire included gender, age, primary language spoken, level of education, marital status, ethnic origin, religious affiliation and income (per annum) (see appendix B).

Alcohol use

Alcohol consumption was assessed using the Alcohol Use Disorder Identification Test (AUDIT); a short questionnaire that aims to identify individuals with harmful alcohol consumption (WHO, 1989) (see appendix B). It is one of the most widely used alcohol screening tests and includes ten questions such as: *How often do you have a drink containing alcohol?* and *How often during the past year have you found that you were not able to stop drinking once you had started?* Participants were asked to answer the questions concerning their alcohol use within the past year and were provided with different multiple choice answers pertaining to the different questions. The set of responses each contain a score ranging from 0 to 4, and total scores higher than 8 are indicators of harmful use of alcohol (Babor et al., WHO, 2001). AUDIT scores ranging from 0 to

8 are not cause for concern and general education about alcohol would be recommended (WHO, 2001). AUDIT scores ranging from 8 – 15 indicate a medium level of alcohol intake problems and advice regarding usage is recommended (WHO, 2001). AUDIT scores ranging from 16 to 19 indicated higher levels of alcohol intake problems and require advice regarding usage as well as continuous monitoring (WHO, 2001). AUDIT scores above 20 are cause for concern and warrant a diagnostic evaluation for alcohol dependence by a specialist in the field (WHO, 2001). Test-retest reliability studies for the scale indicated high reliability (r=.86) (Sinclair et al., 1992). The alpha reliability in the present sample was .83.

Alcohol rating norms

Alcohol rating norms were assessed using twelve questions (see appendix B). This scale was developed for this particular research study to investigate participants' attitudes and beliefs. The content of this scale reflected the estimates of how often and how much do different types of people drink alcohol. Participants were told that they were rating a typical person of the same gender as themselves. Example questions included: *How often does an average university student drink?* And *How much does an average student drink?* Six response options were provided for the questions assessing how often people drink ranging from *0 drinks*, to *1-2 drinks, 3-4 drinks, 5-6 drinks, 7-8 drinks, more than 8 drinks*. Seven response options were provided for the questions assessing how often certain people drink ranging from *less than once a month* to *about once a month, two or three times a month, once or twice a week, three or four times a week, nearly every day* and *once a day*. The responses allowed us to examine whether or not individuals' ratings are similar to their own drinking habits.

Cannabis use

Cannabis consumption was assessed using the Cannabis Use Disorder Identification Test (CUDIT), a brief questionnaire that aims to assess harmful cannabis consumption (Adamson & Sellman, 2003) (see appendix B). The instrument is similar to the AUDIT and includes 10 items, for example: *How often do you use cannabis?* And *How often during the past 6 months did you fail to do what was normally expected from you because of your cannabis use?* Participants were asked to consider their response with regard to the past 6 months. Five response options were provided, ranging from *never, less than monthly, monthly, weekly* to *daily or almost daily*. The set of responses each contained different scores ranging from 0 to 4 and the cut-off score indicating problem cannabis use is 8 (Adamson & Sellman, 2003). Reliability studies for the scale indicated high reliability (r=.84) (Adamson & Sellman, 2003). The alpha reliability in the present sample was .80.

BIS BAS Scales

Individual differences were measured using the Behavioural Inhibition System and Behavioural Activation System Scales (BIS/BAS) (see appendix B). This 20-item scale aims to assess motivational systems that affect individuals' behaviours (Gray, 1981; Carver & White, 1994). The BIS scale includes 7 items measuring the tendency to respond with negative affect in response to unpleasant events. It contains items such as *I feel pretty worried or upset when I think or know somebody is angry at me*. The BAS scale includes 13 items measuring the tendency to respond with positive affect when faced with a desired reward. It covers three different domains: fun seeking behaviour, reward responsiveness and drive. People scoring high on fun seeking are likely to engage in impulsive behaviour to obtain a pleasurable experience (e.g., *I crave excitement and new sensations*). People scoring high on reward responsiveness are likely to engage in positive affect when desired events are experienced (e.g., *When I get something I want, I feel excited and energized*). People scoring high on

drive are likely to get motivated to pursue desired goals (e.g., *When I want something I usually go all-out to get it*). The BIS/BAS scales include four response options ranging from *very true for me* to *somewhat true for me, somewhat false for me* and *very false for me*. The Cronbach's alpha values for the BIS, RR, DR and FUN scales were .74, .73. .76 and .66, respectively (Carver & White, 1994). Our study will focus on the BAS scales as variables of interest examining participants' impulsive behaviours. The alpha reliabilities in the present sample were: drive = .81, fun = .74, reward responsiveness = .67.

Impulsivity

Impulsivity facets were measured using the UPPS-P Impulsive Behaviour Scale (Whiteside & Lynam, 2001, Cyders et al., 2007) (see appendix B). The scale includes 59 items assessing five facets of impulsivity: negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency. All items are assessed using a four point Likert-type scale from 1 = I agree strongly to 4 = I disagree strongly. Items include: *Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse* (to measure negative urgency); *I am not one of those people who blurt out things without thinking* (to measure lack of premeditation); *I generally like to see things through to the end* (to measure lack of perseverance); *I would enjoy fast driving* (to measure sensation seeking) and *When I am very happy, I can't seem to stop myself from doing things that can have bad consequences* (to measure positive urgency) (Whiteside & Lynam, 2001). The UPPS scale has been shown to present good construct validity (Smith et al., 2007). The alpha reliabilities in the present sample were: lack of premeditation = .88, lack of perseverance = .75, sensation seeking = .71, negative urgency = .76, positive urgency = .91.

Self-Control

Self-control was assessed using a brief 10-items scale adapted from Tangney, Baumeister and Boone (2004) (see appendix B). The items assess a person's self-control using a five point Likert-type scale from 1 = very much like me to 5 = not at all like me. Individuals receive an overall score by summing up all responses and dividing them up by 10. The maximum score on the scale is 5, indicating high self-control and the lowest score is 1, indicating low self-control. Items include: *I have a hard time breaking bad habits* and *I do things that feel good in the moment but regret later on* (Tangney et al., 2004). The alpha reliability in the present sample was .79.

Religiosity

Religiousness was assessed using the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS): The BMMRS is a measure of religiousness and spirituality (Fetzer & NIA, 1999) that includes 38 items divided into 11 subscales (see appendix B). The study included five subscales of the BMMRS that are relevant to a person's overall religious beliefs. We included the items that examined an individual's exposure to religious states, reduction of negative life events and stress thanks to their faith and hope; and an overall indicator of the extent to which an individual is religious (Fetzer & NIA, 1999). The five subscales that were used in this study consisted of Daily Spiritual Experiences, Values/Beliefs, Private Religious Practices, Religious and Spiritual Coping and Overall Self-Ranking. Questions included: *To what extent do you consider yourself a religious person?* (Fetzer & NIA, 1999). The alpha reliability in the present sample was .91 for all questions used.

Spirituality

Participants' spiritual health was measured using the Spirituality Assessment Scale (SAS) (Howden, 1992) (see appendix B). The scale includes 28 items assessing spirituality using a six

point Likert-type scale from 1 = strongly disagree to 6 = strongly agree. Questions include: *The meaning I have found for my life provides a sense of peace* and *I feel a connection to all of life.* Individuals receive an overall SAS score by summing up all responses of the 28 items. The scores can range from 28 to 168. Howden (1992) listed three categories of scores to represent the extent to which a person is spiritual: 1) scores ranging from 140 to 160 indicate a strong positive spirituality, 2) scores ranging from 84 to 112 indicate a fair or mixed positive and negative spirituality and 3) scores ranging from 28 to 56 indicate a weak or negative spirituality. The alpha reliability in the present sample was .94.

Mindfulness

Mindfulness was assessed using the Mindfulness Attention Awareness Scale (MAAS) (Brown & Ryan, 2003) (see appendix B). The scale includes 15 items assessing trait mindfulness using a 6 point Likert-scale ranging from 1 = almost always to 6 = almost never. Items included *I find myself preoccupied with the future or the past*, and *I find myself doing things without paying attention*. Higher scores reflected higher trait mindfulness. The Cronbach's alpha values have consistently been above .80 in Brown and Ryan's studies (2003). The alpha reliability in the present sample was .86.

Procedure

This study was approved by the Goldsmiths, University of London Psychology Department Ethics Committee. Representatives from the psychology, music, sociology and organisational psychology departments at Goldsmiths were contacted and given information about the study and a request for participation. The study was also posted on the department's research participation scheme forum where undergraduate psychology students received credits for their participation to satisfy their mandatory research requirements. Participants were also recruited via the *Prolific*

Academic crowdsourcing platform tool where screening criteria were included to select potential participants within the age group of 18 and 30 years old residing in the United Kingdom. The advertisement requesting for participants to take part of the study stated that they were required to answer some questions regarding substance use behaviours (if any) as well as personality variables and religiosity. Participants had to complete the questionnaire online. Once they clicked on the link that was provided in the description of the research, they were directed to the informed consent form where they were given additional information about the study and the option to exclude themselves from participation if they wished to do so. After having given their consent to be a part of the study, they were directed to the battery of tests online. After having completed the questionnaires, the group was directed to a debriefing sheet offering supplementary information about the study and giving them the opportunity to contact the researchers. Individuals were also given relevant website links to visit if their participation in the study has led them to be curious about substance use or concerned about their particular use. We received a total of 253 responses of which 8 were non-completers and were excluded from the analysis. The time to complete the study ranged from 20 to 30 minutes in total.

Results

The analysis will examine the relationship between alcohol and cannabis use, if any, and religious affiliation. The alcohol use variable indicated whether or not an individual has had a drink containing alcohol in the past year and a cannabis use variable indicating whether or not an individual has used cannabis over the past 6 months. We will also investigate the relationship between total scores of the AUDIT and CUDIT-R, personality variables, religious affiliation, spirituality and mindfulness.

The percentage of participants who reported having consumed alcohol in the past year in this sample was 59.2%, while 40.8% reported never consuming alcohol in this period. Moreover, the AUDIT total scores indicated that 11.8% of the sample consume alcohol in a harmful way (AUDIT >8). As for cannabis consumption, 28.6% of the participants reported having used cannabis in the past 6 months, while 71.4% reported not using any cannabis in the past 6 months. The CUDIT total scores indicate that 10.3% of the sample use cannabis in a harmful way (CUDIT >8).

Religious affiliation and alcohol use and abuse

A chi-square analysis was used to investigate the difference of drinking habits across religious groups (table 2.1). Results showed that there was a significant association between religious affiliation and whether or not a person drinks $x^2(3)=25.74$, p <.001. As shown in table 2.1, individuals with no religious affiliation and Christians are significantly more likely to consume alcohol compared to Muslims.

Table 2.1

Chi-square Test and Descriptive Statistics for Alcohol Use by Religious Affiliation

	Religious Affiliation			
Alcohol Use	No Affiliation	Christian	Muslim	Other
Yes	82 (66%)	42 (68%)	6 (19%)	10 (56%)
No	43 (34%)	20 (32%)	26 (81%)	8 (44%)

Note. $\chi^2 = 25.74$*, df = 3. Numbers in parentheses indicate column percentages.
*p < .05

A one-way ANOVA was also used to assess the difference between the mean scores of the alcohol use questionnaire (AUDIT) across religious groups. There was no significant effect of religious affiliation on the total scores of the AUDIT $F(3, 234) = 2.18$, p = n.s. We do notice,

however, that Muslim participants had a lower mean than all other groups, but the difference was not statistically significant (table 2.2).

Table 2.2

Mean Scores on Alcohol and Cannabis Use as a Function of Participants' Religious Group

	Religious Group							
	No Affiliation		Christian		Muslim		Other	
Substance Use	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
AUDIT	3.38	3.55	3.13	3.54	1.57	3.17	2.89	3.51
CUDIT-R	2.34$_{a}$	3.96	1.45$_{b}$	3.45	1.87$_{c}$	4.64	6.00 $_{a,b,c}$	8.55

Note. Means in a row sharing subscripts are significantly different from each other. For all measures, higher means indicate higher alcohol and cannabis use scores.

Religious affiliation and cannabis use and total score

A chi-square analysis was used to investigate the difference of cannabis consumption habits across religious groups (table 2.3). Results showed that there was a significant association between religious affiliation and whether or not a person consumes cannabis $x^2(3)=7.89$, $p<.05$. As shown in table 2.3, Christians and Muslims were the least likely to engage in cannabis use.

A one-way ANOVA was used to assess the difference between the mean scores of the cannabis questionnaire (CUDIT-R) across religious groups. Results showed a significant effect of religion on the total scores of the cannabis questionnaire, $F(3, 232) = 5.02$, $p < .01$. A post hoc Tukey test showed that individuals with other religious affiliations not listed in the questionnaire and individuals with no religious affiliation differed significantly at $p < .01$ (table 2.2). Individuals with other religious affiliations and Christians differed significantly at $p < .001$. Lastly, individuals with other religious affiliations and Muslims also differed significantly at $p < .05$ (table 2.2).

Table 2.3

Chi-square Test and Descriptive Statistics for Cannabis Use by Religious Affiliation

	Religious Affiliation			
Cannabis Use	No Affiliation	Christian	Muslim	Other
Yes	43 (35%)	14 (23%)	5 (16%)	8 (44%)
No	81 (65%)	48 (77%)	27 (84%)	10 (56%)

Note. $\chi^2 = 7.89$*, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

Overall Religiosity Measure

We ran an exploratory factor analysis to examine the relationship between variables from the religiosity measure. A principal component analysis was conducted on the 6 subscales of religiosity. The Kaiser-Meyer-Olkin measure verifies the sampling adequacy for the analysis, KMO = .89, and all KMO values for individual items were > .61, which is well above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity x^2 (15) = 1253.091, p < .001, indicated that correlations between all items were sufficiently large. One component had an eigenvalue over Kraiser's criterion of 1 and in combination explained 78.34% of the variance. Table 2.4 shows the significant high correlations between all of the variables. Given these results indicating that the subscales of the religiosity measure substantively cluster together, we will retain one component for subsequent analyses to simplify the reporting of the results.

Table 2.4

Correlation table showing relationships between the religiosity variables

	1	2	3	4	5	6
Construct						
1.Daily spiritual experiences	-					
2. Values and beliefs	.83***	-				
3. Private religious practices	.85***	.71***	-			
4. Religious and spiritual coping	.80***	.75***	.79***	-		
5. Overall self-ranking	.83***	.73***	.76***	.81***	-	
6. Organizational religiousness	.68***	.57***	.76***	.61***	.58***	-

Note. Data for full sample are presented in the following table (N = 215); * p < .05. ** p < .01. *** p < .001.

Table 2.5

Factor Loadings from Principal Component Factor Analysis: Eigenvalue and Percentage of Variance for Categories of the BMMRS

	Factor loading
Item	Overall Religiosity
Daily spiritual experiences	**.95**
Overall self-ranking	**.89**
Religious and spiritual coping	**.90**
Private religious practices	**.92**
Values and beliefs	**.87**
Organizational religiousness	**.78**
Eigenvalue	4.70
% of variance	78.34

Note: Factor loadings over .40 appear in bold.

Bivariate Correlations and Descriptive Statistics

Descriptive statistics and bivariate correlations are presented in Table 2.6 below. The means and standard deviations calculated included all of the participants (N=245). Amongst all of the participants, the mean score for typical alcohol consumption was 3.03 (SD = 3.52) which is a moderate average on the AUDIT scale. As for cannabis use, the mean score for typical consumption was 2.32 (SD= 4.55). Correlations between individual differences, religiosity, spirituality, mindfulness and substance use measures were analysed for the whole sample. The analysis revealed a significant negative correlation between an individual's alcohol use (AUDIT score) and overall religiosity (BMMRS total score). A similar relationship was found between alcohol use (AUDIT score) and self-control. There were also significant positive associations between an individual's alcohol use (AUDIT score) and facets of impulsivity, namely positive urgency, lack of premeditation and negative urgency. As for the total use of cannabis, the analysis revealed a significant negative correlation between an individual's cannabis use (CUDIT-R Score) and self-control. There were also significant positive associations between an individual's cannabis use (CUDIT score) and facets of impulsivity, namely positive urgency, sensation seeking, lack of perseverance, negative urgency and fun seeking.

Table 2.6

Bivariate correlations and descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Gender	-																		
2. Alcohol Use	-.10	-																	
3. Audit Total	-.07	.50***	-																
4. Cannabis Use	-.07	.21***	.33***	-															
5. Cudit Total	-.05	.16*	.31***	.78***	-														
6. Negative Urgency	.14*	.06	.19**	.13	.19**	-													
7. Lack of Premediation	-.09	.08	.15*	.13	.08	.34***	-												
8. Lack of Perseverance	-.13	-.03	.06	.13	.16*	.28***	.53***	-											
9. Sensation Seeking	-.10	.10	.08	.19**	.20**	.11	.12	-.06	-										
10. Positive Urgency	-.10	.05	.20**	.11	.17*	.61***	.43***	.32***	.15*	-									
11. Drive	-.03	.03	.09	.04	.05	.24***	.03	-.26***	.29***	.31***	-								
12. Fun Seeking	.04	.11	.08	.17**	.15*	.31***	.27***	.00	.58***	.30***	.40***	-							
13. Reward Responsiveness	.24***	.02	-.05	-.02	-.02	.14*	-.28***	-.34***	.19**	.00	.39***	.37***	-						
14. BAS	.10	.06	.05	.07	.07	.29***	.01	-.25***	.46***	.27***	.79***	.76***	.76***	-					
15. BIS	.34***	.01	-.02	-.13	-.12	.24***	-.26***	-.10	-.15*	-.10	-.06	-.03	.44***	.13*	-				
16. Self-Control	.02	-.04	-.22***	-.17*	-.20**	-.55***	-.40***	-.51***	-.06	-.48***	-.09	-.32***	.00	-.17**	-.06	-			
17. Mindfulness	-.08	-.01	-.05	-.04	-.04	-.45***	.02	-.14*	-.05	-.28***	-.08	-.14*	-.11	-.13	-.18**	.32***	-		
18. Spitiruality Total	.09	-.09	-.13	.00	-.02	-.16*	-.17*	-.36***	.15*	-.08	.28***	.17*	.23***	.29***	-.17*	.34***	.17*	-	
19. Religiosity Total	.12	-.32***	-.18**	-.25***	-.13	-.01	.12	.02	-.06	.13	.04	-.07	-.07	-.03	-.12	.01	.13	.33***	-
Mean			3.03		2.32	27.84	21.26	21.21	32.14	25.97	10.19	11.13	16.30	37.59	21.61	3.16	55.57	109.5	49.07
SD			3.52		4.55	7.13	5.84	4.97	7.32	8.74	2.56	2.45	2.43	5.73	4.25	.70	12.88	24.87	24.88

Data for full sample are presented in the following table (N=245): * $p<.05$. ** $p<.01$. *** $p<.001$.

Gender coded as female = 2, male=1. Alcohol use coded as yes=1, no=0. Cannabis use coded as yes=1, no=0.

Personality variables and alcohol use

A hierarchical regression analysis was conducted using the AUDIT total as the outcome variable, with separate steps in the model for age and gender as control variables and UPPS-P personality variables. Age and gender were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency were entered at step 2. As shown in table 2.7, analyses indicated that neither gender nor age predict alcohol use. As for variables of the UPPS-P scale measuring impulsivity-related traits, none of the five facets was a significant predictor of alcohol use.

Table 2.7
Hierarchical Regression Analysis Summary for UPPS-P Variables Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.02	
Gender of Participants	-.86	.53	-.11		
Age of Participants	.06	.07	-.06		
Step 2				.08*	.07*
Gender of Participants	-.95	.64	-.13		
Age of Participants	-.04	.12	-.05		
Negative urgency	.08	.14	.17		
Lack of premeditation	.05	.14	.08		
Lack of perseverance	-.04	.15	-.06		
Sensation seeking	.04	.18	.09		
Positive urgency	.02	.14	.04		

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

A hierarchical regression analysis was conducted using the AUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Drive, fun seeking and reward responsiveness were entered at step 2. As shown in table 2.8, analyses indicated

that neither gender nor age predict alcohol use. As for variables of the BAS scale, none of the three facets was a significant predictor of alcohol use.

Table 2.8
Hierarchical Regression Analysis Summary for BAS Variables Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.51	.52	-.07		
Age of Participants	-.08	.07	-.08		
Step 2				.03	.02
Gender of Participants	-.38	.56	-.05		
Age of Participants	-.06	.07	-.06		
Drive	.14	.11	.10		
Fun Seeking	.16	.11	.11		
Reward Responsiveness	-.20	.14	-.14		

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

A hierarchical regression analysis was conducted using the AUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and the total score of the self-control personality variable. Age and gender were entered as predictors at step 1. Self-control was entered at step 2. As shown in table 2.9, analyses indicated that neither gender nor age predict alcohol use. On the other hand, self-control was a significant predictor of alcohol use (β = -.21, p < .001). The standardized beta coefficient is negative which indicated the more an individual scores high on the self-control scale, the less this individual is likely to consume alcohol (table 2.9).

Table 2.9
Hierarchical Regression Analysis Summary for Self-Control Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.53	.51	-.07		
Age of Participants	-.07	.07	-.08		
Step 2				.05**	.042**
Gender of Participants	-.54	.50	-.07		
Age of Participants	-.06	.07	-.06		
Self-Control Total Score	-1.05	.34	-.21**		

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

Personality variables and cannabis use

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and UPPS-P personality variables. Age and gender were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency were entered at step 2. As shown in table 2.10, analyses indicated that neither gender nor age predict cannabis use. On the other hand, lack of perseverance (β = -.16, p < .05) and sensation seeking (β = .27, p < .001) were both significant predictors of cannabis use. The standardized beta coefficients are positive which indicated the more an individual scores high on the lack of perseverance and sensation seeking subscales, the more that individual is likely to consume cannabis (table 2.10).

Table 2.10
Hierarchical Regression Analysis Summary for UPPS-P Variables Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-0.51	.69	-.05		
Age of Participants	.00	.09	.00		
Step 2				.13***	.12***
Gender of Participants	-.30	.69	-.03		
Age of Participants	.03	.09	.03		
Negative urgency	.07	.06	.11		
Lack of premeditation	-.04	.06	-.05		
Lack of perseverance	.14	.07	.16*		
Sensation seeking	.16	.04	.27***		
Positive urgency	.02	.05	.05		

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

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Drive, fun and reward responsiveness were entered at step 2. As shown in table 2.11, analyses indicated that neither gender nor age predict cannabis use. On the other hand, the fun subscale of the BAS was a significant predictor of cannabis use ($\beta = .16$, $p < .05$). The standardized beta coefficient is positive which indicated the more an individual scores high on the fun subscale, the more this individual is likely to consume cannabis (table 2.11).

Table 2.11

Hierarchical Regression Analysis Summary for BAS Variables Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.37	.67	-.04		
Age of Participants	-.04	.09	-.03		
Step 2				.05	.05*
Gender of Participants	.16	.72	.02		
Age of Participants	-.04	.09	-.03		
Drive	-.02	.15	-.01		
Fun	.30	.15	.16*		
Reward Responsiveness	-.01	.17	-.01		

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

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and the self-control personality variable. Age and gender were entered as predictors at step 1. Self-control was entered at step 2. As shown in table 2.12, analyses indicated that neither gender nor age predict cannabis use. On the other hand, self-control was a predictor of cannabis use (β = -.19, p < .01). The standardized beta coefficient is negative which indicated the more an individual scores high on the self-control scale, the less this individual is likely to consume cannabis (table 2.12).

Table 2.12
Hierarchical Regression Analysis Summary for Self-Control Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.32	.67	-.03		
Age of Participants	-.05	.09	-.04		
Step 2				.04*	.04**
Gender of Participants	-.37	.66	-.04		
Age of Participants	-.04	.00	-.03		
Self-Control Total Score	-1.30	.45	-.19**		

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

Mindfulness and substance use

A hierarchical regression analysis was conducted using the AUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and MAAS mindfulness variable. Age and gender were entered as predictors at step 1. Mindfulness was entered at step 2. As shown in table 2.13, analyses indicated that neither gender nor age predict alcohol use. Mindfulness was not a significant predictor of alcohol use.

Table 2.13
Hierarchical Regression Analysis Summary for Mindfulness Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.70	.50	-.10		
Age of Participants	-.09	.07	-.09		
Step 2				.02	.01
Gender of Participants	-.75	.50	-.10		
Age of Participants	-.09	.07	-.10		
Mindfulness	-.02	.02	-.08		

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

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and MAAS

mindfulness variable. Age and gender were entered as predictors at step 1. Mindfulness was entered at step 2. As shown in table 2.14, analyses indicated that neither gender nor age predict alcohol use. Mindfulness was not a significant predictor of cannabis use.

Table 2.14
Hierarchical Regression Analysis Summary for Mindfulness Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.48	.66	-.05		
Age of Participants	-.04	.09	-.03		
Step 2				.01	.00
Gender of Participants	-.52	.66	-.06		
Age of Participants	-.04	.09	-.03		
Mindfulness	-.02	.02	-.04		

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

Spirituality and substance use

A hierarchical regression analysis was conducted using the AUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and SAS spirituality variable. Age and gender were entered as predictors at step 1. Spirituality was entered at step 2. As shown in table 2.15, analyses indicated that neither gender nor age predict alcohol use. Spirituality was not a significant predictor of alcohol use.

Table 2.15
Hierarchical Regression Analysis Summary for Spirituality Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.59	.52	-.08		
Age of Participants	-.09	.07	-.09		

Step 2				.03	.02
Gender of Participants	-.54	.52	-.07		
Age of Participants	-.11	.07	-.11		
Spirituality	-.02	.01	-.13		

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

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and SAS spirituality variable. Age and gender were entered as predictors at step 1. Spirituality was entered at step 2. As shown in table 2.16, analyses indicated that neither gender nor age predict alcohol use. Spirituality was not a significant predictor of cannabis use.

Table 2.16
Hierarchical Regression Analysis Summary for Spirituality Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.61	.64	-.07		
Age of Participants	-.01	.08	-.01		
Step 2				.01	0.000
Gender of Participants	-.61	.64	-.07		
Age of Participants	-.01	.09	-.01		
Spirituality	.00	.012	.00		

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

Religiosity as a moderator of the link between personality and substance use

To test our hypothesis that religiosity is a moderator of the relationship between impulsivity and substance use, the subsequent analysis will report moderation analysis results including the fun-seeking variable of the BIS/BAS and all five variables of the UPPS-P. We will also examine whether or not religiosity moderates the relationship between self-control and substance use behaviours.

Alcohol use

To test our hypothesis that religiosity is a moderator in the relationship between fun seeking and alcohol consumption, we performed a moderated regression analysis with the interaction of fun and religiosity. To avoid multicollinearity problems, we centred both the fun seeking data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, fun seeking and the interaction of religiosity and fun. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Fun seeking and religiosity were entered at step 3 and the interaction between fun and religiosity was entered at step 4. Table 2.17 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between fun seeking and religiosity in predicting alcohol use is non-significant.

Table 2.17
Moderated Regression Analysis –Religiosity, Fun Seeking and Alcohol Use (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.02	
Gender of Participants	-.75	.50	-.10		
Age of Participants	-.10	.07	-.11		
Step2				.05*	.03*
Gender of Participants	-.63	.50	-.09		
Age of Participants	-.12	.07	-.12		
Religiosity	-.02	.01	-.16*		
Step 3				.05*	.01
Gender of Participants	-.66	.50	-.09		
Age of Participants	-.12	.07	-.12		
Religiosity	-.02	.01	-.15*		
Fun Seeking	.11	.09	.08		
Step 4				.05	.00
Gender of Participants	-.66	.50	-.09		
Age of Participants	-.12	.07	-.12		

Religiosity	-.02	.01	-.15*
Fun Seeking	.11	.09	.08
Religiosity x Fun Seeking	.00	.00	.00

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

To test our hypothesis that religiosity is a moderator in the relationship between negative urgency and alcohol consumption, we performed a moderated regression analysis with the interaction of negative urgency and religiosity. To avoid multicollinearity problems, we centred both the negative urgency king data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, negative urgency and the interaction of religiosity and negative urgency. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Negative urgency and religiosity were entered at step 3 and the interaction between negative urgency and religiosity was entered at step 4. Table 2.18 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between negative urgency and religiosity in predicting alcohol use is non-significant.

Table 2.18
Moderated Regression Analysis – Lack of Perseverance, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				0.020	
Gender of Participants	-.77	.50	-.11		
Age of Participants	-.09	.07	-.10		
Step2				0.045*	0.025*
Gender of Participants	-.62	.50	-.09		
Age of Participants	-.12	.07	-.12		
Religiosity	-0.02	.01	-0.16*		
Step 3				0.067**	0.022*
Gender of Participants	-.79	.50	-.11		

Age of Participants	-.10	.07	-.11		
Religiosity	-0.02	.01	-0.16*		
Negative Urgency	0.07	.03	0.15*		
Step 4				0.069*	0.002
Gender of Participants	-.76	.51	-.11		
Age of Participants	-.11	.07	-.11		
Religiosity	-0.02	.01	-0.16*		
Negative Urgency	0.07	.03	0.14*		
Religiosity x Negative Urgency	.00	.00	-.05		

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

To test our hypothesis that religiosity is a moderator in the relationship between sensation seeking and alcohol consumption, we performed a moderated regression analysis with the interaction of sensation seeking and religiosity. To avoid multicollinearity problems, we centred both the sensation seeking data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, sensation seeking and the interaction of religiosity and sensation seeking. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Sensation seeking and religiosity were entered at step 3 and the interaction between sensation seeking and religiosity was entered at step 4. Table 2.19 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between sensation seeking and religiosity in predicting alcohol use is non-significant.

Table 2.19
Moderated Regression Analysis – Religiosity, Sensation Seeking and Alcohol Use (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.02	
Gender of Participants	-.77	.50	-.11		
Age of Participants	-.10	.07	-.10		
Step2				.05*	.02*

Gender of Participants	-.64	.50	-.09		
Age of Participants	-.12	.07	-.12		
Religiosity	-.02	.01	-.17*		
Step 3				.05*	.01
Gender of Participants	-.60	.50	-.08		
Age of Participants	-.11	.07	-.11		
Religiosity	-.02	.01	-.16*		
Sensation Seeking	.04	.03	.09		
Step 4				.06*	.01
Gender of Participants	-.58	.50	-.08		
Age of Participants	-.11	.07	-.12		
Religiosity	-.02	.01	-.17*		
Sensation Seeking	.04	.03	.09		
Religiosity x Sensation Seeking	.00	.00	-.05		

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

To test our hypothesis that religiosity is a moderator in the relationship between lack of perseverance and alcohol consumption, we performed a moderated regression analysis with the interaction of lack of perseverance and religiosity. To avoid multicollinearity problems, we centered both the lack of perseverance data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, lack of perseverance and the interaction of lack of perseverance and religiosity. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Lack of perseverance and religiosity were entered at step 3 and the interaction between lack of perseverance and religiosity was entered at step 4. Table 2.20 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between lack of perseverance and religiosity in predicting alcohol use is non-significant.

Table 2.20
Moderated Regression Analysis – Religiosity, Lack of Perseverance and Alcohol Use (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.02	

Gender of Participants	-.86	.50	-.12		
Age of Participants	-.09	.07	-.09		
Step2				.05*	.02*
Gender of Participants	-.74	.50	-.11		
Age of Participants	-.10	.07	-.11		
Religiosity	-.02	.01	-.16*		
Step 3				.05	.00
Gender of Participants	-.78	.50	-.11		
Age of Participants	-.10	.07	-.11		
Religiosity	-.02	.01	-.16*		
Lack of Perseverance	-.02	.05	-.03		
Step 4				.05	.00
Gender of Participants	-.78	.51	-.11		
Age of Participants	-.10	.07	-.11		
Religiosity	-.02	.01	-.16*		
Lack of Perseverance	-.02	.05	-.03		
Religiosity x Lack of Perseverance	.00	.00	.00		

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

To test our hypothesis that religiosity is a moderator in the relationship between lack of premeditation and alcohol consumption, we performed a moderated regression analysis with the interaction of lack of premeditation and religiosity. To avoid multicollinearity problems, we centered both the lack of premeditation data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, lack of premeditation and the interaction of lack of premeditation and religiosity. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Lack of premeditation and religiosity were entered at step 3 and the interaction between lack of premeditation and religiosity was entered at step 4. Table 2.21 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between lack of premeditation and religiosity in predicting alcohol use is non-significant.

Table 2.21

Moderated Regression Analysis – Lack of Premeditation, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				0.025	
Gender of Participants	-.92	.50	-.13		
Age of Participants	-.10	.07	-.10		
Step2				0.048*	0.023*
Gender of Participants	-.80	.50	-.11		
Age of Participants	-.12	.07	-.12		
Religiosity	-.02	.01	-0.16*		
Step 3				0.067**	0.019*
Gender of Participants	-.69	.51	-.10		
Age of Participants	-.11	.07	-.12		
Religiosity	-.02	.01	-0.17*		
Lack of Premeditation	.08	.04	0.14*		
Step 4				0.070*	0.003
Gender of Participants	-.69	.50	-.10		
Age of Participants	-.11	.07	-.12		
Religiosity	-.02	.01	-.17		
Lack of Premeditation	.09	.04	0.16*		
Religiosity x Lack of Premeditation	.00	.00	-0.06		

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

To test our hypothesis that religiosity is a moderator in the relationship between positive urgency and alcohol consumption, we performed a moderated regression analysis with the interaction of positive urgency and religiosity. To avoid multicollinearity problems, we centered both the positive urgency data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, positive urgency and the interaction of positive urgency and religiosity. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Positive urgency and religiosity were entered at step 3 and the interaction between positive urgency and religiosity was entered

at step 4. Table 2.22 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between positive urgency and religiosity in predicting alcohol use is non-significant.

Table 2.22
Moderated Regression Analysis – Positive Urgency, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2	
Step 1				0.024		
Gender of Participants	-.79	.51	-.11			
Age of Participants	-.11	.07	-.12			
Step2				0.054*		0.030*
Gender of Participants	-.66	.51	-.09			
Age of Participants	-.14	.07	-.14			
Religiosity	-.02	.01	-0.18*			
Step 3				0.081**		0.027*
Gender of Participants	-.50	.50	-.07			
Age of Participants	-.11	.07	-.11			
Religiosity	-.03	.01	-0.20**			
Positive Urgency	.07	.03	0.17*			
Step 4				0.086**		0.05
Gender of Participants	-.48	.50	-.07			
Age of Participants	-.10	.07	-.10			
Religiosity	-.03	.01	-.18			
Positive Urgency	.07	.03	.17			
Religiosity x Positive Urgency	.00	.00	-.07			

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

To test our hypothesis that religiosity is a moderator in the relationship between self-control and religiosity. To avoid multicollinearity problems, we centred both the self-control data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, self-control and the interaction of religiosity and self-control. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Self-control and religiosity were entered at step 3 and the interaction between self-

control and religiosity was entered at step 4. Table 2.23 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between self-control and religiosity in predicting alcohol use is non-significant.

Table 2.23
Moderated Regression Analysis –Religiosity, Self-Control and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.02	
Gender of Participants	-.74	.50	-.10		
Age of Participants	-.10	.07	-.10		
Step2				.05*	.03*
Gender of Participants	-.63	.50	-.09		
Age of Participants	-.12	.07	-.12		
Religiosity	-.02	.01	-.16*		
Step 3				.07**	.03*
Gender of Participants	-.65	.49	-.09		
Age of Participants	-.10	.07	-.11		
Religiosity	-.02	.01	-.16*		
Self-Control	-.78	.33	-.16*		
Step 4				.08**	.01
Gender of Participants	-.61	.49	-.09		
Age of Participants	-.11	.07	-.11		
Religiosity	-.02	.01	-.16*		
Self-Control	-.76	.33	-.16*		
Religiosity x Self-Control	.02	.01	.12		

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

From this data, we also notice that religiosity is a significant predictor of alcohol use (β = -.16, p < .05). The standardized beta coefficient is negative which indicated the more an individual is religious, the less this individual is likely to consume alcohol (table 2.23).

Cannabis use

To test our hypothesis that religiosity is a moderator in the relationship between fun seeking and cannabis consumption, we performed a moderated regression analysis with the interaction of fun and religiosity. To avoid multicollinearity problems, we centred both the fun seeking data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, fun seeking and the interaction of religiosity and fun. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Fun seeking and religiosity were entered at step 3 and the interaction between fun and religiosity was entered at step 4. Table 2.24 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between fun seeking and religiosity in predicting cannabis use is non-significant.

Table 2.24
Moderated Regression Analysis – Religiosity, Fun Seeking and Cannabis Use (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.33	.67	-.03		
Age of Participants	-.03	.09	-.02		
Step2				.02	.02
Gender of Participants	-.21	.67	-.02		
Age of Participants	-.04	.09	-.04		
Religiosity	-.02	.01	-.12		
Step 3				.06*	.04**
Gender of Participants	-.31	.66	-.03		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.10		
Fun Seeking	.36	.13	.20**		
Step 4				.06	.00
Gender of Participants	-.30	.66	-.03		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.11		
Fun Seeking	.37	.13	.20**		

Interaction	.00	.00	-.03

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

To test our hypothesis that religiosity is a moderator in the relationship between negative urgency and cannabis consumption, we performed a moderated regression analysis with the interaction of negative urgency and religiosity. To avoid multicollinearity problems, we centred both the negative urgency data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, negative urgency and the interaction of religiosity and negative urgency. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Negative urgency and religiosity were entered at step 3 and the interaction between negative urgency and religiosity was entered at step 4. Table 2.25 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between negative urgency and religiosity in predicting cannabis use is non-significant.

Table 2.25
Moderated Regression Analysis – Negative Urgency, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				0.002	
Gender of Participants	-.35	.68	-.04		
Age of Participants	-.02	.09	-.02		
Step2				0.014	0.012
Gender of Participants	-.22	.68	-.02		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.12		
Step 3				0.052*	0.038**
Gender of Participants	-.54	.68	-.06		
Age of Participants	-.02	.09	-.02		
Religiosity	-.02	.01	-.11		

Negative Urgency	.13	.04	0.20**		
Step 4				0.053*	0.001
Gender of Participants	-.56	.68	-.06		
Age of Participants	-.02	.09	-.02		
Religiosity	-.02	.01	-.10		
Negative Urgency	.13	.05	0.20**		
Religiosity xNegative Urgency	.00	.00	.03		

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

To test our hypothesis that religiosity is a moderator in the relationship between sensation seeking and cannabis consumption, we performed a moderated regression analysis with the interaction of sensation seeking and religiosity. To avoid multicollinearity problems, we centred both the sensation seeking data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, sensation seeking and the interaction of religiosity and sensation seeking. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Sensation seeking and religiosity were entered at step 3 and the interaction between sensation seeking and religiosity was entered at step 4. Table 2.26 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between sensation seeking and religiosity in predicting cannabis use is non-significant.

Table 2.26
Moderated Regression Analysis – Religiosity, Sensation Seeking and Cannabis Use(CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.32	.67	-.03		
Age of Participants	-.03	.09	-.02		
Step2				.02	.01

Gender of Participants	-.20	.67	-.02		
Age of Participants	-.05	.09	-.04		
Religiosity	-.02	.01	-.12		
Step 3				.07**	.05***
Gender of Participants	-.07	.65	-.01		
Age of Participants	-.02	.09	-.02		
Religiosity	-.02	.01	-.10		
Sensation Seeking	.14	.04	.23***		
Step 4				.08**	.01
Gender of Participants	-.03	.65	.00		
Age of Participants	-.03	.09	-.02		
Religiosity	-.02	.01	-.12		
Sensation Seeking	.14	.04	.23***		
Interaction	.00	.00	-.08		

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

To test our hypothesis that religiosity is a moderator in the relationship between lack of perseverance and cannabis consumption, we performed a moderated regression analysis with the interaction of lack of perseverance and religiosity. To avoid multicollinearity problems, we centered both the lack of perseverance data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, lack of perseverance and the interaction of lack of perseverance and religiosity. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Lack of perseverance and religiosity were entered at step 3 and the interaction between lack of perseverance and religiosity was entered at step 4. Table 2.27 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between lack of perseverance and religiosity in predicting cannabis use is non-significant.

Table 2.27
Moderated Regression Analysis – Religiosity, Lack of Perseverance and Cannabis Use (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.00	
Gender of Participants	-.22	.68	-.02		
Age of Participants	-.02	.09	-.02		
Step2				.01	.01
Gender of Participants	-.11	.68	-.01		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.11		
Step 3				.03	.02*
Gender of Participants	.07	.68	.01		
Age of Participants	-.03	.09	-.03		
Religiosity	-.02	.01	-.12		
Lack of Perseverance	.12	.06	.14*		
Step 4				.03	.00
Gender of Participants	.09	.69	.01		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.12		
Lack of Perseverance	.12	.06	.14*		
Interaction	.00	.00	-.03		

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

To test our hypothesis that religiosity is a moderator in the relationship between lack of premeditation and cannabis consumption, we performed a moderated regression analysis with the interaction of lack of premeditation and religiosity. To avoid multicollinearity problems, we centered both the lack of premeditation data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, lack of premeditation and the interaction of lack of premeditation and religiosity. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Lack of premeditation and religiosity were entered at step 3 and the interaction between lack of

premeditation and religiosity was entered at step 4. Table 2.28 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between lack of premeditation and religiosity in predicting cannabis use is non-significant.

Table 2.28
Moderated Regression Analysis – Lack of Premeditation, Religiosity and Cannabis Consumption (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				0.003	
Gender of Participants	-.46	.69	-.05		
Age of Participants	-.03	.09	-.02		
Step2				0.016	0.013
Gender of Participants	-.33	.69	-.03		
Age of Participants	-.05	.09	-.04		
Religiosity	-.02	.01	-.12		
Step 3				0.027	0.011
Gender of Participants	-.25	.69	-.03		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.13		
Lack of Premeditation	.08	.05	.11		
Step 4				0.039	0.012
Gender of Participants	-.21	.69	-.02		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.13		
Lack of Premeditation	.10	.06	.14		
Religiosity x Lack of Premeditation	.00	.00	-.11		

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

To test our hypothesis that religiosity is a moderator in the relationship between positive urgency and cannabis consumption, we performed a moderated regression analysis with the interaction of positive urgency and religiosity. To avoid multicollinearity problems, we centred both the positive urgency data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, positive urgency and the interaction of religiosity and positive urgency. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Positive urgency and religiosity were

entered at step 3 and the interaction between positive urgency and religiosity was entered at step 4. Table 2.29 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between positive urgency and religiosity in predicting cannabis use is non-significant.

Table 2.29
Moderated Regression Analysis – Positive Urgency, Religiosity and Cannabis Consumption (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				0.001	
Gender of Participants	-.30	.68	-.03		
Age of Participants	.00	.09	.00		
Step2				0.014	0.013
Gender of Participants	-.18	.68	-.02		
Age of Participants	-.02	.09	-.01		
Religiosity	-.02	.01	-.12		
Step 3				0.040	0.026*
Gender of Participants	-.01	.67	.00		
Age of Participants	.02	.09	.01		
Religiosity	-.02	.01	-.14		
Positive Urgency	.09	.04	0.16*		
Step 4				0.041	0.001
Gender of Participants	-.03	.68	.00		
Age of Participants	.01	.09	.01		
Religiosity	-.03	.01	-.14		
Positive Urgency	.09	.04	0.16*		
Religiosity x Positive Urgency	.00	.00	.03		

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

To test our hypothesis that religiosity is a moderator in the relationship between self-control and cannabis consumption, we performed a moderated regression analysis with the interaction of self-control and religiosity. To avoid multicollinearity problems, we centred both the self-control data and the overall religiosity data. A hierarchical regression analysis was conducted using the cannabis use identification total as the criterion variable, with separate

steps in the model for age and gender as control variables, religiosity, self-control and the interaction of religiosity and self-control. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Self-control and religiosity were entered at step 3 and the interaction between self-control and religiosity was entered at step 4. Table 2.30 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between self-control and religiosity in predicting cannabis use is non-significant.

Table 2.30
Moderated Regression Analysis –Religiosity, Self-Control and Cannabis Use (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.01	
Gender of Participants	-.31	.67	-.03		
Age of Participants	-.02	.09	-.02		
Step2				.02	.01
Gender of Participants	-.20	.67	-.02		
Age of Participants	-.04	.09	-.03		
Religiosity	-.02	.01	-.12		
Step 3				.06*	.04**
Gender of Participants	-.28	.66	-.03		
Age of Participants	-.02	.09	-.01		
Religiosity	-.02	.01	-.11		
Self-Control	-1.38	.45	-.21**		
Step 4				.06*	.00
Gender of Participants	-.26	.66	-.03		
Age of Participants	-.02	.09	-.02		
Religiosity	-.02	.01	-.11		
Self-Control	-1.37	.45	-.21**		
Religiosity x Self-Control	.01	.02	.03		

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

From this data, we also notice that religiosity is not a significant predictor of cannabis use.

Discussion

This study aimed to examine the interaction between personality differences and alcohol and cannabis use in a sample of young adults residing in the United Kingdom. The analysis focused on impulsivity-related traits specified by the UPPS-P and BIS/BAS frameworks as well as the self-control specified by the SCS framework. All facets of the UPPS-P have been previously shown to relate to alcohol use and abuse (Coskunpinar, Dir & Cyders, 2013). Findings also suggested that impulsivity-related traits are more related to cannabis as opposed to drinking behaviours, particularly sensation seeking and lack of premeditation facets (Shin & Chung, 2013). Cannabis use was also shown to be related to the negative urgency trait (Tomko, Prisciandaro, Falls & Magid, 2016). The study also examined the relationship between religiosity, spirituality and mindfulness traits, specified by the BMMRS, SAS and MAAS frameworks and alcohol and cannabis use. Findings suggest that overall religiosity and spiritual practices are associated with less problematic alcohol use (Delva, Andrade, Sanhueza & Han, 2015). Mindfulness practices were also shown to protect individuals from engaging in substance use behaviour (Karyadi et al., 2014; De Wall et al, 2014).

In a sample of young adults residing in the United Kingdom, 59.2% reported having consumed alcohol in the past year while 11.8% of those participants reported consuming alcohol in a harmful way. These findings are in line with previous studies suggesting that a large number of young adults in the United Kingdom consume alcohol in a hazardous way (Craigs, Bewick, Gill, O'May & Radley, 2011). Nevertheless, national statistics have shown that recent trends in the drinking behaviours of youngsters have slightly declined in the past years (Dunstan, 2010). Among adolescents aged 16 to 24 years, weekly alcohol consumption lowered from 16.9 units per week in 2005 to 11.1 units per week in 2010 (Dunstan, 2010). Data also showed that the proportion of adolescents drinking above the recommended guidelines (4 units for at least one day per week for males and 3 units for at least one day for females)

decreased from 2005 until 2010 (Dunstan, 2010). These findings could be related to the rise of intervention strategies that are being set forth in schools and communities. Moreover, 28.6% of the participants in our sample reported having used cannabis in the past six months while 10.3% of the sample reported using cannabis in a harmful way. These findings support Bennett and Holloway (2014) suggesting cannabis is the most popular illicit drug used among youth in the United Kingdom. Alcohol use results indicated that Muslim participants drank significantly less alcohol that individuals from other religious groups. This difference was not apparent for cannabis use and may be due to the fact that Islam strictly prohibits the consumption of alcoholic beverages.

Of all personality variables included in the study, self-control was the most significantly associated to typical alcohol consumption. The association showed that increased levels of self-control lead to less alcohol consumption. These findings support the observation that individuals with high self-control tend to have lower impulse-control problems such as alcohol misuse (Tangney, Baumeister, & Boone, 2004). Contrary to our initial expectations, none of the BAS and UPPS traits showed an association with alcohol consumption. Our findings did not support those reported by Coskunpinar, Dir and Cyders (2013). On the other hand, the results showed various associations between personality variables and typical cannabis consumption. This is in line with the study conducted by Shin and Chung (2013) showing stronger associations with cannabis as opposed to alcohol use behaviours. Firstly, self-control was a significant predictor of cannabis use behaviours. The association showed that increased levels of self-control lead to less cannabis consumption. Our findings support the idea that high levels of self-control are associated with a reduced risk of engaging in substance use behaviours (Pearson, Kite & Henson, 2013). Secondly, when examining the UPPS-P facets of impulsivity, cannabis consumption was related to sensation seeking and lack of perseverance. The association indicated that both sensation seeking and lack of perseverance are risk factors that

can lead to an increase risk of cannabis consumption. This is also in line with recent findings underlining sensation seeking as a predictor of cannabis consumption (Shin & Chung, 2013).

The total religiosity score showed a significant negative association with alcohol consumption. The association underlined the protective role of overall religiosity in reducing the likelihood of consuming alcohol. This is in line with the observation that young adults who report being religious have significantly lower rates of alcohol use (Ford & Hill, 2012). However, our results do not support the literature concerning cannabis use. Previous findings had suggested that low religiosity increases the risk of engaging in cannabis use (Kovacs, Piko & Fitzpatrick, 2011; Ford & Hill, 2012). Our analysis did not indicate a similar relationship between overall religiosity and cannabis use in a sample of young adults in the United Kingdom. We had initially hypothesized that spirituality is a protective factor and leads to less alcohol and cannabis use as was shown in previous studies (Delva, Andrade, Sanhueza & Han, 2015; Debnam, Milam, Furr-Holden & Bradshaw, 2016; Katho & Sgoutas-Emch, 2016). Our findings did not support the previous literature as spirituality was not significantly related to substance use behaviours in our sample. Similarly, mindfulness was not a protective factor for either alcohol or cannabis use. Findings within this area of research remain scarce but there are some indications that suggest mindfulness traits are associated to less substance use behaviours (Karyadi, VanderVeen & Cyders, 2014).

Finally, our analyses examining the moderating effect of religiosity on the relationship between personality variables and substance use behaviours did not generate significant findings. Our findings do not build on the observations established by Galbraith and Connor (2015) who showed the moderating effect of religiosity on impulsivity and alcohol use (Galbraith & Connor, 2015).

Limitations and Future Directions

Generalisation of the findings is limited by the majority of females in the sample of this study, with 68.2% of respondents being female participants. There is a potential sampling bias in the results and thus further research is needed to support the findings. The relatively low rates of cannabis problems in this sample may also make it difficult to detect statistically significant relationships with the other variables. Moreover, our sample size, including 245 young adults, is relatively small and thus decreases statistical power.

The inclusion of a variety of different measures and variables in this study was another limitation as it could potentially increase the probability of type 1 errors due to the multiple hypotheses that needed to be tested. This multiple comparisons problem was addressed by using statistical steps like the Bonferroni correction to adjust the p values when necessary.

Another limitation to note is the use of self-report questionnaires to collect data. While this method can be very advantageous, it is important to note that we cannot control the validity and truthfulness behind the responses of each participant. The social desirability bias or a participants' way of responding in a manner that he deems favourable to others could have greatly impacted the set of responses received; specifically when discussing substance behaviours. Some of the questions or statements may have also been misunderstood by the participants, consequently affecting the reliability of the study.

This study will serve as a comparison study alongside the studies described in succeeding chapters as it is the only one conducted with a sample representing Western societies. The chapters described in the rest of the thesis will explore similar research questions with samples of participants in the Middle East and Gulf region.

Young adults in the United Kingdom consume a variety of different substances. Identifying risk and resilience factors related to substance use behaviours is significant to the

understanding of addictive behaviours in general and could guide prevention measures and treatments. A similar study including a wider range of participants is necessary to examine impulsivity as a risk factor further. Exploring different measures of spirituality and mindfulness can also yield interesting results. Furthermore, there are many new trends in substance use behaviours among young adults in different parts of the world, similar analyses with different kinds of substances could also shed more light on the topic.

In summary**,** these findings indicate that emerging adults in the United Kingdom engage in alcohol and cannabis use behaviours. Sensation seeking and lack of perseverance are impulsivity-traits that were shown to be related to increased cannabis use. On the other hand self-control is a personality trait that was shown to protect individuals from engaging in harmful alcohol and cannabis use. Religiosity was a protective factor of alcohol use and misuse. The study in this chapter extends the literature in the field by highlighting the interactions of numerous variables related to alcohol and cannabis use behaviours in a UK sample.

CHAPTER 3

SUBSTANCE USE BEHAVIOURS IN A SAMPLE OF YOUNG ADULTS IN LEBANON: IMPULSIVITY-RELATED TRAITS AND RELIGIOSITY

Overview

This chapter begins with a summary of studies that have examined substance use behaviours in Lebanon. We will focus on studies that have assessed personality traits and alcohol and cannabis use in young adult populations, as well as studies that have examined religiosity and differences between religious groups. It then goes on to report a study of 173 young adults residing in Lebanon. These participants completed a self-report questionnaire including measures of impulsivity-related traits, religiosity and alcohol and cannabis use. Hierarchical regression analyses indicated that fun seeking predicted significantly more alcohol consumption, while reward responsiveness predicted less alcohol use. Findings also suggested that religiosity was associated with less alcohol consumption. Moderation analyses indicated that the interaction between religiosity and fun seeking was a significant predictor of alcohol consumption. High religiosity diminished the relationship between impulsivity and alcohol use. The interaction between religiosity and reward responsiveness was also a significant predictor of both alcohol and cannabis consumption. Moderation analyses indicated that high religiosity strengthened the protective effect of reward responsiveness against both alcohol and cannabis use. The interplay of high religiosity and high reward responsiveness thus predicted lower consumptions of substances.

Introduction

The first part of this chapter will provide an overview of relevant studies that have examined substance use behaviours among university students and young adults in Lebanon. We will also include studies discussing the significant relationship between impulsivity-related traits and alcohol and cannabis use using the multi-component approach to impulsivity outlined in the first chapter. Studies including religiosity will also be discussed.

Substance use in young adult populations in Lebanon

In contrast to the literature focusing on alcohol and cannabis use in the United Kingdom reviewed in the previous chapter, the amount of research examining substance use behaviours in Lebanon remains scarce. Nevertheless, existing data in this area will be informative for the study presented in this chapter and the thesis more generally. The following study will expand these findings by examining substance use behaviours in a sample of Lebanese students. Personality and religiosity will be discussed as possible risk and resilience factors related to substance use.

Substance use amongst university students in the Middle East region is a growing social issue. Data from Lebanon indicate that substance use disorders are more prevalent amongst young individuals aged 18 to 34 years old (Karam, Mneimneh, Karam, Fayyad, Nasser, Chaterji, & Kessler, 2006). Lebanon is a relatively small country formed by an astonishingly diverse population where ethnic backgrounds, cultures and religious beliefs have created several nationwide divisions. The Lebanese population is divided into many sectarian and religious groups. Central Intelligence Agency reports in 2013-2014 indicated that 54% of the Lebanese population is Muslim (of which 27% are Sunni Muslims and 27% are Shia Muslims), 41% of the Lebanese population is Christian (of which 21% are Maronite Christians, 8% are Greek Orthodox Christians, 5% are Greek Catholic Christians and 7% include smaller Christian denominations) and the remaining 5% of the Lebanese population is Druze (The World

Factbook, 2013-14). Small regions can differ greatly in terms of culture, attitudes, beliefs and ways of life. This division and disparity in daily life habits may affect young adults' likelihood of engaging in substance use behaviours. Up to this date, substance use in Lebanon remains a very taboo topic. The Lebanese Ministry of Public Health recently issued a statement with a six year plan to strengthen mental health services with a particular emphasis on substance use problems in Lebanon (Ministry of Public Health, 2015). The announcement of the ministry emphasizes the taboo nature of mental health disorders and substance use problems which eventually affects prevalence rate reporting. A group of researchers had initially discussed the taboo nature of mental health issues in Lebanon and underlined the fact that the Lebanese population reaches out to religious figures and spiritual advisers when they encounter mental health related issues (Karam, Mneimneh, Dimassi, Fayyaf, Karam, Nasser, Chatterji & Kessler, 2008). The Lebanese ministry of public health also notes that alcohol, nicotine and cannabis are the most common substances used in Lebanon amongst high school and university students (Ministry of Public Health, 2015). Numerous non-governmental organizations are trying to raise awareness and reach out to young adults suffering from substance use problems. Unfortunately, the need for prevention and treatment programs is substantial and resources are still lacking.

Studies conducted with Lebanese samples of students reveal group differences across religious affiliations. 1837 university students were questioned about their religious involvement and lifetime alcohol use (Ghandour, Karam & Maalouf, 2009). Muslims who have tried alcohol had the highest mean age as opposed to other religious affiliations, who have tried alcohol at younger age groups. Data regarding ever drinking alcohol underlined the high prevalence of consumption among Christians and significantly lower prevalence rate among Muslims (Ghandour et al., 2009). Christians were ten times more likely than Muslims to ever consume alcohol and twice as likely to be diagnosed with lifetime abuse and dependence as

per the DSM-IV guidelines (Ghandour et al., 2009). Karam, Ghandour, Maalouf, Yamout and Salamoun (2010) reported findings of a longitudinal study including a variety of different samples. The research examined substance use behaviours in Lebanon. There were five sample groups in the study: 1307 high school students, 1837 university students, 162 individuals seeking treatments in hospitals and clinics, 52 individuals arrested for drug related offences and 103 street users or individuals not under arrest or undergoing any form of treatment (Karam et al., 2010). Individuals were given surveys including demographic questions, patterns of licit and illicit substance use and misuse and attitudes towards substance use (Karam et al., 2010). Findings suggest that 70% of university students reported having tried alcohol while 9.1% were diagnosed with lifetime alcohol abuse as per the DSM-IV guidelines (Karam et al., 2010). 12% of university students reported using cigarettes and 8.8% reported having tried cannabis (Karam et al., 2010). More recent studies have shown an increase in substance use behaviours amongst Lebanese students. Salame, Barbour and Salameh (2013) conducted a similar study with 1235 university students in central Beirut. Participants were asked to fill out a survey including demographics, questions about alcohol consumption, personal beliefs and peer's behaviours with alcohol (Salame et al., 2013) Their findings suggest that 16.1% of the sample consume alcohol in a harmful and hazardous way (AUDIT score > 8) (Salame et al., 2013). There were also significant differences between Christian and Muslim participants where Christians reported significantly higher alcohol consumption than Muslims (Salame et al. 2013).

Recent studies conducted in the field are attempting to get a better understanding of risk and resilience factors related to substance use behaviours among Lebanese youth. Salameh, Salame, Waked, Barbour, Zeidan, and Baldi (2014) conducted a study to understand the risk factors that can lead university students to engage in risky behaviours. 3384 students in Lebanese universities were recruited and given a paper-based questionnaires targeting the

attractiveness of substance use (Salameh et al., 2014). The research focused on tobacco based substances and found that 23% of the sample were water pipe smokers, while 19.2% of the sample were cigarette smokers. The researchers noted that student attractiveness ratings were positively correlated with higher rates of cigarette smoking, water pipe smoking and problematic alcohol drinking (Salameh et al., 2014). The findings underline the need for additional comprehensive studies within Middle Eastern samples and particularly in Lebanon.

Impulsivity-related traits and young adult alcohol and cannabis use

The following study focused on one personality inventory to examine impulsivity-related traits in relation to substance use behaviours. Fun seeking and drive subscales of the BAS have been identified as particularly risky traits that are related to substance use behaviours (Voigt, Dillard, Braddock, Anderson, Sopory & Stephenson, 2009). The pursuit of certain goals or "drive" and an impulsive and spontaneous desire to obtain new and rewarding experiences or "fun" are aspects of behaviour that are believed to be more prominent in individuals at heightened risk for substance use and abuse (Voigt et al., 2009). Findings suggest that both of these subscales are associated with alcohol use and long-term alcohol abuse (Loxton & Dawe, 2001). Franken, Muris and Georgieva (2006) found that drug addicts had significantly higher BAS scores than healthy control participants. The results show particular associations with both drive and fun seeking subscales of the BAS among a clinical population of drug addicts (Franken et al., 2006).

Empirically, fun seeking is the facet of the BAS that is the most commonly found to be associated with substance use and other risky behaviours. Positive associations have been found between high fun seeking traits and a willingness to spontaneously approach new experiences among a sample of 232 high school girls in Australia (Loxton & Dave, 2001). High fun seeking also increases the risk of using illegal substances, alcohol use, binge drinking episodes and long-term alcohol abuse (Johnson, Turner & Iwata, 2005; Franken & Muris, 2006;

Zisserson & Palfai, 2007). A sample of 1803 young adults residing in Miami were given self-report questionnaires examining personality variables and substance use behaviours (Johnson et al., 2005). Findings suggest that fun seeking predicts drug use and alcohol use and abuse (Jonhson et al., 2005). In line with those findings, a study conducted with 276 university students in the Netherlands found significant associations between the fun seeking variables and drug use, alcohol consumption and binge drinking (Franken & Muris, 2006). Similar associations have been found within an Australian sample of university students where the fun seeking facet of the BAS significantly predicted alcohol use (Feil & Hasking, 2008). The following study did not underline any significant associations between the other facets of the BAS (drive and reward responsiveness) and alcohol use behaviours (Feil & Hasking, 2008). Voigt, Dillard, Braddock, Anderson, Sopory, and Stephenson (2009) also underlined the positive association between the fun seeking subscale and alcohol, tobacco and other risky behaviours. Consistent with these findings, fun seeking was also shown to be related to increased risk for being a drinker, engaging in heavy and frequent drinking and being a smoker amongst university students in Canada (O'Connor, Stewart & Watt, 2009).

We have mentioned the associations found between fun seeking and drive, the first two subscales of the BAS. Literature concerning the third subscale, reward responsiveness, is inconsistent. Reward responsiveness refers to a person's receptivity to reward (Voigt et al., 2009). On the one hand, some evidence suggests a positive association between reward responsiveness and a desire to engage in substance use behaviours (Kambouropoulos & Staiger, 2001; Franken, 2002; Zisserson & Palfai, 2007). On the other hand, there are findings that suggest the opposite. For instance, reward responsiveness was shown to be negatively associated with alcohol and tobacco use, among other risky behaviours in a sample of university students in Pennsylvania, USA (Voigt et al., 2009). Reward responsiveness was also shown to be positively related with a person's general well-being and is important for resilience

from maladaptive psychological functioning (Taubitz, Pedersen & Larson, 2015). High reward responsiveness also seemed to be negatively associated with depression and is considered to be a protective factor of mental health disorders (Liverant, Sloan, Pizzagalli, Harte, Kamholz, Rosebrock & Kaplan, 2014).

Religiosity and young adult alcohol and cannabis use

Religiosity has been identified as a protective factor for substance use behaviours, as discussed in the previous chapters. Early studies had suggested that church attendance can have a significant impact on individuals and lead to less substance use behaviours (Adlaf & Smart, 1985). More recent findings have supported these findings and showed that low religiosity can lead to an increase in cigarette smoking, alcohol consumption, binge drinking, cannabis use and other drug problems as well (Peltzer, Malaka & Phaswana, 2002; Hodge, Andereck and Montoya, 2007). A series of studies conducted by Stillman (2010) supported these findings by underlining the significant negative relationship between overall religious involvement and alcohol use. Findings suggested that the more individuals pray on a daily basis, the less likely they are to consume alcohol (Stilman, 2010). Rasic, Kisely and Langille (2011) also found that personal importance of religiosity and religious attendance protected individuals from substance use behaviours. Numerous studies have been conducted with Western samples of university students to examine the relationship between religiosity and substance use behaviours. The study discussed in Chapter 2 was in line with those findings, and showed that high religiosity predicted less alcohol and cannabis consumption. Overall, findings consistently supported the protective effect of increased religiosity in refraining young adults from engaging in risky behaviours (Gomes, Andrade, Izbicki, Moreira-Almeida & Oliveira, 2013; Moore, Berkley-Patton & Hawes, 2013; Escobar & Vaughan, 2014; Jankowski, Hardy, Zamboanga, Ham, Schwartz, Kim & Cano, 2015; Drabble, Trocki and Klinger, 2016).

As we mentioned above, the majority of the research studies were conducted with university students from Western countries. There is a lack of evidence examining similar associations in the Middle East region. One of the first studies conducted in a developing country replicated the findings listed above in a sample of university students from Mexico, suggesting a negative association between religiosity and nicotine use (Benjamins & Buck, 2008).

Moving towards the Middle East region, the first chapter of this thesis described the extent to which Lebanon is a country where the population is strongly divided into different subgroups owning their sets of beliefs and religious affiliations. It is thus of great importance to examine how much religiosity and religious affiliation can direct young adults' behaviours when they enter university and eventually the workplace environments. Ghandour, Karam and Maalouf (2009) examined substance use behaviours among 1837 university students across various universities in central Beirut. Their findings suggested that ever drinking and alcohol dependence were significantly more prevalent among Christians as opposed to Muslims (Ghandour et al., 2009). Findings suggested that Christians were 10 times for likely than their Muslim peers to have ever consumed alcohol (Ghandour et al., 2009). Additionally, lifetime alcohol use and dependence were significantly more prevalent among non-believers regardless of their religious affiliation or group (Ghandour et al., 2009). Similarly, Ghandour and El-Sayed (2013) examined the relationship between religiosity and gambling behaviours among 570 university students in Lebanon. Their findings underlined similar group differences between Christians and Muslims where Christians were significantly more likely to engage in such risky behaviours (Ghandour & El-Sayed, 2013). Overall religiosity was also a predictor of less experiences of lifetime gambling (Ghandour & El-Sayed, 2013). To this date, there is a lack of additional studies supporting the following evidence in Middle Eastern societies. The following study will aim to examine whether or not culture acts as a moderator of the

relationships between risk and protective factors and substance use behaviours in an environment where the use of substances is more socially sanctioned.

Religiosity as a moderator

The following study was designed to build on the findings of the previous chapter with a sample of participants from different cultural backgrounds. As we have seen in the previous chapter, several studies have examined the interplay between religiosity and personality variables in understanding substance use behaviours among young adults. To build upon the findings of De Wall and colleagues (2014), Galbraith and Conner (2015), and the results of the study described in Chapter 2, the present study will examine the moderating effect of religiosity on the association between impulsivity-related traits and alcohol and cannabis use in a sample of Lebanese university students. A predisposition to allow one's dedication to religious traditions and values affect one's behaviour may influence the effect of personality and individual differences on substance use behaviours. Based on the literature underlining the significant effect between personality traits and substance use behaviours, we expect that religiosity can influence the strength of this relationship.

The current study

The aims of this study are: (a) to examine rates of alcohol and cannabis use, and compare these rates, across different religious groups of university students in Lebanon; (b) to examine group differences amongst Christian and Muslim participants where it is hypothesized that Muslim participants will report significantly less alcohol and cannabis use as shown in previous studies; (c) to examine associations between BAS personality traits and aspects of alcohol and cannabis use in a sample of college students; (d) to test whether the impulsivity trait accounts for unique variance in alcohol and cannabis use as shown in research studies conducted in Western societies; (e) to examine associations between religiosity traits and aspects of alcohol and substance use; (f) to examine the moderating effect of religiosity on the

relationship between personality traits and substance use. It is hypothesized that impulsivity will be positively associated with alcohol and cannabis use in the following sample, while religiosity will be negatively associated with alcohol and cannabis use behaviours. For the moderation analyses, it is predicted that participants who are highly religious would show weaker associations between impulsivity and substance use behaviours.

Method

Participants

Participants were 173 university students from 3 different universities in central Beirut, Lebanon during the 2013-2014 school years. All of the participants were residing in Lebanon. The sample was 65.3% female and 34.7% male and ranged in age from 18-30, with a mean of 21.31 (SD = 2.57). Data regarding first language spoken indicated that 39.3% of the participants speak Arabic as a first language, 31.8% speak English as a first language, 26.6% speak French as a first language and 2.3% speak Armenian as a first language. 86.7% of the participants were currently pursuing their undergraduate degrees, while 8.7% were pursuing master's degrees and 0.6% were pursuing doctoral degrees. Data regarding marital status indicated that 98.3 % of the participants were single, while 1.7% were married. Data regarding ethnicity showed that 83.2% of the sample were of Arab ethnic origins, 11.0% were Caucasian/White, 2.9% reported having other origins and 2.9% preferred not to specify their ethnic origins. 64.2% of the participants had been residing in Lebanon for their entire life, 17.3% had been living in Lebanon for more than 5 years, 13.3 % had been living in Lebanon for 2-5 years and 5.2% had been living in Lebanon for 1 year/less. Religious affiliation data indicated that 57.8% were Christians, 23.7% were Muslims, 15% were not affiliated to any religion and 3.5% were affiliated to other religions. Lastly, data regarding socioeconomic status indicated that 56.1% of the participants did not generate any income, 19.7% made less than 10 000$ per annum, 12.7$ made approximately 10 000 to 30 000$ per annum, 7.5% preferred not

to indicate what their socioeconomic status is, 2.3% made approximately 30 000 to 70 000$ per annum, and 1.7% made more than 70 000$ per annum.

Measures

Demographics

Demographic information provided in the online questionnaire included gender, age, primary language spoken, level of education, marital status, ethnic origin, religious affiliation and income (per annum).

Alcohol use

Alcohol consumption was assessed using the AUDIT; a short questionnaire that aims to identify individuals with harmful alcohol consumption (WHO, 1989). The scale was described in details in Chapter 2. Cronbach's alpha in this sample was .72.

Cannabis use

Cannabis consumption was assessed using the CUDIT; a brief questionnaire that aims to assess harmful cannabis consumption (Adamson & Sellman, 2003). The following scale was described in more depth in Chapter 2. Cronbach's alpha in this sample was .87.

BIS BAS Scales

Personality traits were measured using the Behavioural Inhibition System and Behavioural Activation System Scales (BIS BAS). The scales aim to assess motivational systems that affect individuals' behaviours (Gray, 1981). The measure was described in details in Chapter 2. Cronbach's alpha in this sample were: drive = .73, fun = .67, reward responsiveness = .68.

Religiosity

Religiousness was assessed using the BMMRS: The BMMRS is a measure of religiousness and spirituality (Fetzer & NIA, 1999). The measure was described in detail in Chapter 2. Cronbach's alpha in this sample was .89 for all of the items of the scale.

Procedure

This study was approved by the Goldsmiths, University of London Psychology Department Ethics Committee. Five universities in Beirut, Lebanon were contacted with information about the study and a request to come into the campuses and recruit participants. Three universities allowed us to enter the campuses and advertise the study on their social networking groups where they post daily information for current students. The Psychology Students Society of one university allowed us to post the information on their group pages as well. The advertisements stated that we were looking for volunteers to participate in a research project and that they required to fill out a questionnaire including questions pertaining to substance use behaviours (if any) as well as individual characteristics and religiosity. Students were approached all around the different areas of the campuses and were given paper-based questionnaires to fill out in person. They were firstly given the informed consent form where they were informed about the study and given the option to exclude themselves from participation or agree to be given the questionnaire. Once they agreed to participate, they were directed to the battery of tests. All of the measures were completed in English. After completion of the questionnaires, the debriefing sheet offered the participants supplementary information about the study and gave them the opportunity to contact the researchers. Participants were also given relevant website links to visit if their participation in the study led them to be concerned about their substance use. It took approximately 15 to 20 minutes to complete the questionnaire. We were able to recruit 173 participants who were all included in the analysis of the study.

Results

The percentage of participants who reported having consumed alcohol in the past year in this sample was 85%. Results also indicate that 24.9% of the sample consume alcohol in a harmful way (AUDIT > 8), higher than was observed by previous studies (Karam et al., 2010; Salame et al., 2013). The percentage of participants who reported having used cannabis in the

past six months in this sample was 31.8%, and 11.6% of these individuals consumed cannabis in a harmful way (CUDIT-R > 8).

Religious affiliation and alcohol use and abuse

A chi-square analysis was used to investigate the difference in drinking habits across different religious group: Christianity, Islam and no religious affiliation. Participants that selected "other" religious groups were excluded from the analysis due to a small number of participants that selected this response. Results showed that there was a significant association between religious affiliation and whether or not a person had ever drunk alcohol $x^2(3) = 51.4$, $p < .001$. Table 3.1 shows that almost all Christians and individuals with no religious affiliation have tried alcohol at least once in their lifetime. On the other hand, more Muslims report not having tried alcohol than those who ever had an alcoholic drink.

Moreover, a one-way ANOVA was used to assess the difference between the mean scores of the alcohol use questionnaire (AUDIT) across religious group. There was a significant effect of religion on the total scores of the AUDIT $F(3, 169) = 5.23$, $p < .05$. Post hoc comparisons with Tukey's correction indicated that individuals with no religious affiliation ($M = 6.96$, $SD = 4.56$) and Christians ($M = 5.28$, $SD = 3.99$) had significantly higher alcohol use and problems than Muslims ($M = 3.20$, $SD = 0.58$) as shown in table 3.2. The mean difference between individuals with no religious affiliation and Christians was not statistically significant.

Table 3.1

Chi-square Test and Descriptive Statistics for Alcohol Use by Religious Affiliation

	Religious Affiliation		
Alcohol Use	No Affiliation	Christian	Muslim
Yes	23 (88%)	98 (98%)	20 (49%)
No	3 (12%)	2 (2%)	21 (51%)

Note. $\chi^2 = 51.41$*, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

Table 3.2
Mean Scores of Alcohol and Cannabis Use as a Function of Participants' Religious Group

Substance Use	Religious Group					
	No Affiliation		Christian		Muslim	
	M	*SD*	*M*	*SD*	*M*	*SD*
AUDIT Score	6.96_{a}	4.56	5.28_{b}	3.99	$3.2_{a,b}$	0.58
CUDIT-R Score	$6.5_{c,d}$	8.02	1.58_{c}	3.66	2.27_{d}	3.93

Note. Means in a row sharing subscripts are significantly different from each other. For all measures, higher means indicate higher alcohol and cannabis use scores.

Religious affiliation and cannabis use and total score

A chi-square analysis was used to investigate the difference in cannabis consumption habits across religious group as shown in table 3.3. Results showed that there was a significant association between religious affiliation and whether or not a person has ever used cannabis. $x^2(3)=15.4$, $p < .05$. Table 3.3 shows that having no religious affiliation increases the odds of having tried cannabis. More than half of the students with no religious affiliation reported having tried cannabis, while most Christian and Muslim students report not having tried cannabis.

As shown in table 3.2 above, a one-way ANOVA was used to assess the difference between the mean scores of the cannabis questionnaire (CUDIT-R) across religious groups. Results showed a significant effect of religion on the total scores of the cannabis questionnaire, $F(3, 169) = 7.68$, $p < .001$. Post hoc comparisons with Games Howell correction (assumption of homogeneity of variance was violated) indicated that cannabis use and abuse was significantly greater for individuals with no religious affiliation (M=6.50, SD = 8.02), as opposed to Christians (M=1.58, SD= 3.66) and Muslims (M=2.27, SD=3.93). Comparisons

between Christian and Muslim groups indicated that Christians had lower means on the CUDIT-R than Muslims. The difference was not statistically significant.

Table 3.3

Chi-square Test and Descriptive Statistics for Cannabis Use by Religious Affiliation

	Religious Affiliation		
Cannabis Use	No Affiliation	Christian	Muslim
Yes	17 (65%)	24 (24%)	12 (29%)
No	9 (35%)	76 (76%)	29 (71%)

Note. $\chi^2 = 15.38$*, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

Overall religiosity measure

Similarly to the analysis undertaken in the previous chapter, we ran an exploratory factor analysis to examine the relationship between variables of the religiosity measure. A principal component analysis was conducted on the five subscales of religiosity. The Kaiser-Meyer-Olkin measure verifies the sampling adequacy for the analysis, KMO = .85, and all KMO values for individual items were > .79, which is well above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity x^2 (10) = 524.846, $p < .001$, indicated that correlations between all items were sufficiently large. One component had an eigenvalue over Kraiser's criterion of 1 and in combination explained 70.80% of the variance. Table 3.4 shows the significant correlations between all of the variables. Given these results indicating that the subscales of the religiosity measure cluster together, we will retain one component for subsequent analyses. The total religiosity score was calculated by adding up the scores of all of the five subscales of the BMMRS (daily spiritual experiences, values and beliefs, private religious practices, religious and spiritual coping and overall self-ranking).

Table 3.4

Exploratory Factor Analysis: Correlation Table

	1	2	3	4	5
Construct					
1.Daily spiritual experiences	-				
2. Values and beliefs	.69***	-			
3. Private religious practices	.71***	.44***	-		
4. Religious and spiritual coping	.71***	.56***	.63***	-	
5. Overall self-ranking	.75***	.51***	.65***	.67***	-

Data for full sample are presented in the following table (N = 173); * p < .05. ** p < .01. *** p < .001.

Table 3.5

Factor Loadings from Principal Component Factor Analysis: Eigenvalue and Percentage of Variance for Categories of the BMMRS

	Factor loading
Item	Overall Religiosity
Daily spiritual experiences	**.92**
Overall self-ranking	**.85**
Religious and spiritual coping	**.85**
Private religious practices	**.82**
Values and beliefs	**.76**
Eigenvalues	3.54
% of variance	70.80

Note: Factor loadings over .40 appear in bold.

Bivariate correlations and descriptive statistics

Descriptive statistics and bivariate correlations are presented in Table 3.5 below. The means and standard deviations calculated included all of the participants (N=173). Correlations between individual differences, religiosity and substance use measures were analysed for the whole sample. This analysis revealed a negative correlation between individuals' overall religiousness and spirituality ranking and problematic alcohol use. As for the total use of cannabis, the analysis revealed a significant negative correlation between the behavioural inhibition system (BIS) and cannabis use, and a significant negative correlation between religious and spiritual coping and total cannabis use.

Table 3.6

Bivariate correlations and descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender of Participants	-														
2. Alcohol Use	-.07	-													
3. AUDIT Total	-.27**	.42**	-												
4. Cannabis Use	.05	.11	.33**	-											
5. CUDIT Total	-.20*	.14	.42**	.68**	-										
6. Fun	.12	-.11	-.14	-.07	.00	-									
7. Drive	.09	.01	.06	.12	.12	.43**	-								
8. Reward Responsiveness	.09	-.02	-.18*	-.11	-.14	-.39**	-.41**	-							
9. BAS	.07	-.04	.03	.07	.11	.79**	.81**	-.73**	-						
10. Daily Spiritual Experiences	.03	-.22**	-.24**	-.11	-.12	-.00	-.23**	.26**	-.20**	-					
11. Values and Beliefs	.05	-.04	-.14	-.10	-.12	.01	-.16*	.18*	-.14	.69**	-				
12. Private Religious Practices	-.12	-.24**	-.17*	-.15*	-.13	-.04	-.13	.21**	-.16*	.71**	.44**	-			
13. Religious and Spiritual Coping	.08	-.20**	-.23**	-.24**	-.25**	.01	-.16*	.26**	-.16*	.71**	.56**	.63**	-		
14. Overall Self Ranking	.02	-.26**	-.29**	-.13	-.09	.05	-.15	.23**	-.14	.75**	.51**	.65**	.67**	-	
15. Religiosity Total	-.01	-.24**	-.24**	-.17*	-.16*	-.01	-.20**	.27**	-.20**	.94**	.69**	.88**	.83**	.80**	-
Mean			4.99		2.58	8.01	8.43	17.72	23.72	14.47	6.02	7.21	8.20	4.64	40.5491
SD			4.13		5.03	2.26	2.45	1.87	5.14	8.39	1.53	7.35	4.22	1.56	20.10

Data for full sample are presented in the following table (N = 173);
* p < .05. ** p < .01. *** p < .001.
Gender coded as female = 2, male = 1. Alcohol use coded as yes = 1, no = 0.
Cannabis use coded as yes = 1, no = 0.

Personality and alcohol use

A hierarchical regression analysis was conducted using the AUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Fun-seeking, reward responsiveness and drive were entered at step 2. As shown in table 3.7 analyses indicated that gender is a significant predictor of alcohol use (β = -.26, p < .001). The standardized beta coefficient is negative which indicated that males were more likely to use substance use than females. Results also showed that reward responsiveness is a significant predictor of alcohol use (β = -.21, p < .05). This indicates that the personality trait was a protective factor for alcohol use in our sample. On the other hand, the fun-seeking variable was also shown to be a predictor of alcohol use (β = .24, p < .01). The standardized beta coefficient is positive and this is an indication that impulsivity is a risk factor for alcohol use.

Table 3.7
Hierarchical Regression Analysis Summary for Personality Variables Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.08***	
Gender of Participants	-2.23	.65	-.26***		
Age of Participants	.14	.12	.09		
Step 2				.15***	.07**
Gender of Participants	-1.95	.64	-.22**		
Age of Participants	.15	.12	.09		
Drive	-.18	.14	-.11		
Fun Seeking	.43	.15	.24**		
Reward Responsiveness	-.46	.18	-.21*		

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

Personality and cannabis use

A hierarchical regression analysis was conducted using the CUDIT total as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Fun seeking, reward responsiveness and drive were entered at step 2. As shown in table 3.8, analyses indicated that gender is a significant predictor of cannabis use (β = -.23, p < .01). The standardized beta coefficient is negative which indicated that males were more likely to use cannabis than females. None of the personality variables were significant predictors of cannabis use.

Table 3.8
Hierarchical Regression Analysis Summary for Personality Variables Predicting Cannabis Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.06**	
Gender of Participants	-2.39	.8	-.23**		
Age of Participants	.12	.15	.06		
Step 2				.08*	.02
Gender of Participants	-2.27	.81	-.21**		
Age of Participants	.14	.15	.07		
Drive	-.17	.18	-.08		
Fun Seeking	.17	.19	.08		
Reward Responsiveness	-.34	.23	-.13		

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

Religiosity as a moderator of the link between personality and substance use

Alcohol use

To test our hypothesis that religiosity is a moderator in the relationship between impulsivity and alcohol consumption, we performed a moderated regression analysis with the interaction of impulsivity and religiosity. The fun seeking variable of the BAS was used to represent impulsivity. To avoid multicollinearity problems, we centred both the impulsivity data and the overall religiosity data. A hierarchical regression analysis was conducted using the alcohol use identification total as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity, fun seeking and the interaction of religiosity and fun seeking. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. Fun seeking was entered at step 3 and the interaction between impulsivity and religiosity was entered at step 4. Table 3.9 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between impulsivity and religiosity is a significant (β = -.16, $p < .05$) predictor of alcohol consumption. The interaction term of impulsivity and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores, the slope of the relationship between impulsivity and alcohol use was b = .50, SE b = .19, t = 2.63, $p < .05$. When religiosity was moderate, the slope of the relationship between impulsivity and alcohol use was b = .23, SE b = .13, t = 1.74. Lastly, the analysis indicated that at +1 standard deviation of religiosity scores the slope was b = -.05, SE b = .17, t = -.28 The following results suggest that the strongest association between impulsivity and alcohol use occurs when religiosity is low, as demonstrated by the steep positive association in figure 3.1. On the other hand, when religiosity is high, the relationship between impulsivity and alcohol use is not significant. This

weak association is shown by the flat slope in figure 3.1. As indicated in figure 3.1, the highest score on the AUDIT is a total of 8 which underlines the association between low religiosity, impulsivity and alcohol consumption but not problematic alcohol use.

Table 3.9
Moderated Regression Analysis – Fun Seeking, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.08***	
Gender	-2.23	.65	-.26***		
Age	.14	.12	.09		
Step 2				.14***	.06***
Gender	-2.24	.63	-.26***		
Age	.16	.12	0.1		
Religiosity	-.05	.02	-.25***		
Step 3				.15***	0.01
Gender	-2.14	.63	-.25***		
Age	.15	.12	.09		
Religiosity	-.05	.02	-.25		
Fun Seeking	.2	.13	.11***		
Step4				.18***	.24*
Gender	-2.16	.62	-.25***		
Age	.17	.12	.11		
Religiosity	-.05	.01	-.25***		
Fun Seeking	.23	.13	.12		
Fun Seeking x Religiosity	-.01	.01	-.16*		

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

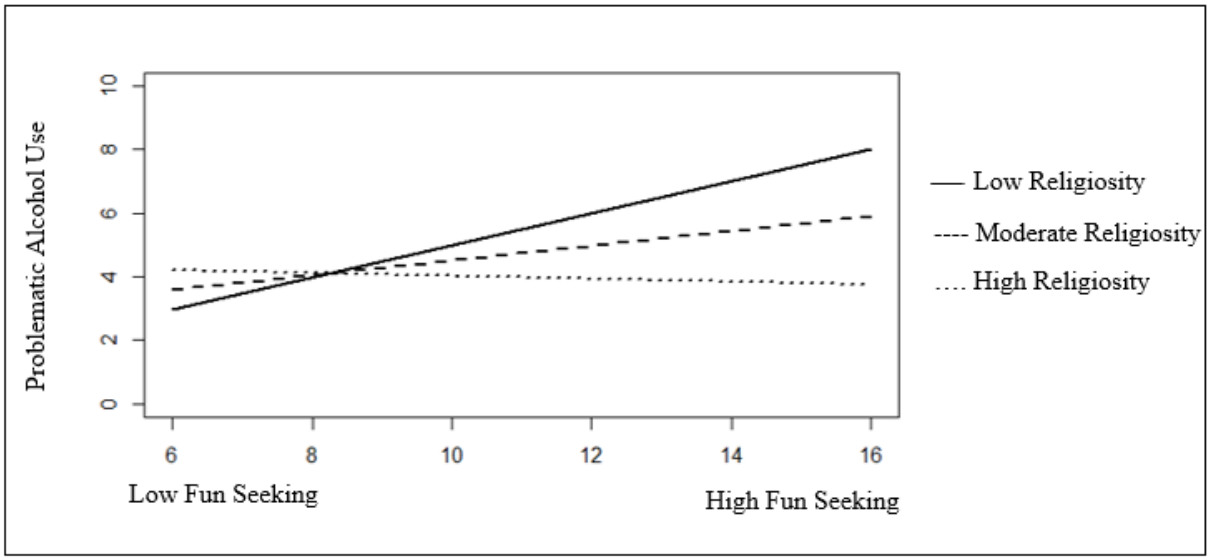

Figure 3.1. Moderation effect of religiosity on the relationship between impulsivity and alcohol use.

To test our hypothesis that religiosity is a moderator in the relationship between reward responsiveness and alcohol consumption, we performed a moderated regression analysis with the interaction of reward responsiveness and religiosity. To avoid multicollinearity problems, we centered both the reward responsiveness data and the overall religiosity data. Table 3.10 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between reward responsiveness and religiosity is a significant (β = -.18, p < .05) predictor of alcohol consumption. The interaction term of reward responsiveness and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores, the slope of the relationship between reward responsiveness and alcohol use was b = .03, SE b = .19, t = 0.16. When religiosity was moderate, the slope of the relationship between

reward responsiveness and alcohol use was b = -.32, SE b = .17, t = -1.89. Lastly, the analysis indicated that at +1 standard deviation of religiosity scores the slope was b = -.66, SE b = .24, t = -2.72 , $p < .05$. The following results suggest that the strongest association between reward responsiveness and alcohol use occurs when religiosity is high, as demonstrated by the steep negative association in figure 3.2. On the other hand, when religiosity is low, the relationship between reward responsiveness and alcohol use is not significant anymore. This weak association is shown by the flat slope in figure 3.2.

Table 3.10
Moderated Regression Analysis – Reward Responsiveness, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.08***	
Gender	-2.23	.65	-.26***		
Age	.14	.12	.09		
Step2				.14***	.06***
Gender	-2.24	.63	-.26***		
Age	.16	.12	.10		
Religiosity	-.05	.02	-.25***		
Step 3				.15***	.01
Gender	-2.17	.63	-.25***		
Age	.16	.12	.10		
Religiosity	-.05	.02	-.23**		
Reward Responsiveness	.21	.17	.10		
Step 4				.18***	.03*
Gender	-1.99	.62	-.23**		
Age	.19	.11	.12		
Religiosity	-.04	.02	-.21**		
Reward Responsiveness	.32	.17	.14		
Interaction	.02	.01	.18*		

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

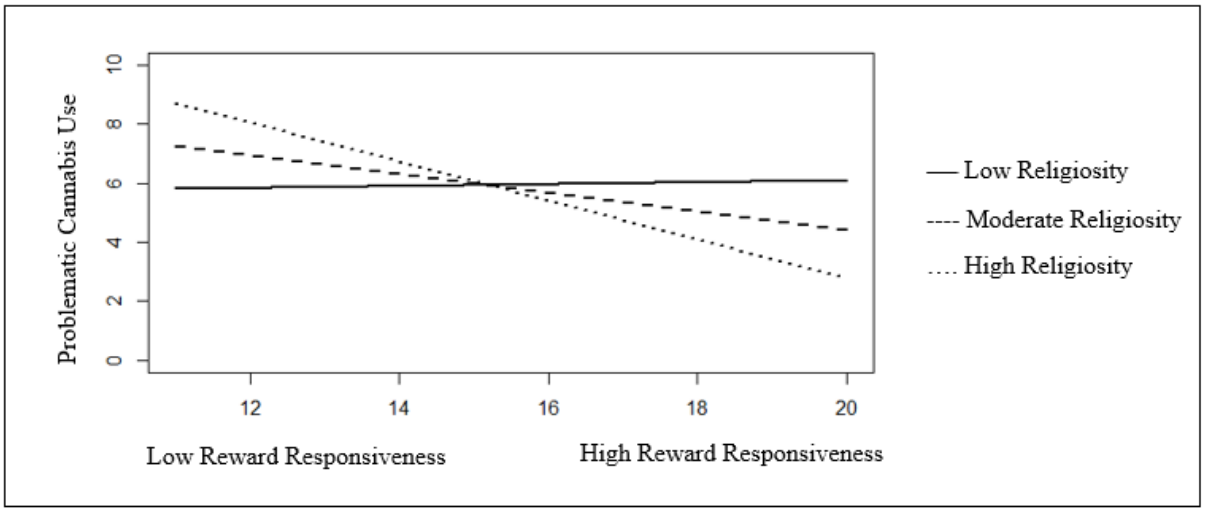

Figure 3.2. Moderation effect of religiosity on the relationship between reward responsiveness and alcohol use.

To test our hypothesis that religiosity is a moderator in the relationship drive and alcohol consumption, we performed a moderated regression analysis with the interaction of drive and religiosity. To avoid multicollinearity problems, we centered both the drive data and the overall religiosity data. Table 3.11 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between drive and religiosity in predicting alcohol use is non-significant.

Table 3.11
Moderated Regression Analysis – Drive, Religiosity and Alcohol Consumption (AUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.08***	
Gender of Participants	-2.23	.65	-.26***		
Age of Participants	.14	.12	.09		
Step2				.14***	.06***
Gender of Participants	-2.24	.63	-.26***		

Age of Participants	.16	.12	.10		
Religiosity	-.05	.02	-.25***		
Step 3				.15***	.00
Gender of Participants	-2.27	.63	-.26***		
Age of Participants	.17	.12	.11		
Religiosity	-.05	.02	-.24***		
Drive	.09	.13	.05		
Step 4				.15***	.00
Gender of Participants	-2.27	.63	-.26***		
Age of Participants	.18	.12	.11		
Religiosity	-.05	.02	-.24***		
Drive	.10	.13	.06		
Religiosity x Drive	.00	.01	.04		

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

Cannabis Use

To test our hypothesis that religiosity is a moderator in the relationship between impulsivity and cannabis consumption, we performed a moderated regression analysis with the interaction of fun seeking and religiosity. To avoid multicollinearity problems, we centered both the fun seeking data and the overall religiosity data. Table 3.12 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between impulsivity and religiosity in predicting cannabis use is non-significant.

Table 3.12
Moderated Regression Analysis – Fun Seeking, Religiosity and Cannabis Consumption (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.06**	
Gender of Participants	-2.39	.80	-.23**		
Age of Participants	.12	.15	.06		
Step2				.08**	.02

Gender of Participants	-2.39	.79	-.23**		
Age of Participants	.13	.15	.07		
Religiosity	-.03	.02	-.13		
Step 3				.08*	.00
Gender of Participants	-2.40	.80	-.23**		
Age of Participants	.13	.15	.07		
Religiosity	-.03	.02	-.13		
Fun Seeking	-.02	.17	-.01		
Step 4				.09**	.01
Gender of Participants	-2.42	.80	-.23**		
Age of Participants	.16	.15	.08		
Religiosity	-.03	.02	-.13		
Fun Seeking	.01	.17	.00		
Religiosity x Fun Seeking	-.01	.01	-.12		

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

To test our hypothesis that religiosity is a moderator in the relationship between reward responsiveness and cannabis consumption, we performed a moderated regression analysis with the interaction of reward responsiveness and religiosity. To avoid multicollinearity problems, we centered both the reward responsiveness data and the overall religiosity data. Table 3.13 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between reward responsiveness and religiosity is a significant ($\beta = .21$, $p < .01$) predictor of cannabis consumption. The interaction term of reward responsiveness and religiosity was significant.

Simple slopes analysis indicated that at -1 standard deviation of religiosity scores, the slope of the relationship between reward responsiveness and cannabis use was b = .09, SE b = .24, t = 0.39. When religiosity was moderate, the slope of the relationship between reward responsiveness and cannabis use was b = -.43, SE b = .21, t = -2.05, $p < .05$. Lastly, the analysis indicated that at +1 standard deviation of religiosity scores the slope was b = -.96, SE b = .31, t = -3.12, $p < .05$. The

following results suggest that the strongest association between reward responsiveness and cannabis use occurs when religiosity is high, as demonstrated by the steep negative association in figure 3.3. On the other hand, when religiosity is low, the relationship between reward responsiveness and cannabis use is not significant anymore. This weak association is shown by the flat slope in figure 3.3.

Table 3.13
Moderated Regression Analysis – Reward Responsiveness, Religiosity and Cannabis Consumption (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.06**	
Gender of Participants	-2.39	.80	-.23**		
Age of Participants	.12	.15	.06		
Step2				.08**	.02
Gender of Participants	-2.39	.79	-.23**		
Age of Participants	.13	.15	.07		
Religiosity	-.03	.02	-.13		
Step 3				.09**	.01
Gender of Participants	-2.31	.79	-.22**		
Age of Participants	.14	.15	.07		
Religiosity	-.03	.02	-.10		
Reward Responsiveness	.28	.21	.10		
Step 4				.13***	.05**
Gender of Participants	-2.04	.78	-.19*		
Age of Participants	.18	.14	.09		
Religiosity	-.02	.02	-.09		
Reward Responsiveness	.43	.21	.16*		
Religiosity x Reward Responsiveness	.03	.01	.22**		

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

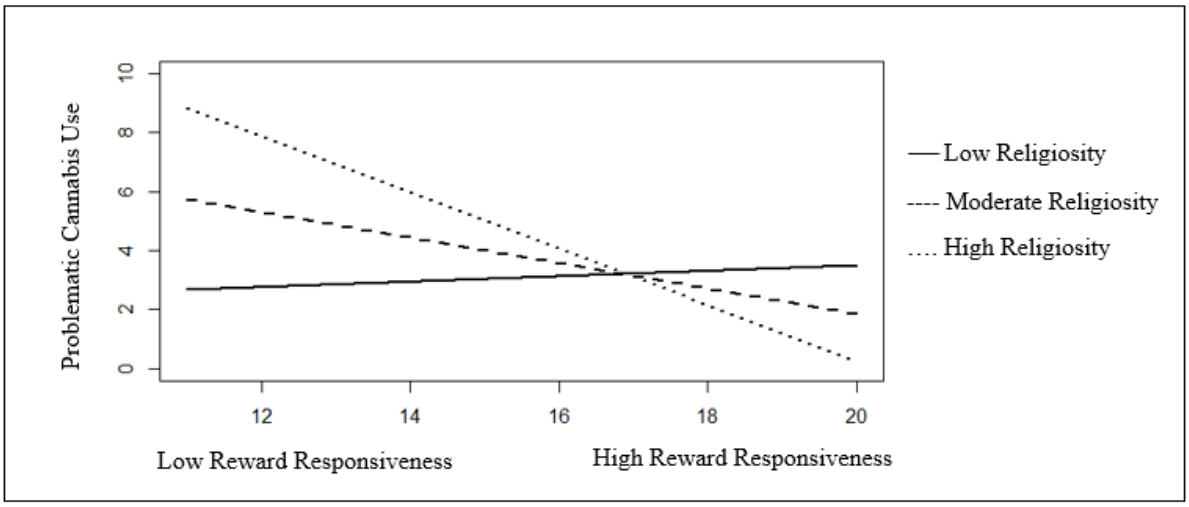

Figure 3.3. Moderation effect of religiosity on the relationship between reward responsiveness and cannabis use.

To test our hypothesis that religiosity is a moderator in the relationship between drive and cannabis consumption, we performed a moderated regression analysis with the interaction of drive and religiosity. To avoid multicollinearity problems, we centred both the drive data and the overall religiosity data. Table 3.14 illustrates the coefficients table of the moderated regression analysis that was conducted. Results indicate that the interaction between drive and religiosity in predicting cannabis use is non-significant.

Table 3.14

Moderated Regression Analysis – Drive, Religiosity and Cannabis Consumption (CUDIT)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.058**	
Gender of Participants	-2.39	.80	-.23**		
Age of Participants	.12	.15	.06		
Step2				.075**	.017
Gender of Participants	-2.39	.79	-.23**		
Age of Participants	.13	.15	.07		
Religiosity	-.03	.02	-.13		
Step 3				.08**	.01
Gender of Participants	-2.46	.79	-.23**		
Age of Participants	.15	.15	.08		
Religiosity	-.03	.02	-.12		
Drive	.17	.16	.08		
Step 4				.08*	.00
Gender of Participants	-2.46	.80	-.23**		
Age of Participants	.16	.15	.08		
Religiosity	-.03	.02	-.11		
Drive	.19	.16	.09		
Religiosity x Drive	.01	.01	.05		

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

Discussion

This study aimed to determine how personality differences specified by the BIS/BAS framework were associated with alcohol and cannabis consumption in a sample of university students in Lebanon. A particular focus was given to the fun seeking subscale of the BAS, a trait that has previously been shown to relate to problematic alcohol and substance use behaviours in young adults (Voigt et al., 2009). Another aim was to determine how religiosity traits specified by the BMMRS framework were associated with alcohol and cannabis use. The study focused on overall religiosity, a sociocultural set of beliefs that has previously been shown to protect individuals from problematic substance use behaviours (Peltzer et al., 2002). It is also important to mention that given the strong division between religious groups in the Lebanese society, another aim was to examine group differences more closely.

Our findings suggested that both fun seeking and reward responsiveness subscales of the BAS were significantly related to alcohol use and misuse. Fun seeking was positively associated with alcohol consumption, which indicates that the more individuals scored high on the fun seeking subscale, the more they were prone to consume alcohol. On the other hand, reward responsiveness was negatively associated with alcohol consumption which indicates that the more individuals scored high on the reward responsiveness subscale, the less they were prone to consume alcohol. This is in line with previous findings underlining the protective effect of reward responsiveness (Voigt et al, 2009) and the risk factor effect of fun seeking in predicting alcohol use (Feil & Hasking, 2008). The findings of this study are also in line with the results described in the second chapter with the sample of students in the United Kingdom. On the other hand, our analysis did not reveal significant relationships between any of the personality variables and cannabis use. This is inconsistent with previous findings suggesting a link between fun seeking or impulsivity-related traits and cannabis use (Franken & Murris, 2006; Voigt et al., 2009).

Findings concerning the relationship between religiosity and substance use behaviours indicated that religiosity is negatively related to alcohol consumption. The association underlined the protective role of overall religiosity in reducing levels of drinking. This is in line with previous findings suggesting that religious involvement and prayer on a daily basis is associated with less alcohol consumption (Stillman et al., 2010) and that strong religious beliefs also lead to less drinking (Moore et al., 2013). On the other hand, our findings do not support the literature concerning religiosity and cannabis use. Previous findings had suggested that church attendance may reduce cannabis consumption and substance use behaviours (Adalf & Smart, 1985; Gomes et al., 2013). Similarly, low religiosity was shown to be associated with more cannabis consumption (Peltzer et al., 2002). Our analysis indicated that the relationship between overall religiosity and cannabis use in a Lebanese sample of university students was not significant.

Contrary to the findings noted in the previous chapter, the study reported the significant role of religiosity as a moderator of the relationship between fun seeking and alcohol consumption. The results build on the findings established by Galbraith and Connor (2015) who underlined the moderating effect of attending religious services on sensation seeking and alcohol abuse. The moderation analysis suggested that individuals scoring high on the overall religiosity scale were less likely to consume alcohol, even if they scored high on the fun seeking scale. Additionally, individuals who had low scores on the religiosity scale as well as high scores on the fun seeking scale consumed significantly large amounts of alcohol.

Religiosity was also a significant moderator of the relationship between reward responsiveness and alcohol and cannabis use. This is a novel finding. The moderation analyses revealed that religiosity intensified the relationship between reward responsiveness and substance use behaviours. When religiosity was high, results showed that the protective

relationship between reward responsiveness and alcohol and cannabis use was strengthened. A combination of high religiosity and high reward responsiveness accounted for significant reductions of substance use behaviours. Interestingly, reward responsiveness on its own, was not significantly associated with less cannabis use. Nevertheless, the interaction between religiosity and reward responsiveness predicted less cannabis use. The present data therefore suggest that young adults who score high in religiosity and reward responsiveness variables are less likely to engage in problem alcohol or cannabis use. When examining young adults' likelihood of engaging in risky behaviours, the combination of strong religious beliefs along with a personality profile that is highly sensitive to reward seems to lead to good outcomes. This is in line with the findings suggesting the resilience effect of reward responsiveness on maladaptive psychological functioning (Taubitz et al., 2015), as well as the protective factor of increased religiosity on substance use behaviours (Hodge et al., 2007).

One of the most novel aspects of the chapter is the fact that the study was conducted with a sample of participants from a developing country in the Middle East region. In our sample of university students, 85% reported having used cannabis in the past year and approximately one third of the participants reported having used cannabis in the past six months. These findings underline the need to create intervention and prevention measures with young adults in the region. As mentioned in the introduction of this chapter, the study also allowed us to examine significant differences between religious groups. Our results suggested that individuals with no religious affiliation and Christians consume significantly more alcohol than Muslims. This is consistent with findings from Ghandour and colleagues (2009) who noted that Muslims consumed significantly lower levels of alcohol than Christians. Our findings also suggested that individuals with no religious affiliation are those that are most likely to engage in both alcohol and cannabis use behaviours.

Our results underlined the fact that Christians consumed significantly more alcohol than Muslims. Similar group differences were not found for cannabis use behaviours. We could relate this to the fact that certain religious beliefs, particularly among the Islamic religion, strictly prohibit the consumption of alcoholic beverages. Low alcohol consumption among Muslims was expected as both the Sunni and Shia Islamic groups frown upon the consumption of alcohol. There is a strong emphasis placed on strictly forbidding the use of alcohol, while much less discussion surrounds the use of different substances. The beginning of the chapter underlined the inevitable taboo surrounding illicit drug use in the Lebanese community which may eventually lead to an unfortunate avoidance of the problem.

Limitations

Generalisation of the findings is limited by the majority of females in the sample of this study, with 65.3% of respondents being female participants. There is a potential sampling bias in the results and thus further research is needed to support the findings. One of the biggest difficulties was to get responses from universities in Lebanon. The lack of responsiveness to our inquiries lead to a relatively small sample size which limits statistical power. A more extensive study including a larger number of participants from a variety of universities outside of central Beirut is necessary to generalize those findings to a national sample, representative of Lebanese youth. The relatively low rates of cannabis problems in this sample may also make it difficult to detect statistically significant relationships with the other variables.

Future directions

From this research, it is apparent that the Lebanese student population is engaging in various substance use behaviours. Identifying risk and resilience factors is of great significance to raise awareness and create prevention measures. A more detailed examination of impulsivity would be necessary. The fun seeking trait of the BIS/BAS measuring trait impulsivity indicated interesting results. It would also be beneficial to examine other facets of

impulsivity to understand which specific aspects of this personality trait can lead to an increase in substance use behaviours.

Moreover, examining interactions between fun seeking, reward responsiveness and religiosity in relation to other substances such as nicotine or cocaine may yield interesting results as well. Religiosity has been found to reduce the odds of using cocaine in high school students in the US (Palamar & Ompad, 2014). But it has yet to be shown whether religiosity can moderate the relationship between personality characteristics and cocaine use.

Lastly, future studies could include a subgroup analysis to determine whether or not there are differences between individuals who are considered to abuse a specific substance as opposed to other groups of individuals who consume the substance in a less problematic or non-problematic way. The subgroup analysis could potentially divide the sample into categories of alcohol use for instance while using the cut-off scores of the AUDIT and analyse each of the subgroups separately. Statistical analyses would include tests of interaction to examine the extent to which groups differ from one another. Other subgroup analyses could include separating men and women, separating groups by religion and even including treatment and intervention strategies across more vulnerable populations and examining the effectiveness of those strategies.

Conclusion

The findings of this study underlined the fact that young adults in Lebanon are engaging in various substance use behaviours. Fun seeking was shown to be related to increased alcohol use while reward responsiveness was associated with significantly less alcohol and cannabis use behaviours. Religiosity was a protective factor leading to less substance use. This study extends the literature by highlighting moderating effects of overall religiosity on the relationship between fun seeking and alcohol use and on the relationship between reward responsiveness and alcohol and cannabis use.

CHAPTER 4

SUBSTANCE USE BEHAVIOURS IN THE UNITED ARAB EMIRATES: AN EXAMINATION OF DOKHA, NICOTINE AND ALCOHOL USE IN YOUG ADULTS

Overview

This chapter begins with a summary of studies that have examined substance use behaviours in the UAE. We will focus on studies that have examined prevalence rates of the dokha substance. It then goes on to report a study of 191 young adults residing in the UAE. These participants completed a self-report questionnaire including measures of impulsivity-related traits, religiosity and dokha, nicotine and alcohol use. Hierarchical regression analyses indicated that fun seeking predicted significantly more dokha, nicotine and alcohol use. Results also showed that lack of premeditation and positive urgency predicted significantly more dokha and alcohol use, and lack of perseverance and sensation seeking predicted significantly more nicotine use. Moderation analyses indicated that the interaction between religiosity and negative urgency was a significant predictor of alcohol consumption. High religiosity diminished the relationship between negative urgency and alcohol use. The interaction between positive urgency and religiosity was also a significant predictor of alcohol consumption. High religiosity also diminished the link between positive urgency and alcohol use. Lastly, the interaction between sensation seeking and religiosity was also a significant predictor of alcohol use, where high religiosity diminished the association between sensation seeking and alcohol use. Religiosity was not a significant moderator of the relationships between impulsivity-related traits and dokha and nicotine use.

Introduction

The first part of this chapter will provide an overview of relevant studies that have examined dokha, nicotine and alcohol use among young adults in the UAE. We will also include studies discussing the relationship between religiosity and substance use behaviours.

Dokha use in young adult populations in the United Arab Emirates

There is a dearth of research examining substance use behaviours in the UAE, as opposed to both Lebanon and the United Kingdom discussed in the previous chapters. Nevertheless, there has been a growing interest in the region in recent years and the existing data will be informative for the study presented in this chapter, and the thesis more generally. The following study will expand the current findings by examining dokha, nicotine and alcohol use in a sample of university students residing in the UAE. Personality and religiosity will also be discussed as possible risk and resilience factors related to substance use.

Dokha use is a growing problem in the UAE. As we have described in the first chapter, dokha is a mixed tobacco product smoked in a pipe that is very popular in the Gulf region, particularly in the UAE. Dokha is sold in hundreds of tobacco shops available in the entire country and is a much cheaper substance than cigarettes. Preliminary findings in a sample of 104 university students across the UAE found that 12.5% of the participants had smoked dokha in their lifetime (Jayakumari et al., 2010). Dokha use is also significantly more prevalent among males as opposed to females (Jayakumari et al., 2010). Recent findings in a university sample showed 5.4% of the females are current dokha smokers as opposed to 30.4% of the males in the sampe (Jayakumari et al., 2010). A recent study in Abu Dhabi including a 9337 adults showed that dokha use was the highest among UAE national males (16.1%) followed by male expatriates of Arab origins (3.5%) and male expatriates of other origins (3.1%) (Aden, Karrar, Shafey, & Al Hosni, 2013). Female participants of all nationalities were much less likely to smoke dokha (less than 1% for UAE nationals and all female expatriates) (Aden et al., 2013).

A national-scale study underlined the importance of targeting young Emiratis and the use of dokha in the UAE (AL-Houqani et al., 2012). A large sample of UAE nationals (N=170 430) older than 18 years were given self-report questionnaires examining their nicotine use (Al-Houqani et al., 2012). Findings support the stance that dokha use is much more prevalent among males in the UAE (Al-Houqani et al., 2012). Smoking dokha was also shown to be the highest among individuals aged between 20 and 39 years old (Al-Houqani et al., 2012). The study also found that the average use of dokha was approximately 12 times per day, which is equivalent to six grams of tobacco (Al-Houqani et al., 2012).

As mentioned in the first chapter, smoking dokha can also lead to similar cardio-respiratory effects as other forms of smoking (Shaikh, Haque, Al Mohsen, Al Mohsen, Humadi, Al Mubarak & Al Sharbatti, 2012). A study examining dokha use among 97 male university students in the UAE found that individuals experienced an increase in the systolic blood pressure, heart rate and respiratory rate after their smoking session (Shaikh et al., 2012). Smokers also report enjoying smoking dokha as opposed to other forms of nicotine due to the stronger sensation of light headedness experienced, a lack of odour, an absence of staining the lips and the low cost of the substance (Shaikh et al., 2012).

Crookes and Wolff (2014) examined dokha use among high school students recruited from five English curriculum, non-governmental schools. 394 students completed a paper-based questionnaire including questions pertaining to tobacco consumption (Crookes & Wolff, 2014). Findings suggest that 23.4% of the sample of high school students were regular users of any tobacco product: dokha, regular cigarettes or shisha (Crookes & Wolff 2014). Tobacco consumption in general was significantly more prevalent in males than in females, and dokha use was the most popular of all substances with 54.8% of smokers reported using dokha exclusively (Crookes & Wolff, 2014). Regular cigarette smoking was the second most popular

substance, with 23% of the sample reporting using cigarettes, followed by 22.2% of the sample reporting using shisha (Crookes & Wolff, 2014).

In line with those findings, 560 male secondary students in the Ajman Emirate were given self-report questionnaires to examine the prevalence rates of dokha use (Al Shemmari, Shaikh, & Sreedharan, 2014). The students in grades 10, 11 and 12 were between 17 and 20 years old and 39% of them reported ever smoking any form of tobacco (Al Shemmari et al., 2014). As for dokha use, 36% of the sample reported ever having smoked dokha, while 24% of the sample reported being current dokha smokers (Al Shemmari et al., 2014). The highest prevalence rate was for students older than 18 years (Al Shemmari et al., 2014).

Another study examining rates of tobacco use in the Ajman Emirate targeted a population of adults older than 18 years old (Sreedharan, Muttappallymyalil, Shaikh, Al Sharbatti & Scott, 2015). The study included 4047 residents of Ajman and included both males and females (Sreedharan et al., 2015). Findings suggest that tobacco use in general was significantly more prevalent among males and that 26.1% of the sample consumed tobacco in the form of cigarettes, while 2.7% consumed tobacco in the form of dokha (Sreegharan et al., 2015).

To this date, there is a dearth of research examining the health risks associated with dokha use. There is a lack of regulation over dokha sales and little is known about this form of smoking nicotine (Crookes & Wolff, 2014). In the UAE, 16 year olds are legally allowed to purchase cigarettes but it is unclear whether or not this age restrictions applies to dokha products which leads vendors to sell dokha to younger children as well (Crookes & Wolff, 2014). A recent review of studies examining dokha use in the UAE reported that smoking dokha seems to be a habit that starts in early adolescence (John & Muttappallymyalil, 2013). This could be due to the fact that dokha is available in different flavours and that the midwakh pipe is available in different colours and styles making it a trendy activity to engage in (John

& Muttappallymyalil, 2013). Dokha is available throughout the country and sold at a very low cost which increases its attractiveness among young populations as well (John & Muttappallymyalil, 2013). Young populations in the UAE report that the attractiveness to the dokha substance is due to the strong sensation of light-headedness, the lack of odor and the small dose required to satisfy nicotine craving (John & Muttappallymyalil, 2013). Dokha use if seen all around the country, from young adults smoking in cafes and restaurants or outdoors on university campuses to smoking while driving. It is a big trend in substance use behaviours in the UAE and is slowly becoming a way to socialize with peers similarly to shisha smoking (John & Muttappallymyalil, 2013).

Alcohol use in young adult populations in the United Arab Emirates

The literature examining other psychoactive substances with samples of participants from the UAE remains scarce. A study examining health habits of medical students in the UAE reported that students had a variety of unhealthy habits such as bad diets and activity levels (Carter, Elzubeir, Abdulrazzaq, Revel & Townsend, 2003). 175 medical students residing in Al Ain city, part of the Abu Dhabi Emirate, were given self-report questionnaires assessing various health habits (Carter et al., 2003). Only 4% of the students reported being current users of tobacco and 1% reported currently using alcohol (Carter et al., 2003). The sample was mainly comprised of females (70%) which could explain why the prevalence rates of substance use behaviours are low (Carter et al., 2003).

Ahmadi and Ahmed (2013) conducted a similar study examining the extent to which a sample of female medical students in the Dubai Emirate consumed psychoactive substances. 102 self-report questionnaires were collected and the findings suggest that only 8.92% of the sample reports ever having used a substance (including alcohol, tobacco and cannabis) in their lifetime (Ahmadi & Ahmed, 2013). There were no reports of individuals having used any other substance listed in the study including: heroin, cocaine, LSD and ecstasy. The following results

are significantly lower than findings reported in previous chapters with a sample of participants from Western societies. This could be due to the fact that the chosen sample only included female participants that are currently enrolled in medical school (Ahmadi & Ahmed, 2013). The study also examined the reasons why students opted not to engage in substance use behaviours. Findings suggested that religion was the strongest factor that lead them to make the decision not to consume any of the substances listed (alcohol, cannabis, tobacco) (Ahmadi & Ahmed, 2013). Participants were also concerned about their health and reported a lack of interest in engaging in substance use behaviours (Ahmadi & Ahmed, 2013).

The current study

As we have discussed above, current findings examining substance use behaviours in the UAE focus on prevalence rates among high school students and university students. The nature of the studies are mainly exploratory and the researchers haves stressed the importance of understanding the scope of the problem to create appropriate prevention measures. To this date, there are no studies that we are aware of that have examined personality differences as possible risk factors that lead to substance use behaviours within samples of UAE participants. Similarly, a lack of research studies have examined religiosity as a potential protective factor and moderator affecting the relationship between impulsivity and religiosity. The previous chapters presented in this thesis have examined risk and resilience factors associated with alcohol and cannabis use among young adults in the United Kingdom and in Lebanon. Due to ethical restrictions given by the authorities of the UAE, we were unable to examine cannabis use among university students. Our main focus was thus directed towards legal substances that are very popular in the UAE, such as the use of tobacco (dokha and cigarettes) and alcohol.

The aims of this study are: (a) to examine rates of dokha, nicotine and alcohol use in the UAE; (b) to examine associations between impulsivity-related personality traits (using the BAS scales and the UPPS) and dokha, nicotine and alcohol use in a sample of college students;

(c) to test whether the impulsivity trait accounts for unique variance in substance use behaviours, as shown in research studies conducted in Western societies; (d) to examine associations between religiosity traits and aspects of substance use behaviours; (e) to examine the moderating effect of religiosity on the relationship between personality traits and substance use.

It is hypothesized that impulsivity-related traits will be positively associated with dokha, nicotine and alcohol use in this sample, while religiosity will be negatively associated with substance use behaviours. For the moderation analyses, it is predicted that participants who are highly religious would show weaker associations between impulsivity and substance use behaviours.

Method

Participants

Participants (N=191) were young adults residing in the UAE. They were recruited from two different universities in central Dubai. The administration offices were contacted prior to the data collection and on site participation and recruitment took place. The participants were 52.9% male, and ranged from 18 to 30 years old with a mean of 22.51 (SD=3.71). 50.3 % of the participants in this sample reported having obtained a high school degree or equivalent, followed by 35.6% who reported having obtained a bachelor's degree, 11.0% having obtained a master's degree and 0.5% reported obtaining a doctoral degree. The rest of the participants noted that they have obtained professional degrees or other diplomas that were not listed. Data regarding marital status indicated that 93.2% of the sample were single, 4.7% were married and the rest of the sample had an unclassified relationship status. As for ethnicity, data showed that 56.3% of the participants were of Arab origin, 13.1% were of Indian origin, 11.0% were of White/Caucasian origin, 6.8% were of other Asian origin, 4.7% were of other origin, 3.7% were multiracial, 2.1% were of Black origin and 2.1% preferred not to specify their ethnic

origin. Religious affiliation data indicated that 42.4% of the participants were Muslim, 35.6% were Christian, 14.1% were not affiliated to any religion and 14.1% were Hindu. Lastly, data regarding socioeconomic status indicated that 40.3% of the participants were not currently generating any income, 13.1% generated less than 10 000 AED per annum, 13.6% generated between 10 000 AED and 30 000 AED per annum, 5.2% generated between 30 000 to 70 000 AED per annum, 20.4% generated more than 70 000 AED per annum and 7.3% preferred to no specify their annual income.

Measures

Demographics

Demographic information provided in the online questionnaire included gender, age, primary language spoken, level of education, marital status, ethnic origin, religious affiliation and income (per annum).

Dokha use

For the purpose of this study, Dokha use was assessed using 7 short questions developed by the authors of this study that were designed to examine a person's dokha use in the past 6 months, if any (see appendix B). The measure included questions that ask about current dokha use (if any) as well as some questions that are to the questions present in the AUDIT and CUDIT scales. Some of the questions included in the AUDIT and CUDIT were not relevant to dokha and were therefore not included in the questionnaire. Participants were asked about their current dokha use and were provided with different multiple choice answers pertaining to the questions. The set of responses contained a score ranging from 0 to 4. The higher an individual scored, the more dokha consumption was observed. Questions included: *How often do you use dokha*? and *In a typical week when you are using dokha, how often do you feel your head*

spinning or feel dizziness? We did not use any cut-off score for this scale as we would need reliability and validity studies to do so. The overall score obtained on the dokha use questionnaire was analysed as an interval variable included in the regression analyses. Cronbach's alpha in this sample was .84 for the total scale score.

Nicotine use

Nicotine use was assessed using the Fagerström Test for Nicotine Dependence (FTND); a short questionnaire that aims to identify individuals with smoking dependence (Heatherton, Kozlowski, Frecker & Fagerström, 1991) (see appendix B). The test contains 6 questions including: *How many cigarettes per day do you smoke?* and *Do you smoke when you are so ill that you are in bed most of the day?* The set of responses contain a score ranging from either 0 to 3 or 0 to 1. The highest possible outcome is a score of 10 and indicates strong nicotine dependence. Cronbach's alpha in this sample was 84.

Alcohol use

Alcohol consumption was assessed using the AUDIT; a short questionnaire that aims to identify individuals with harmful alcohol consumption (WHO, 1989). The scale was described in detail in Chapter 2. Cronbach's alpha in this sample was .72.

BIS BAS Scales

Personality traits were measured using the Behavioural Inhibition System and Behavioural Activation System Scales (BIS BAS). The scales aim to assess motivational systems that affect individuals' behaviours (Gray, 1981). The measure was described in detail in Chapter 2. Cronbach's alphas in this sample were: drive = .79, fun = .81, reward responsiveness = .57.

UPPS Scale

Impulsivity facets were measured using the UPPS-P Impulsive Behaviour Scale (Whiteside & Lynam, 2001, Cyders et al., 2007). The measure was described in detail in

Chapter 2. Cronbach's alphas in this sample were: lack of premeditation = .88, lack of perseverance = .84, sensation seeking = .89, negative urgency = .92, positive urgency = .95.

Religiosity

Religiousness was assessed using the BMMRS: The BMMRS is a measure of religiousness and spirituality (Fetzer & NIA, 1999). The measure was described in detail in Chapter 2. Cronbach's alpha in this sample was .95 for all of the items of the scale.

Procedure

This study was approved by the Goldsmiths, University of London Psychology Department Ethics Committee. Participants were recruited in a university campus in Dubai. The study's advertisement stated that the students were required to answer questions regarding their dokha, nicotine and alcohol use as well as a few personality constructs and religiosity. Participants were given paper-based questionnaires and completed them on campus. The first page of the questionnaire included the informed consent procedure where participants were informed about the study and given the option to participate or exclude themselves from participating. Once the participants gave their written consent, they were given time to fill out the battery of tests presented to them. After completion of all questions, the debriefing sheet offered participants supplementary information about the study and gave them the opportunity to contact the researchers. Participants were also given relevant website links to visit if their participation in the study led them to be concerned about their substance use. 202 participants fille out the questionnaires yet 191 were included in the analysis as 11 questionnaires were kept blank. It took on average 15 to 20 minutes to complete the questionnaire.

Results

The percentage of participants who reported having ever used dokha in this sample was 58.1%. 45.5% of the sample reported having used dokha in the past six months. The youngest age reported for having started using the substance was 10 years old. 24.6% of the participants

who reported smoking dokha noted that they experienced head spins and dizziness every single time they smoked dokha. 29.3% of the participants used dokha four or more times a week. 18.8% considered themselves to be heavy users, while 13.6% considered themselves to be average users and 10.5% considered themselves to be light users. The rest of the participants noted that they were either non-users or previous users. 40.3% of the sample reported being current nicotine smokers, while 59.7% reported being non-smokers. The FTND total scores indicated that 16.3% of the participants scored more than 5 out of 10, while 1.6% of the sample reached the maximum score indicating a strong dependence for nicotine. As for alcohol consumption, the percentage of participants who reported having had a drink of alcohol in the past year in this sample was 52.9%, while 47.1% reported never consuming alcohol. The AUDIT total scores indicated that 11.1% of the sample consume alcohol in a harmful way (AUDIT>8).

The analysis will examine the relationship between dokha, nicotine and alcohol use, if any, and religious affiliation. The alcohol use, dokha use and nicotine use variables indicated whether or not an individual has smoked dokha in the past six months, currently smokes nicotine and has had a drink containing alcohol in the past year. We will also investigate the relationship between substance use behaviours, personality differences and religious affiliation.

Religious affiliation and dokha use and abuse

A chi-square analysis was used to investigate the difference of dokha smoking habits across religious groups (table 4.1). Results showed that there was a significant association between religious affiliation and whether or not a person smokes dokha, $x^2(3)=9.92$, $p<.05$. As shown in table 4.1, Hindus, Muslims and individuals with no religious affiliation are significantly more likely to smoke dokha compared to Christians.

Table 4.1

Results of Chi-square Test and Descriptive Statistics for Dokha Use by Religious Affiliation

	Religious Affiliation			
Dokha Use	Christian	Muslim	Hindu	No Affiliation
No	36 (56%)	29 (36%)	3 (20%)	10 (37%)
Yes	30 (44%)	52 (64%)	12 (80%)	17 (63%)

Note. $\chi^2 = 9.92$*, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

A one-way ANOVA was also used to assess the difference between the mean scores of the dokha use questionnaire across religious groups. Results showed a significant effect of religion on the total scores of the dokha questionnaire, $F(3, 187) = 5.16$, $p < .01$. A post hoc Games-Howell test (assumption of homogeneity was violated) showed that Christians and Muslims differed greatly at $p < .01$ where Muslims' mean score of dokha smoking was significantly higher than the mean score of Christians (table 4.2). Christians also differed significantly from Hindus at $p < .05$ where Hindus' mean score of dokha smoking was significantly higher than the mean score of Christians (table 4.2).

Table 4.2

Mean Scores of Substance Use as a Function of Participants' Religious Group

	Religious Group							
	Christian		Muslim		Hindu		No Affiliation	
Substance Use	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Dokha Score	$3.68_{a,b}$	0.69	7.06_{a}	6.76	8.93_{b}	5.91	6.89	6.45
AUDIT Score	3.28	3.54	1.92_{c}	3.45	3.33	3.7	4.04_{c}	4.04
FTND Score	1.62	2.72	2.37	3.14	2.29	2.92	1.00	1.59

Note. Means in a row sharing subscripts are significantly different from each other. For all measures, higher means indicate higher alcohol and cannabis use scores.

Religious affiliation and alcohol use and abuse

A chi-square analysis was used to investigate the difference of alcohol consumption habits across religious groups (table 4.3). Results showed that there was a significant

association between religious affiliation and whether or not a person drinks alcohol, $x^2(3) = 34.70$, $p < .001$. As shown in table 4.3, individuals with no religious affiliation, Christians and Hindus are significantly more likely to consume alcohol than Muslims.

Table 4.3

Results of Chi-square Test and Descriptive Statistics for Alcohol Use by Religious Affiliation

	Religious Affiliation			
Alcohol Use	Christian	Muslim	Hindu	No Affiliation
No	19 (28%)	58 (72%)	6 (40%)	7 (26%)
Yes	49 (72%)	23 (28%)	9 (60%)	20 (74%)

Note. $\chi^2 = 34.70$*, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

A one-way ANOVA was also used to assess the difference between the mean scores of the AUDIT questionnaire across religious groups. Results showed a significant effect of religion on the total scores of the AUDIT, $F(3, 185) = 13.84$, $p < .05$ (table 4.2). A post hoc Tukey test showed that individuals with no religious affiliation and Muslims differed greatly at $p < .05$ where Muslims' mean score of alcohol consumption was significantly lower than the mean score of individuals with no religious affiliation (table 4.2).

Religious affiliation and nicotine use and dependence

A chi-square analysis was used to investigate the difference of nicotine use habits across religious groups (table 4.4). Results showed that the association between smoking and religious affiliation was non-significant, $x^2(3) = 47.30$, p = n.s (table 4.4).

Table 4.4

Results of Chi-square Test and Descriptive Statistics for Nicotine Use by Religious Affiliation

	Religious Affiliation			
Nicotine Use	Christian	Muslim	Hindu	No Affiliation
No	45 (66.2%)	42 (51.9%)	8 (53.3%)	19 (70.4%)
Yes	23 (33.8%)	39 (48.1%)	7 (46.7%)	8 (29.6%)

Note. $\chi^2 = 34.70$, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

A one-way ANOVA was also used to assess the difference between the mean scores of the nicotine use questionnaire across religious groups. Results examining the effect of religion on the total score of the nicotine questionnaire were non-significant $F(3, 186) = 2.01$, p = n.s (table 4.2).

Overall Religiosity Measure

We have run an exploratory factor analysis to examine the relationship between variables of the religiosity measure. A principal component analysis was conducted on the 6 subscales or religiosity. The Kaiser-Meyer-Olkin measure verifies the sampling adequacy for the analysis, KMO = .92, and all KMO values for individual items were > .57, which is above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity x^2 (15) = 951.151, $p < .001$, indicated that correlations between all items were sufficiently large. One component had an eigenvalue over Kraiser's criterion of 1 and in combination explained 75.61% of the variance. Table 4.5 shows the significant positive correlations between all of the variables. Given these results indicating that the subscales of the religiosity measure cluster together, we will retain one component for subsequent analyses.

Table 4.5

Exploratory Factor Analysis: Correlation Table Suggesting the Presence of One Construct

	1	2	3	4	5	6
Construct						
1.Daily spiritual experiences	-					
2. Values and beliefs	.77***	-				
3. Private religious practices	.79***	.66***	-			
4. Religious and spiritual coping	.77***	.75***	.69***	-		
5. Overall self-ranking	.82***	.75***	.80***	.76***	-	
6. Organizational religiousness	.61***	.52***	.64***	.58***	.66***	-

Data for full sample are presented in the following table ($N = 215$); * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4.6

Factor Loadings from Principal Component Factor Analysis: Eigenvalue and Percentage of Variance for Categories of the BMMRS

	Factor loading
Item	Overall Religiosity
Daily spiritual experiences	**.92**
Overall self-ranking	**.86**
Religious and spiritual coping	**.88**
Private religious practices	**.88**
Values and beliefs	**.92**
Organizational religiousness	**.76**
Eigenvalues	4.54
% of variance	75.61

Note: Factor loadings over .40 appear in bold.

Bivariate Correlations and Descriptive Statistics

Descriptive statistics and bivariate correlations are presented in Table 4.7 below. The means and standard deviations calculated included all of the participants (N=191). Correlations between personality traits, religiosity and dokha, nicotine and alcohol use were analysed for the whole sample. The analysis revealed significant positive correlations between dokha use scores and variables of the UPPS questionnaire: negative urgency, lack of premeditation lack of perseverance, sensation seeking and positive urgency. Similar positive associations were found between participants' total dokha scores and the fun subscale of the BAS and total BAS scores. There were also various significant association for nicotine use. Participants' total scores on the nicotine use questionnaire (FTND) was significantly positively associated with

all variables of the UPPS questionnaire: negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency. Similar positive associations were found with the fun-seeking subscale of the BAS and total BAS scores. Moreover, there were also a variety of associations found between personality variables, religiosity and alcohol use. Individuals' total scores on the AUDIT were significantly positively related to the following subscales of the UPPS scale: negative urgency, lack of premeditation, lack of perseverance and positive urgency. The AUDIT scores were also positively associated with the fun subscale of the BAS. The analysis also revealed negative correlations between individuals' total scores on the AUDIT and the BIS total score as well as total religiosity.

Table 4.7
Bivariate correlations and descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Gender																	
2. Dokha Use	-.41***	-															
3. Dokha Total	-.42***	.79***	-														
4. Nicotine Use	-.11	.53***	.54***	-													
5. Nicotine Total	-.16*	.45***	.57***	.79***	-												
6. Alcohol Use	-.12	.13	.07	.11	.06	-											
7. Alcohol Total	-.21**	.30***	.30***	.20**	.17*	.62***	-										
8. Negative Urgency	-.15*	.34***	.40***	.35***	.41***	-.03	.15*	-									
9. Lack of Premeditation	-.18*	.38***	.35***	.24***	.25***	.21**	.31***	.26***	-								
10.Lack of Perseverance	-.15*	.35***	.343***	.28***	.31***	.10	.24***	.33***	.69***	-							
11. Sensation Seeking	-.37***	.38***	.37***	.26***	.32***	.18*	.13	.51***	.15*	.01	-						
12. Positive Urgency	-.23**	.44***	.51***	.37***	.38***	.06	.30***	.75***	.34***	.41***	.47***	-					
13. Drive	.07	-.08	-.02	.06	.05	-.02	-.04	.19**	-.31***	-.42***	.27***	.10	-				
14. Fun	-.22**	.41***	.39***	.38***	.42***	.26***	.25***	.49***	.32***	.24***	.66***	.42***	.24***	-			
15. Reward Responsiveness	.00	-.04	.04	-.00	.11	-.07	-.12	.27***	-.32***	-.33***	.28***	.012	.50***	.27***	-		
16. BAS	-.08	.15*	.20**	.22**	.28***	.09	.06	.44***	-.11	-.20**	.56***	.25***	.77***	.71***	.76***	-	
17. Religiosity Total	.22**	-.17*	-.17*	-.03	-.01	-.52***	-.41***	.01	-.42***	-.30***	-.01	-.10	.22**	-.12	.25***	.15*	-
Mean			5.98		1.9		2.83	31.5	21.55	19.91	37.01	32.17	12.31	12.64	17.86	42.81	45.13
SD			6.48		2.82		3.65	8.11	5.87	5.05	7.46	9.82	2.42	2.63	2.19	5.41	26.36

Data for full sample are presented in the following table (N=191): * $p<.05$. ** $p<.01$. *** $p<.001$.
Gender coded as female = 2, male=1. Alcohol use coded as yes=1, no=0. Dokha use coded as yes=1, no=0. Nicotine use coded as yes=1, no=0.

Personality variables and dokha use

A hierarchical regression analysis was conducted using the dokha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables and UPPS-P personality variables. Age and gender were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency were entered at step 2. As shown in table 4.8, analyses indicated that both gender (β = -.37, p < .001) and age (β = -.35, p < .001) predicted dokha use. Both standard beta coefficients were negative which indicated that males and younger participants were more likely to engage in dokha smoking behaviours. Moreover, lack of premeditation (β = .18, p < .05) and positive urgency (β = .23, p < .05) were both significant predictors of dokha use. The standardized beta coefficients were both positive which indicated that the higher an individual scores on the lack of premeditation and positive urgency facets, the more the individual is likely to smoke dokha (table 4.8).

Table 4.8
Hierarchical Regression Analysis Summary for UPPS-P Variables Predicting Dokha Use (N=191)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.29***	
Gender of Participants	-4.72	.81	-.37***		
Age of Participants	-.61	.11	-.35***		
Step 2				.44***	.14***
Gender of Participants	-3.26	.80	-.25***		
Age Participants	-.42	.11	-.24***		
Negative urgency	-.01	.07	-.01		
Lack of premeditation	.19	.09	.18*		
Lack of perseverance	.07	.11	.05		
Sensation seeking	.09	.06	.11		
Positive urgency	.15	.06	.23*		

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

A hierarchical regression analysis was conducted using the dokha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Drive, fun seeking and reward responsiveness were entered at step 2. As shown in table 4.9, the fun subscale of the BAS was a significant predictor of dokha use (β = .30, p < .001). The standardized beta coefficients was positive which indicated that the more an individual scores high on fun subscale, the more the individual is likely to smoke dokha (table 4.9).

Table 4.9
Hierarchical Regression Analysis Summary for BAS Variables Predicting Dokha Use (N=191)

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.29***	
Gender of Participants	-4.59	.81	-.36***		
Age of Participants	-.61	.11	-.35***		
Step 2				.37***	.08***
Gender of Participants	-3.76	.80	-.29***		
Age of Participants	-.57	.11	-.32***		
Drive	-.15	.19	-.06		
Fun	.74	.16	.30***		
Reward Responsiveness	-.09	.21	-.03		

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

Personality variables and nicotine use

A hierarchical regression analysis was conducted using the nicotine use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables and UPPS-P personality variables. Age and gender were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency were entered at step 2. As shown in table 4.10, analyses indicated that age was a significant predictor of nicotine use (β = -.15, p < .05). The standard beta coefficient is

negative which indicates that younger participants were more likely to smoke nicotine. Moreover, the results indicate that negative urgency (β = .22, p < .05), lack of perseverance (β = .22, p < .05) and sensation seeking (β = .20, p < .05) were predictors of nicotine use. The standardized beta coefficients were positive which indicated that the more an individual scores high on negative urgency, lack of perseverance and sensation seeking scales, the more the individual is likely to smoke nicotine (table 4.10).

Table 4.10
Hierarchical Regression Analysis Summary for UPPS-P Variables Predicting Nicotine Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.05*	
Gender of Participants	-.76	.41	-.14		
Age of Participants	-.11	.55	-.15*		
Step 2				.23***	.19***
Gender of Participants	-.04	.41	-.01		
Age of Participants	-.01	.06	-.02		
Negative urgency	.08	.04	.22*		
Lack of premeditation	.01	.05	.01		
Lack of perseverance	.12	.06	.22*		
Sensation seeking	.07	.03	.20*		
Positive urgency	.01	.03	.02		

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire (FTND) as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Drive, fun seeking and reward responsiveness were entered at step 2. As shown in table 4.11, the fun subscale of the BAS was a significant predictor of nicotine use (β = .30, p < .001). The standardized beta coefficients was positive which indicated that the more an individual scores high on fun subscale, the more the individual is likely to smoke nicotine (table 4.11).

Table 4.11
Hierarchical Regression Analysis Summary for BAS Variables Predicting Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.04*	
Gender of Participants	-.68	.40	-.12		
Age of Participants	-.11	.06	-.14		
Step 2				.19***	.14***
Gender of Participants	-.23	.38	-.04		
Age of Participants	-.08	.05	-.10		
Drive	-.04	.09	-.03		
Fun	.42	.08	.40***		
Reward Responsiveness	.02	.10	.01		

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

Personality variables and alcohol use

A hierarchical regression analysis was conducted using the AUDIT (AUDIT) as the criterion variable, with separate steps in the model for age and gender as control variables and UPPS-P personality variables. Age and gender were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency were entered at step 2. As shown in table 4.12, analyses indicated that gender was a significant predictor of alcohol use (β = -.24, p < .001). The standard beta coefficient is negative which indicates that male participants were more likely to drink alcohol. Age was also a significant predictor of alcohol use (β = .17, p < .05). The standard beta coefficient is positive which indicates that older participants were more likely to drink alcohol. Moreover, the results indicate that lack of premeditation (β = .19, p < .05) and positive urgency (β = .47, p < .001) were predictors of alcohol consumption. The standardized beta coefficients were positive which indicated that the more an individual scores high on lack of premeditation and positive urgency scales, the more the individual is likely consume alcohol (table 4.12).

Table 4.12
Hierarchical Regression Analysis Summary for UPPS-P Variables Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.07***	
Gender of Participants	-1.77	.53	-.24***		
Age of Participants	.17	.07	.17*		
Step 2				.24***	.17***
Gender of Participants	-1.22	.53	-.17*		
Age of Participants	.30	.07	.30***		
Negative urgency	-.07	.05	-.15		
Lack of premeditation	.12	.06	.19*		
Lack of perseverance	-.02	.07	-.02		
Sensation seeking	-.03	.04	-.07		
Positive urgency	.18	.04	.47***		

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

A hierarchical regression analysis was conducted using the AUDIT as the criterion variable, with separate steps in the model for age and gender as control variables and BAS personality variables. Age and gender were entered as predictors at step 1. Drive, fun seeking and reward responsiveness were entered at step 2. As shown in table 4.13, the fun subscale of the BAS was a significant predictor of alcohol use (β = .28, p < .001). The standardized beta coefficient was positive which indicated that the more an individual scores high on fun subscale, the more the individual is likely to consume alcohol (table 4.13). Results also indicated that reward responsiveness was also a predictor of alcohol use (β = .30, p < .001). The standardized beta coefficient was negative which indicated that the more an individual scores high on the reward responsiveness subscale the less the individual is likely to consume alcohol (table 4.13).

Table 4.13
Hierarchical Regression Analysis Summary for BAS Variables Predicting Alcohol Use (N=191)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.04*	
Gender of Participants	-1.77	.53	-.24		
Age of Participants	.17	.07	.17		
Step 2				.19***	.15***
Gender of Participants	-1.31	.53	-.18*		
Age of Participants	.18	.07	.18*		
Drive	-.14	.12	-.01		
Fun	.39	.10	.28***		
Reward Responsiveness	-.30	.14	-.18		

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

Religiosity as a moderator of the relationship between impulsivity and substance use

Dokha Use

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the fun seeking variable. Age and gender were entered as predictors at step 1. The religiosity total score was entered at step 2. Both religiosity and fun seeking variables were entered at step 3 and the interaction between both variables was entered at step 4. As shown in table 4.14, the total religiosity score was a significant predictor of dokha use ((β = -.18, p < .001). The standardized beta coefficient was negative which indicated that the more an individual is religious, the less this person is likely to smoke dokha (table 4.14). Results also indicated that religiosity was not a significant moderator of the relationship between fun seeking and dokha use (table 4.14).

Table 4.14
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Fun Seeking and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.29***	
Gender	-4.65	.81	-.36***		
Age	-.62	.11	-.35***		
Step 2				.32***	.03**
Gender	-4.03	.83	-.31***		
Age	-.69	.11	-.40***		
Religiosity	-.04	.02	-.18**		
Step 3				.38***	.06***
Gender	-3.43	.80	-.26***		
Age	-.63	.11	-.36***		
Religiosity	-.04	.02	-.15*		
Fun Seeking	.65	.15	.26***		
Step 4				.40***	.01
Gender	-3.39	.80	-.26***		
Age	-.66	.11	-.37***		
Religiosity	-.03	.02	-.14*		
Fun Seeking	.65	.15	.26***		
Interaction (Religiosity & Fun Seeking)	.01	.01	.11		

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

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the negative urgency variable. Age and gender were entered as predictors at step 1. Both religiosity and negative urgency were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.15, results indicated that religiosity was not a significant moderator of the relationship between negative urgency and dokha use (table 4.15).

Table 4.15
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Negative Urgency and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.29***	
Gender	-4.67	.81	-.36***		
Age	-.61	.11	-.35***		
Step 2				.28***	.09***
Gender	-3.79	.79	-.29***		
Age	-.53	.11	-.30***		
Negative Urgency	.21	.05	.26***		
Religiosity	-.04	.02	-.17**		
Step 3				.39***	.01
Gender	-3.89	.79	-.30***		
Age	-.52	.11	-.30***		
Negative Urgency	.22	.05	.28***		
Religiosity	-.04	.02	-.16**		
Interaction (Religiosity & Negative Urgency)	.00	.00	.10		

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

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of premeditation variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of premeditation were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.16, results indicated that religiosity was not a significant moderator of the relationship between lack of premeditation and dokha use (table 4.16).

Table 4.16

Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Premeditation and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2

Step 1				.29***	.08***
Gender	-4.67	.81	-.36***		
Age	-.61	.11	-.35***		
Step 2				.38***	.08***
Gender	-3.82	.79	-.30***		
Age	-.64	.11	-.37***		
Lack of Premeditation	.29	.07	.26***		
Religiosity	-.02	.02	-.06		
Step 3				.38***	.01
Gender	-3.89	.79	-.30***		
Age	-.65	.11	-.37***		
Lack of Premeditation	.29	.07	.27***		
Religiosity Total	-.01	.02	-.06		
Interaction (Religiosity & Lack of Premeditation)	.00	.00	.07		

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

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of perseverance variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of perseverance were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.17, results indicated that religiosity was not a significant moderator of the relationship between lack of perseverance and dokha use (table 4.17).

Table 4.17
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Perseverance and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1					.29***
Gender	-4.67	.81	-.36***		
Age	-.61	.11	-.35***		
Step 2				.36***	.07***
Gender	-3.98	.80	-.31***		
Age	-.60	.11	-.34***		
Lack of Perseverance	.27	.08	.21***		
Religiosity	-.03	.02	-.10		
Step 3				.36***	.00
Gender	-3.99	.81	-.31***		
Age	-.60	.11	-.34***		

Lack of Perseverance	.27	.08	.21***
Religiosity	-.03	.02	-.10
Interaction (Religiosity & Lack of Perseverance)	.00	.00	.01

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

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the sensation seeking variable. Age and gender were entered as predictors at step 1. Both religiosity and sensation seeking were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.18, results indicated that religiosity was not a significant moderator of the relationship between sensation seeking and dokha use (table 4.18).

Table 4.18
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Sensation Seeking and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.29***	
Gender	-4.67	.81	-.36***		
Age	-.61	.11	-.35***		
Step 2				.36***	.07***
Gender	-3.05	.85	-.24***		
Age	-.64	.11	-.37***		
Sensation Seeking	.19	.06	.22***		
Religiosity	-.05	.02	-.19**		
Step 3				.37***	.01
Gender	-2.86	.86	-.22***		
Age	-.64	.11	-.37***		
Sensation Seeking	.20	.06	.23***		
Religiosity	-.04	.02	-.18*		
Interaction (Religiosity & Sensation Seeking)	.00	.00	.10		

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

A hierarchical regression analysis was conducted using the dokha use total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the positive urgency variable. Age and gender were entered as predictors at step

1. Both religiosity and positive urgency were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.19, results indicated that religiosity was not a significant moderator of the relationship between positive urgency and dokha use (table 4.19).

Table 4.19
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Positive Urgency and Dokha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.29***	
Gender	-4.72	.81	-.37***		
Age	-.61	.11	-.35***		
Step 2				.41***	.11***
Gender	-3.61	.78	-.28***		
Age	-.41	.12	-.24***		
Positive Urgency	.22	.04	.34***		
Religiosity	-.03	.02	-.12		
Step 3				.41***	.00
Gender	-3.60	.79	-.28***		
Age	-.41	.12	-.24***		
Positive Urgency	.22	.04	.33***		
Religiosity	-.02	.04	-.09		
Interaction (Religiosity & Positive Urgency)	.00	.00	-.03		

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

Nicotine Use

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the fun seeking variable. Age and gender were entered as predictors at step 1. The religiosity total score was entered at step 2. Both religiosity and fun seeking variables were entered at step 3 and the interaction between both variables was entered at step 4. As shown in table 4.20, the total religiosity score was not a significant predictor of nicotine use ((β = -.01, p = n.s). Results also indicated that religiosity was not a significant moderator of the relationship between fun seeking and nicotine use (table 4.20).

Table 4.20
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Fun Seeking and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.04*	
Gender	-.75	.41	-.13		
Age	-.11	.06	-.14		
Step 2				.04*	.00
Gender	-.74	.43	-.13		
Age	-.11	.06	-.14		
Religiosity	.00	.01	-.01		
Step 3				.19***	.15***
Gender	-.35	.40	-.06		
Age	-.07	.05	-.10		
Religiosity	.00	.01	.03		
Fun Seeking	.42	.07	.40***		
Step 4				.20***	.01
Gender	-.34	.40	-.06		
Age	-.08	.05	-.11		
Religiosity	.00	.01	.04		
Fun Seeking	.42	.07	.40***		
Interaction (Religiosity & Fun Seeking)	.00	.00	.07		

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the negative urgency variable. Age and gender were entered as predictors at step 1. Both religiosity and negative urgency were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.21, results indicated that religiosity was not a significant moderator of the relationship between negative urgency and nicotine use (table 4.21).

Table 4.21
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Negative Urgency and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.05*	
Gender	-.73	.41	-.13		
Age	-.11	.06	-.15*		
Step 2				.18***	.13***
Gender	-.51	.39	-.10		
Age	-.02	.06	.00		
Negative Urgency	.14	.03	.39***		
Religiosity	.00	.01	.00		
Step 3				.18***	.00
Gender	-.54	.40	-.10		
Age	-.02	.06	-.02		
Negative Urgency	.14	.03	.41***		
Religiosity	.00	.01	.00		
Interaction (Religiosity & Negative Urgency)	.00	.00	.07		

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of premeditation variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of premeditation were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.22, results indicated that religiosity was not a significant moderator of the relationship between lack of premeditation and nicotine use (table 4.22).

Table 4.22
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Premeditation and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.05*	
Gender	-.73	.41	-.13		
Age	-.11	.06	-.15*		
Step 2				.11***	.06**
Gender	-.60	.41	-.11		
Age	-.10	.06	-.13		
Lack of Premeditation	.13	.04	.27***		
Religiosity	.01	.01	.10		
Step 3				.11***	.01
Gender	-.63	.41	-.11		
Age	-.10	.06	-.14		
Lack of Premeditation	.13	.04	.28***		
Religiosity Total	.01	.01	.11		
Interaction (Religiosity & Lack of Premeditation)	.00	.00	.09		

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of perseverance variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of perseverance were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.23, results indicated that religiosity was not a significant moderator of the relationship between lack of perseverance and nicotine use (table 4.23).

Table 4.23
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Perseverance and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2

Step 1				.05*	
Gender	-.73	.41	-.13		
Age	-.11	.06	-.15*		
Step 2				.13***	.08***
Gender	-.64	.41	-.11		
Age	-.07	.06	-.09		
Lack of Perseverance	.17	.04	.31***		
Religiosity	.01	.01	.09		
Step 3				.13***	.01
Gender	-.71	.41	-.13		
Age	-.07	.06	-.09		
Lack of Perseverance	.17	.04	.3***		
Religiosity	.01	.01	.09		
Interaction (Religiosity & Lack of Perseverance)	.00	.00	.09		

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the sensation seeking variable. Age and gender were entered as predictors at step 1. Both religiosity and sensation seeking were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.24, results indicated that religiosity was not a significant moderator of the relationship between sensation seeking and nicotine use (table 4.24).

Table 4.24
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Sensation Seeking and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.05*	
Gender	-.73	.41	-.13		
Age	-.11	.06	-.15*		
Step 2				.12***	.08***
Gender	-.10	.43	-.02		
Age	-.10	.05	-.13		
Sensation Seeking	.11	.03	.30***		
Religiosity	.00	.01	-.03		
Step 3				.12***	.00
Gender	-.09	.44	-.02		

Age	-.10	.06	-.13
Sensation Seeking	.11	.03	.30***
Religiosity	.00	.01	-.03
Interaction (Religiosity & Sensation Seeking)	.00	.00	.01

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

A hierarchical regression analysis was conducted using the nicotine use questionnaire total (FTND) score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the positive urgency variable. Age and gender were entered as predictors at step 1. Both religiosity and positive urgency were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.25, results indicated that religiosity was not a significant moderator of the relationship between positive urgency and nicotine use (table 4.25).

Table 4.25
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Positive Urgency and Nicotine Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.05*	
Gender	-.76	.41	-.14		
Age	-.11	.06	-.15*		
Step 2				.15***	.10***
Gender	-.48	.41	-.09		
Age	.01	.06	.01		
Positive Urgency	.10	.02	.37***		
Religiosity	.01	.01	.04		
Step 3				.15***	.00
Gender	-.47	.41	-.09		
Age	.01	.06	.01		
Positive Urgency	.10	.02	.37***		
Religiosity	.01	.02	.07		
Interaction (Religiosity & Positive Urgency)	.00	.00	-.03		

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

Alcohol Use

A hierarchical regression analysis was conducted using the alcohol use questionnaire (AUDIT) total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the fun seeking variable. Age and gender were entered as predictors at step 1. The religiosity total score was entered at step 2. Both religiosity and fun seeking variables were entered at step 3 and the interaction between both variables was entered at step 4. As shown in table 4.26, the total religiosity score was a significant predictor of alcohol use ((β = -.37, p < .001). The standardized beta coefficient was negative which indicated that the more an individual is religious the less this person is likely to consume alcohol (table 4.26). Results also indicated that religiosity was not a significant moderator of the relationship between fun seeking and alcohol use (table 4.26).

Table 4.26
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Fun Seeking and Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.07***	
Gender	-1.74	.53	-.24***		
Age	.17	.07	.17*		
Step 2				.19***	.12***
Gender	-1.04	.51	-0.14*		
Age	.08	.07	.08		
Religiosity	-.05	.01	-.37***		
Step 3				.23***	.03**
Gender	-.78	.51	-.11		
Age	.10	.07	.11		
Religiosity	-.05	.01	-.35***		
Fun Seeking	.26	.09	.19**		
Step 4				.24***	.01
Gender	-.82	.51	-.11		

Age	.12	.07	.12
Religiosity	-.05	.01	-.36***
Fun Seeking	.26	.09	.19**
Interaction (Religiosity & Fun Seeking)	-.01	.00	-.12

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

A hierarchical regression analysis was conducted using the alcohol use questionnaire (AUDIT) total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the negative urgency variable. Age and gender were entered as predictors at step 1. Both religiosity and negative urgency were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.27, the analysis revealed that the interaction between religiosity and negative urgency was a predictor of alcohol consumption (β = -.15, p < .05).

Table 4.27
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Negative Urgency and Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.07***	
Gender	-1.74	.52	-.24***		
Age	.17	.07	.17*		
Step 2				.22***	.15***
Gender	-.96	.50	-.13		
Age	.15	.07	.15*		
Negative Urgency	.08	.03	.18*		
Religiosity	-.05	.01	-.36***		
Step 3				.24***	.02*
Gender	-.87	.50	-.12		
Age	.15	.07	.15*		
Negative Urgency	.07	.03	.15*		
Religiosity	-.05	.01	-.36***		
Interaction (Religiosity & Negative Urgency)	.00	.00	-.15*		

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

The interaction term of negative urgency and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores the slope of the relationship between negative urgency and alcohol use was b = .14, SE b = .04, t = 3.48, p < .001. When

religiosity was moderate, the slope of the relationship between impulsivity and alcohol use was b = .07, SE b = .03, t = 2.09, $p < .05$. Lastly, the analysis indicated that at +1 standard deviation of religiosity scores the slope was b = -.003, SE b = .05, t = -.07. The following results suggest that the strongest association between negative urgency and alcohol use occurs when religiosity is low, as demonstrated by the steep positive association in figure 4.1. On the other hand, when religiosity is high, the relationship between sensation seeking and alcohol use is not significant anymore. This weak association is shown by the flat slope in figure 4.1.

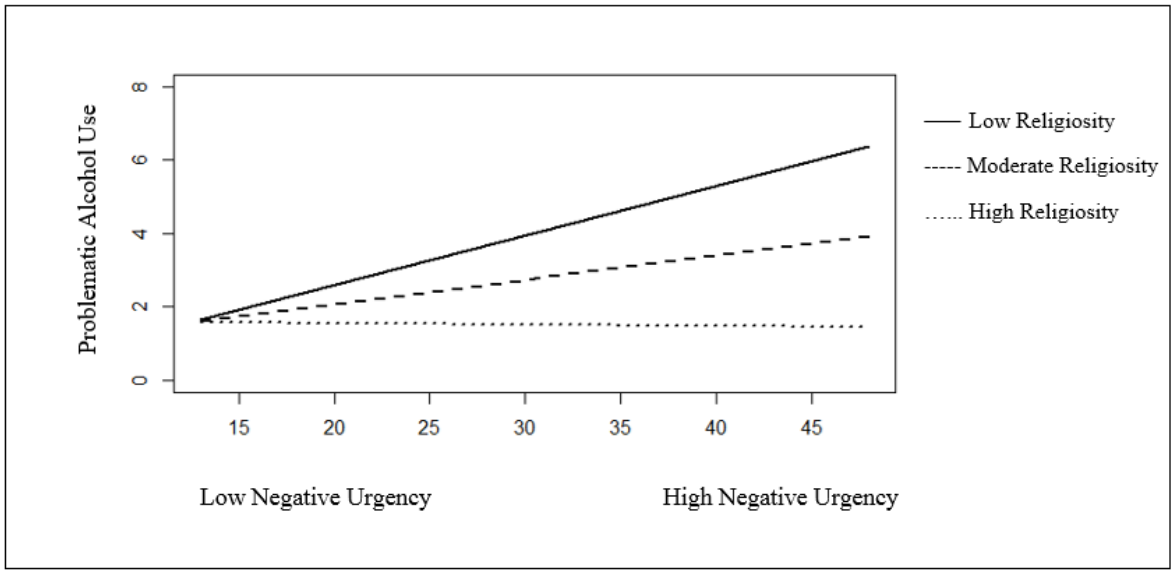

Figure 4.1. Moderation effect of religiosity on the relationship between negative urgency and alcohol use.

A hierarchical regression analysis was conducted using the alcohol use questionnaire (AUDIT) total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of premeditation variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of premeditation were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.28,

the analysis revealed that the interaction between religiosity and lack of premeditation was not significant (β = .02, p = n.s).

Table 4.28
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Premeditation and Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.07***	
Gender	-1.74	.52	-.24***		
Age	.17	.07	.17*		
Step 2				.22***	.14***
Gender	-0.98	.50	-.14		
Age	.11	.07	.11		
Lack of Premeditation	.11	.05	.17*		
Religiosity	-.04	.01	-.29***		
Step 3				.22***	.00
Gender	-.99	.51	-.14*		
Age	.10	.07	.11		
Lack of Premeditation	.11	.05	.17*		
Religiosity	-.04	.01	-.29***		
Interaction (Religiosity & Lack of Premeditation)	.00	.00	.02		

A hierarchical regression analysis was conducted using the alcohol use questionnaire (AUDIT) total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the lack of perseverance variable. Age and gender were entered as predictors at step 1. Both religiosity and lack of perseverance were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.29, the analysis revealed that the interaction between religiosity and lack of perseverance was not significant (β = -.01, p = n.s).

Table 4.29
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Perseverance and Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.07***	
Gender	-1.74	.52	-.24***		
Age	.17	.07	.17*		
Step 2				.21***	.14***
Gender	-1.04	.50	-.14*		
Age	.12	.07	.12		
Lack of Perseverance	.10	.05	.14		
Religiosity	-.04	.01	-.32***		
Step 3				.21***	0
Gender	-1.03	.51	-.14*		
Age	.12	.07	.12		
Lack of Perseverance	.10	.05	.14		
Religiosity	-.04	.01	-.32***		
Interaction (Religiosity & Lack of Perseverance)	.00	.00	-.01		

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

A hierarchical regression analysis was conducted using the alcohol use questionnaire (AUDIT) total score as the criterion variable, with separate steps in the model for age and gender as control variables, religiosity and the sensation seeking variable. Age and gender were entered as predictors at step 1. Both religiosity and sensation seeking were entered at step 2 and the interaction between both variables was entered at step 3. As shown in table 4.30, the analysis revealed that the interaction between religiosity and sensation seeking was significant (β = -.14, p <.05).

Table 4.30
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Sensation Seeking and Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	*R2*	ΔR2
Step 1				.07***	
Gender	-1.74	.52	-.24***		
Age	.17	.07	.17*		
Step 2				.20***	.13***
Gender	-.83	.54	-.11		
Age	.10	.07	.10		
Sensation Seeking	.05	.04	.09		
Religiosity	-.05	.01	-.37***		
Step 3				.22***	.02*

Gender	-1.01	.54	-.14
Age	.10	.07	.10
Sensation Seeking	.04	.04	.08
Religiosity	-.05	.01	-.37***
Interaction (Religiosity & Sensation Seeking)	.00	.00	-.14*

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

The interaction term of sensation seeking and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores the slope of the relationship between sensation seeking and alcohol use was b = .11, SE b = .05, t = 2.41, $p < .05$. When religiosity was moderate, the slope of the relationship between impulsivity and alcohol use was b = .04, SE b = .03, t = 1.10. Lastly, the analysis indicated that at +1 standard deviation of religiosity scores the slope was b = -.04, SE b = .05, t = -.7. The following results suggest that the strongest association between sensation seeking and alcohol use occurs when religiosity is low, as demonstrated by the steep positive association in figure 4.2. On the other hand, when religiosity is high, the relationship between sensation seeking and alcohol use is not significant anymore. This weak association is shown by the flat slope in figure 4.2.

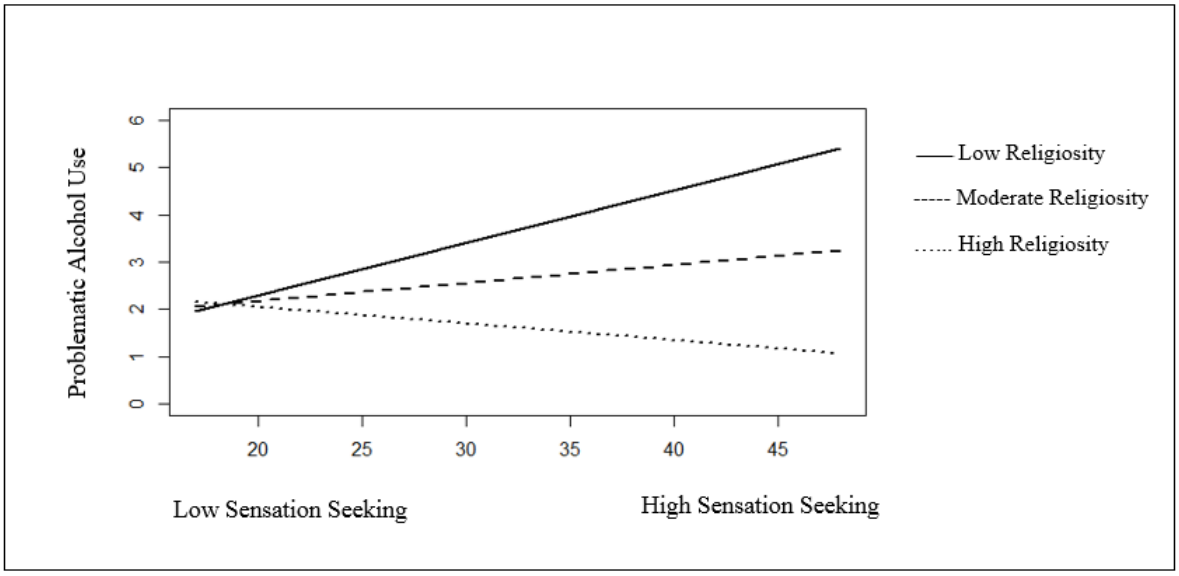

Figure 4.2. Moderation effect of religiosity on the relationship between sensation seeking and alcohol use.

A moderated hierarchical regression analysis was conducted using the AUDIT as the criterion variable, with separate steps in the model for age and gender as control variables, positive urgency, religiosity and the interaction between positive urgency and religiosity. Age and gender were entered as predictors at step 1. Positive urgency and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between religiosity and positive urgency was a predictor of alcohol consumption (β = -.18, p < .01) (table 4.31).

Table 4.31
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Positive Urgency and Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.07***	
Gender of Participants	-1.77	.53	-.24***		
Age of Participants	.17	.07	.17*		
Step 2				.28***	.21***
Gender of Participants	-.75	.49	-.10		
Age of Participants	.24	.07	.24***		
Positive Urgency	.13	.03	.34***		
Religiosity	-.04	.01	-.30***		
Step 3				.31***	.03**
Gender of Participants	-.64	.48	-.09		
Age of Participants	.25	.07	.26***		
Positive Urgency	.11	.03	.30***		
Religiosity	-.04	.01	-.03***		
Interaction (Positive Urgency and Religiosity)	-.00	.00	-.18**		

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

The interaction term of positive urgency and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores the slope of the relationship between positive urgency and alcohol use was b = .18, SE b = .03, t = 5.61, p < .001 and at +1 standard deviation of religiosity scores the slope was b = .05, SE b = .04, t = 1.29. The following results suggest that the strongest association between positive urgency and alcohol use occurs

when religiosity is low, as demonstrated by the steep positive association in figure 4.3. On the other hand, when religiosity is high, the relationship between positive urgency and alcohol use is not significant anymore. This weak association is shown by the flat slope in figure 4.3.

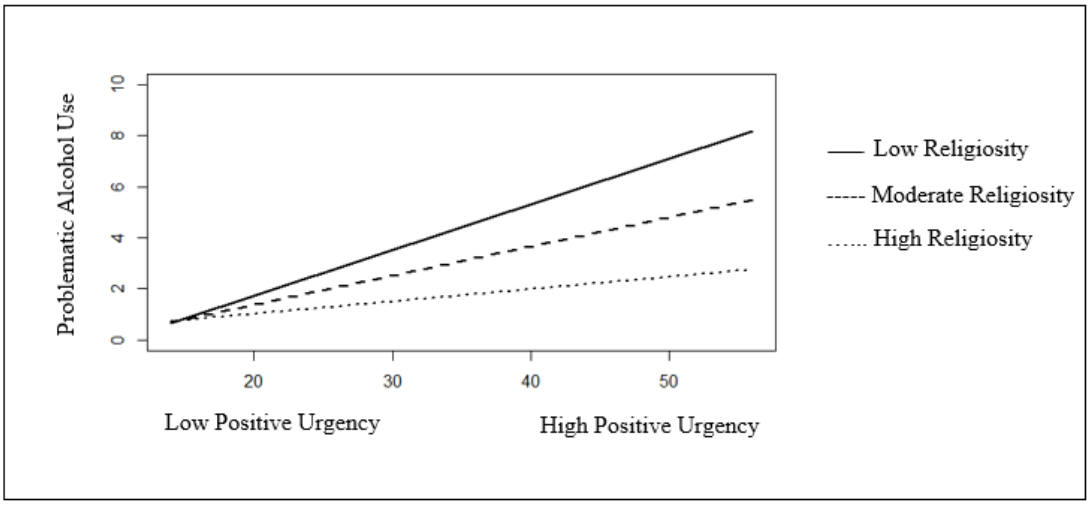

Figure 4.3. Moderation effect of religiosity on the relationship between positive urgency and alcohol use.

Discussion

This study aimed to examine substance use behaviours in a sample of university students in the Dubai Emirate. The study also aimed to determine how personality differences specified by the BIS/BAS and UPPS-P frameworks were associated with dokha, alcohol and nicotine use and how religiosity traits specified by the BMMRS framework could interfere with students' likelihood of engaging in substance use behaviours. The study focused on overall religiosity and examined whether or not findings were similar to the studies conducted with samples of young adults from the United Kingdom and Lebanon described in previous chapters.

Our analysis revealed that the fun seeking subscale of the BAS was significantly related to dokha, nicotine and alcohol use and misuse. Fun seeking was positively associated to all substances which indicates that the more individuals scored high on the fun seeking subscale, the more they were prone to consume dokha, nicotine or alcohol. This is in line with previous findings in the literature (Feil & Hasking, 2008; Voigt et al., 2009) and with the findings from the studies described in the previous chapters (Chapters 2 and 3). Lack of premeditation and positive urgency were also associated with dokha and alcohol use and misuse. The positive association indicated that the more an individual scored highly on these facets of the UPPS, the more this person was likely to consume dokha and alcohol. The findings suggest that the same facets of impulsivity predict both alcohol and dokha use. On the other hand, our findings suggested that lack of perseverance and sensation seeking were both associated with nicotine use and misuse. The positive association indicated that the more an individual scored highly on these facets of the UPPS, the more this person was likely to smoke cigarettes.

Religiosity was shown to be related to both dokha and alcohol use. The association between religiosity and dokha use indicated that the more individuals scored highly on overall religiosity, the less likely they were to consume both substances. There was no significant association with nicotine use. The association between overall religiosity and alcohol use is in line with the findings shown in chapters 2 and 3. The results suggesting that overall religiosity was also significantly related to dokha use are novel and can set a precedent for prospective studies examining dokha use in the UAE. Dokha use was also shown to be more prevalent among Muslim and Hindu participants when compared to Christians. The total scores of the Dokha scale indicated that Muslims and Hindus had significantly higher means that individuals with no religious affiliation and Christians. Differences across religious groups were also found for alcohol consumption. Muslims had the lowest percentage of participants who noted ever trying alcohol as opposed to the other religious groups. The total scores of the AUDIT indicated

that individuals with no religious affiliation had a significantly higher mean when compared to Muslims. Similar differences were not found for nicotine consumption.

The moderation analyses results build on the findings established by Galbraith and Connor (2015) described in chapter 3. Our findings suggest that overall religiosity is a significant moderator of the relationship between negative urgency and alcohol use. The analysis suggested that individuals scoring high on the overall religiosity scale were less likely to consume alcohol, even if they scored high on the negative urgency scale. On the other hand, individuals who had scored low on the religiosity scales, as well as high scores on the negative urgency scale, consumed larger amounts of alcohol. Negative urgency measures the extent to which individuals act rashly in response to negative mood states. Religiosity on the other hand, has been shown to be a protective factor when individuals face uncontrollable negative events (Park, Cohen & Herb, 1990). Religiosity could diminish the expression of impulsivity and in turn decrease substance use behaviours.

Overall religiosity was also a significant moderator of the relationship between sensation seeking and alcohol consumption. The analysis suggested that individuals who reported being highly religious were less likely to consume alcohol regardless of their score on the sensation seeking scale. On the other hand, individuals who reported not being religious at all and had high scores on the sensation seeking scale reported consuming significant amounts of alcohol. Our findings also revealed a significant moderation between overall religiosity and positive urgency in predicting alcohol use. The analysis suggested that religiosity was a significant moderator of the relationship between positive urgency and alcohol consumption whereby high levels of religiosity lead to significantly lower levels of alcohol use regardless of an individual's score on the positive urgency scale. Similarly to the results found for negative urgency and sensation seeking, once overall religiosity was low and positive urgency was high, alcohol consumption was significantly high. These findings may be due to the fact that alcohol

consumption is strictly prohibited in the Islamic religion. Overall religiosity thus acts as a protective factor of the substance. Given that there are no religious restrictions against dokha nor nicotine, the moderation analyses in our sample did not generate similar findings.

The study described in this chapter is one of the first studies of this kind conducted with a sample of participants in the UAE. Coupled with the results of chapter 3 with the Lebanese sample, we now have an overview of the scope of the problem in the Middle East region with two very different countries.

Our findings suggest that 45.5% of the sample in this study reported having used dokha in the past six months, these results are significantly higher than the numbers found by Crookes and Wolff (2014) with a younger sample of high school students. Our results are also significantly higher than those reported by Jayakumary and colleagues (2010) and Al-Houqani and colleagues (2012) described in the introduction of this chapter. This could suggest that dokha use is currently on the rise and suggests the need to examine dokha use further in the UAE to eventually implement intervention and prevention measures among young populations.

Limitations

We were able to get a good mix of both female and male participants in the sample which is very effective in understanding gender differences as many of the previous studies conducted exclusively included male participants. This is due to the fact that many public universities in the UAE separate males and females for cultural and religious reasons. Our findings showed that substance use among males was significantly higher for all three substances examined in this study. The group difference was particularly high for dokha consumption, a substance that is widely popular among males in the UAE.

Our sample size however remains relatively small (N=191). There is a potential sampling bias and further research is needed to support the findings reported in this study.

The study also initially aimed to include the CUDIT-R and examine rates of cannabis use among young populations to be able to compare the rates to the other samples. However, due to ethical and legal restrictions, the CUDIT-R was removed from the battery of tests.

Future directions

From this research, we notice that young adults in the UAE have high consumption rates of alcohol, cigarette smoking and dokha. This study is the first one to examine risk and resilience factors associated with substance use behaviours among young individuals in the UAE. Further replications are necessary to support these findings. Most of the studies currently published in the literature mainly focus on prevalence rates among teenagers and young adults in the UAE. To this date however, it has yet to be shown which particular environmental factors or personality variables can be risk factors leading to increased substance use and whether or not particular variables can protect individuals from engaging in such risky behaviours.

The results of this study support the stance that there males consume significantly more dokha than females in the UAE. Subgroup analyses by gender could potentially raise interesting findings. Future studies examining the trends of dokha use by gender and potentially the effectiveness of prevention strategies on males as opposed to females could generate interesting findings.

Conclusion

This study showed that various facets of impulsivity predicted substance use behaviours among young adults in the Dubai Emirate. Lack of premeditation and positive urgency predicted more dokha and alcohol use, while lack of perseverance and sensation seeking predicted more nicotine use. Fun seeking was also a predictor of all substances.

On the other hand, overall religiosity was a protective factor for both dokha and alcohol use, but not nicotine use. Moderation analyses indicated that religiosity was a significant moderator between the relationship of negative urgency and alcohol use, sensation seeking and alcohol use and positive urgency and alcohol use.

This study extends the literature by highlighting relationships between risk and resilience factors related to substance use behaviours among young adults in the Dubai Emirate. Impulsivity variables were identified as significant risk factors related to increased substance use behaviours while religiosity was shown to be a protective factor leading to less alcohol consumption and dokha use.

CHAPTER 5

STUDY 1: SHISHA USE IN THE UNITED ARAB EMIRATES: PREVALENCE, PERCEPTIONS, PERSONALITY AND RELIGIOSITY

Overview

This chapter begins with a summary of studies that have examined shisha use in the UAE. It then goes on to report a study of 80 young adults residing in the Dubai Emirate. These participants completed a self-report questionnaire including measures of impulsivity-related traits, overall religiosity, shisha use and attitudes and beliefs about the use of shisha. A hierarchical regression analysis indicated that negative urgency predicted significantly more shisha use. On the other hand, lack of perseverance and reward responsiveness predicted significantly less shisha use. As for religiosity, our analyses showed that it was not a significant predictor of shisha use. Nevertheless, moderation analyses indicated that the interaction between religiosity and negative urgency was a significant predictor of shisha use. High religiosity strengthened the positive relationship between negative urgency and shisha consumption.

Introduction

Smoking shisha is one of the most common social activities in the Middle East region, particularly in the UAE. Shisha use has been examined in many countries across the world, but findings still remain scarce. A meta-analysis examining the prevalence rates of tobacco consumption across countries indicated that studies investigating shisha use were conducted in the United States, Europe, the Middle East, the Arab Gulf region and Australia (Akl Gunukula, Aleem, Obeid, Abou Jaoude, Honeine & Irani, 2011). The study reported that shisha smoking is particularly high amongst high school students and university students (Akl et al., 2011). Also, due to the high rates of immigration, the studies included in the meta-analysis suggested that immigrants of Middle Eastern descent have introduced this behaviour to Western societies which eventually increased the use of shisha worldwide (Alk et al., 2011).

As mentioned in the national study conducted with UAE nationals residing in the Abu Dhabi Emirate described in chapter four, smoking prevalence is significantly higher among Emirati males compared to females (Al-Houqani & Najat, 2012). The study reported that the mean age of shisha use is 23.5 and that smoking shisha is the third most common form of nicotine consumption after cigarettes and dokha (Al-Houqani & Najat, 2012).

One of the first studies conducted with a sample of teenagers in the Abu Dhabi Emirate found that 17.2% of males and 12.8% of females reported having smoked shisha in the last thirty days (Asfour, Stanley, Weitzman & Sherman, 2015). The study included 439 students who were given a survey including 92 questions about nicotine consumption, eating habits and physical exercise (Asfour et al., 2015). Results suggested that approximately 50% of the students reported never having received any form of education regarding the health consequences associated with shisha use or any other form of tobacco consumption (Asfour et al., 2015).

Similarly, the study conducted with participants from the Ajman Emirate discussed in Chapter 4 reported that shisha use was the second most common form of nicotine consumption after cigarettes (Sreedharan et al., 2015). Interviewers administered questionnaires to 4047 residents in Ajman above the age of 18 years (Sreedharan et al., 2015). The analysis indicated that 10.3% of the sample reported ever having used shisha, while 4.6% consider themselves to be current smokers (Sreedharan et al., 2015). Significant gender differences were also noted, with male participants reporting higher numbers of nicotine consumption as opposed to female participants (Sreedharan et al., 2015).

The studies described above underline the scope of the shisha consumption problem within the Gulf region, particularly in the UAE. To this date, most of the studies conducted focus on prevalence rates among youth, yet compared to studies conducted in other parts of the world, we still do not have an understanding of the factors that could be significantly related to tobacco consumption. Kakodkar and Bansal (2013) examined the extent to which individual characteristics and attitudes and perceptions towards the substance can have an effect on shisha consumption. The study included 280 college students in the area of Pune, India (Kakodkar & Bansal, 2013). The participants were given a paper-based questionnaire including socio-demographic characteristics, personal characteristics of the shisha smoker (reason for smoking shisha and positive and negative feelings about shisha smoking), perceptions about shisha smoking in comparison to cigarette smoking and perceptions about the harmful effects of shisha smoking (Kakodkar & Bansal, 2013). Results indicated that the age of initiation to shisha use was on average 17.3 and that male participants consumed significantly more shisha than females (Kakodkar & Bansal, 2013). Most of the participants were under the impression that shisha smoking is less harmful than cigarette smoking, which is why they tend to consume more shisha (Kakodkar & Bansal, 2013). Findings also suggested that 27.3% of the

participants smoke to get a pleasurable experience while 39.2% smoke for relaxation purposes (Kakodkar & Bansal, 2013).

The current study

As shown in the discussion above, most research studies examining shisha use in the UAE mainly focus on prevalence rates among young populations. To this date, there are no studies we are aware of that have examined the relationship between personality variables and shisha consumption in the UAE. The study presented in this chapter supplements the study presented in Chapter four in this thesis, which discussed risk and resilience factors associated with dokha use among young adults in the UAE. The sample characteristics in this study differ from the studies in previous chapters. This study will include older participants currently working in media and tech agencies around Dubai, as opposed to university students. Both female and male participants were recruited from a media hub located in central Dubai. Participants were all younger than 30 years old.

The aims of this study are: (a) to examine rates of shisha use in the UAE; (b) to understand the motives behind shisha smoking (negative and positive feelings experienced); (c) to examine whether or not individuals are knowledgeable about the risks associated with shisha use; (d) to examine associations between impulsivity-related traits (UPPS) and shisha use in a sample of young adults in the Emirates; (e) to examine associations between religiosity traits and aspects of shisha use; (f) to examine the moderating effect of religiosity on the relationship between personality traits and shisha use. It is hypothesized that individuals will have misconceptions about the dangers of shisha smoking, as opposed to nicotine smoking, as well as the negative effects that shisha can have on one's health. It is also hypothesized that impulsivity-related traits will be positively associated with shisha use in the following sample, while religiosity will be negatively associated with shisha use. For the moderation

analysis, it is predicted that participants who are highly religious would show weaker associations between impulsivity and shisha use.

Method

Participants

Participants (N=80) were young adults residing in the UAE. The sample was 48.8% male, and ranged from 22 to 30 years old with a mean of 26.05 (SD=2.28).. 2.5% of the participants in this sample reported that their highest degree obtained was a high school degree or equivalent, while 67.5% reported having obtained a bachelor's degree and 30% reported having obtained a master's degree. As for ethnicity, data reports showed that 72.5% of the participants were of Arab origin, 25% of the participants were of white-Caucasian origin, 1.3% were multiracial and 1.3% were of other origin. Religious affiliation data indicated that 47.5% of the participants were Muslims, 45% were Christians, 5% were affiliated to other religions and 2.5% were not affiliated to any religion. Lastly, data regarding socioeconomic status indicated that 1.3% of the participants were not currently generating any income, 11.3% generated between 10 000 AED and 30 000 AED per annum, 1.3% generated between 30 000 to 70 000 AED per annum, 85% generated more than 70 000 AED per annum and 1.3% preferred to no specify their annual income.

Measures

Demographics

Demographic information provided in the online questionnaire included gender, age, primary language spoken, level of education, marital status, ethnic origin, religious affiliation and income (per annum).

Shisha use

For the purpose of this study, shisha use was assessed using 10 short questions that were developed by the authors to examine a person's shisha use in the past 6 months, if any (see appendix B). The measure includes questions that were inspired by those present in the AUDIT and CUDIT scales. Participants were asked about their shisha use and were provided with different multiple choice answers pertaining to the questions. As for the AUDIT and CUDIT scales, the set of responses of the shisha use questionnaire are of Likert-type scale. The higher an individual scored, the more shisha they consumed on a regular basis. Questions included: *How many pots of shisha tobacco (shisha heads) do you smoke in a typical session?* and *Did you feel that you needed help/support to stop smoking shisha?* The set of responses contained a score ranging from either 0 to 4 or 0 to 6. The response options differed from question to question. Response options included: *not at all*, *sometimes, most of the time* and *all the time*. The more an individual reported smoking shisha on a regular basis the higher the score on the shisha questionnaire. The total shisha score was calculated by adding up the scores of all 10 responses. Similarly to the scores of the AUDIT and CUDIT, the overall score obtained from the shisha use questionnaire will be analysed as an interval variable and included as such in our regression analyses. We did not use any cut off scores for this scale as we would need validity and reliability studies to do so. Cronbach's alpha in this sample was .71.

Perceptions of shisha smoking in comparison to cigarette smoking

Individuals' perceptions about shisha smoking in comparison to cigarette smoking were assessed via eight questions used in a previous similar study by Kakodkar1 and Bansal (2013). The set of responses contained three possible choices: yes, no or don't know. The more an individual responded correctly to the questions, the higher the score which indicated that the

participant had an accurate perception of both shisha and cigarette smoking. Questions included: *In Shisha smoking you breathe more deeply because of the less irritating nature of moisturized smoke;* and *Shisha smoking is less dangerous than cigarette smoking.*

Shisha use health risks

Knowledge about the health risks of shisha use was assessed using seven statements that were included in a previous similar study by Kakodkar1 and Bansal (2013). Participants were given three choices to agree or disagree with the statements based on their knowledge: *yes*, *no* or *I don't know*. The more an individual responded correctly, the higher the score which indicated that the participant had accurate knowledge regarding the statements about the health risks associated with shisha smoking.. Statements included: *gastrointestinal cancer*, and *cardiovascular disease*.

Personal and negative feelings experienced by smokers

Participants' personal feelings experienced while smoking shisha were assessed. A set of eight statements including four positive feelings and four negative feelings were presented as used in a previous similar study by Kakodkar1 and Bansal (2013). Participants were instructed to select which of the 8 statements applied to them. Statements included: *positive feeling about shisha smoking - sweet smell*, and *negative feeling about shisha smoking - pollution*. The answers of the participants on this scale indicated what participants liked and disliked about shisha smoking.

Nicotine use

Nicotine dependence was assessed using the Fagerström Test for Nicotine Dependence (FTND); a short questionnaire that aims to identify individuals with smoking dependence (Heatherton, Kozlowski, Frecker & Fagerström, 1991). The measure was described in detail in chapter 4. Cronbach's alpha in this sample was .87.

Alcohol use

Alcohol consumption was assessed using the Alcohol Use Identification Test (AUDIT); a short questionnaire that aims to identify individuals with harmful alcohol consumption (WHO, 1989). The measure was described in detail in chapter 2. Cronbach's alpha in this sample was .88.

Reward Responsiveness

Reward responsiveness was measured using the questions included in the Behavioural Inhibition System and Behavioural Activation System Scales (BIS BAS). The scales aim to assess motivational systems that affect individuals' behaviours and was described in more details in Chapter 2 (Gray, 1981). Reward responsiveness is one of the domains included in the behavioural activation system. There are five questions that measure the trait. The set of responses contain 4 options ranging from *very true for me* to *somewhat true for me, somewhat false for me* and *very false for me*. Questions included: *when I'm doing well at something I love to keep at it,* and *when I see an opportunity for something I like I get excited right away.* The alpha reliability in the present sample was .82.

UPPS Scale

Impulsivity facets were measured using the UPPS-P Impulsive Behaviour Scale (Whiteside & Lynam, 2001, Cyders et al., 2007). The measure was described in detail in Chapter 2. Cronbach's alphas in this sample were: lack of premeditation = .91, lack of perseverance = .89, sensation seeking = .95, negative urgency = .95, positive urgency = .97.

Religiosity

Religiousness was assessed using the BMMRS: The BMMRS is a measure of religiousness and spirituality (Fetzer & NIA, 1999). The measure was described in detail in Chapter 2. Cronbach's alpha in this sample was .66 for all of the items of the scale.

Procedure

This study was approved by the Goldsmiths, University of London Psychology Department Ethics Committee. The participants were recruited by advertising the study in one of the Dubai Emirate's regional hubs where media agencies and organizations are based. A high proportion of young adults residing in Dubai work in that area. We were able to advertise our study and have volunteers participate in the two studies that are described in this chapter, The advertisement stated that participants were required to take part of an online questionnaire including questions related to shisha use as well as a behavioural task to be completed on a portable computer. The questionnaire was paper-based and took approximately 10 to 15 minutes on average to be completed. The first page of the questionnaire included the informed consent procedure where participants were informed about the study and given the option to participate or exclude themselves from participating. Once the participants gave their written consent, they were given time to fill out the battery of tests presented to them. After completion of all questions, the debriefing sheet offered participants supplementary information about the study and gave them the opportunity to contact the researchers. Participants were also given relevant website links to visit if their participation in the study led them to be concerned about their substance use. We were able to recruit 80 participants who were all included in the subsequent analysis.

Results

The percentage of participants who reported having ever used shisha in this sample was 85%, while 15% reported never having used the substance. 35.2% of the sample reported having smoked shisha once, 9.9% reported having stopped smoking, 9.9% reported smoking less than monthly, 12.7% reported smoking on a monthly basis, 29.6% reported smoking on a weekly basis and 2.7% reported smoking daily.

42.5% of the sample reported being current nicotine smokers, while 42.5% reported being non-smokers. The FTND total scores indicated that 16.3% of the participants scored more than 5 out of 10, while 1.6% of the sample reached the maximum score indicating a dependence on nicotine.

The analysis will examine the relationship between shisha, nicotine and alcohol use, if any, and religious affiliation. The alcohol use, shisha use and nicotine use variables indicated whether or not an individual has smoked shisha in the past six months, currently smokes nicotine and has had a drink containing alcohol in the past year. We will also investigate the relationship between substance use behaviours, personality differences and religious affiliation.

Shisha use: reasons for smoking, positive and negative feelings, perceptions and health risks

Table 5.1 below describes the personal characteristics of the participants who reported smoking shisha in the following sample. Findings suggest that pleasurable experience (75%) and socializing (75%) are the major reasons for smoking shisha. Other significant reasons were the addition of intimacy to a social experience (42.5%), and habit (40%). 67% of the participants reported feeling relaxed when smoking shisha and 46.3% enjoyed the sweet smell of shisha. On the other hand, 93.8% of the participants believed that smoking shisha is harmful to their health and 38.8% felt strongly about the smoke production resulting from shisha smoking.

The analysis revealed that participants' perceptions about shisha smoking compared to cigarette smoking were not always correct, as observed in table 5.2. Less than half of the participants (35%) were not aware of the fact that shisha smoking requires individuals to breathe more deeply due to the less irritating nature of the smoke. A small number of

participants (26.3%) were aware that shisha smoke contains carbon monoxide which is harmful to health; in fact, most of the participants (64.9) responded that they did not know the answer to that question. Generally, a large proportion of the sample were able to answer correctly the remaining statements. Nevertheless, a large number of participants reported that they did not know the answer to various statements listed.

Moreover, our analysis of the sample's knowledge concerning the health risks associated with shisha consumption revealed that most participants did not know that shisha smoking caused any of the seven health risks listed. Less than half of the participants responded correctly for all seven statements (table 5.3). The most common understanding was that shisha smoking can cause lung cancer, with 47.5% of the participants responding correctly. As for gastrointestinal cancer, 76.2% of the participants did not know it could be associated with shisha smoking. 85% of the participants did not know shisha smoking could be associated with bladder cancer, 68.8% were not aware of the risk of lip cancer, 68.8% were not aware of the risk of infections, 67.5% were not aware of the risk of cardiovascular disease and finally 78.7% were not aware of the risk of alterations in chromosomes.

Table 5.1

Personal characteristics of the shisha smokers in Dubai

Characteristics	n	(%)
Reason for shisha smoking		
a. pleasurable experience	60	75%
b. adds to intimacy in social gathering	34	42.5%
c. friends demand	9	11.3%
d. socializing	60	75%
e. habit	32	40%
f. helps to deal with pressure	6	7.5%
g. time availability and boredom	14	17.50%
h. social status	1	1.30%
i. any other reason	2	2.50%
Positive feeling about shisha smoking		
a. sweet smell	37	46.30%

Perceptions about shisha smoking in comparison to cigarette smoking

	Yes n (%)	No n (%)	Don't know n (%)
Shisha smoking is less dangerous than cigarette smoking.	7 (8.8)	***58 (72.5)**	15 (18.7)
Tobacco toxins are filtered out by the water in the pipe and hence shisha smoking is less dangerous.	3 (3.8)	***43 (53.8)**	34 (42.4)
Shisha smoking is less irritating and therefore less toxic to the respiratory tract.	5 (6.3)	***44 (55)**	31 (38.7)

b. relaxation	54	67.50%
c. gives a kick	24	30%
d. any other	6	7.70%
Negative feeling about shisha smoking		
a. pollution	16	20%
b. smoke production	31	38.80%
c. harmful to health	75	93.8%
d. any other	3	3.8%

Table 5.2

Perceptions about shisha smoking in comparison to cigarette smoking

	Yes n (%)	No n (%)	Don't know n (%)
Shisha smoking is less dangerous than cigarette smoking.	7 (8.8)	***58 (72.5)**	15 (18.7)
Tobacco toxins are filtered out by the water in the pipe and hence shisha smoking is less dangerous.	3 (3.8)	***43 (53.8)**	34 (42.4)
Shisha smoking is less irritating and therefore less toxic to the respiratory tract.	5 (6.3)	***44 (55)**	31 (38.7)
In shisha smoking you breathe more deeply because of the less irritating nature of moisturized smoke.	***28 (35)**	19 (23.8)	33 (41.2)
Shisha smoking releases higher concentration of smoke than cigarette smoking.	***56 (70)**	5 (6.3)	19 (23.7)
Tobacco and other flavouring substances are used in shisha smoking.	***67(83.8)**	0 (0)	13 (16.2)
Shisha has less nicotine than cigarette.	9 (11.3)	***40 (50)**	31 (38.7)
Shisha smoke contains carbon monoxide which is harmful to health.	***21 (26.3)**	7 (8.8)	52 (64.9)

* are the correct answers for every statement

Table 5.3

Perceptions of the smoker about the health risks associated with shisha smoking

Shisha smoking causes:	Yes* n (%)	No n (%)	Don't know n (%)
a. Lung cancer	**38 (47.5)**	2 (2.5)	40 (50)
b. Gastrointestinal cancer	**10 (12.5)**	9 (11.3)	61 (76.2)
c. Bladder cancer	**5 (6.3)**	7 (8.7)	68 (85)
d. Lip cancer	**19 (23.8)**	6 (7.4)	55 (68.8)
e. Infections	**21 (26.2)**	4 (5)	55 (68.8)
f. Cardiovascular disease	**20 (25)**	6 (7.5)	54 (67.5)
g. Alterations in chromosomes	**2 (2.5)**	15 (18.8)	63 (78.7)

*correct answer in bold

Religious affiliation and substance use behaviours

Shisha use

A chi-square analysis was used to examine shisha consumption (if any) in the past six months across religious groups (table 5.4). Results showed that there was no significant association between religious affiliation and whether or not a person has recently smoked shisha.

Table 5.4

Results of Chi-square Test and Descriptive Statistics for Shisha Use by Religious Affiliation

	Religious Affiliation		
Shisha Use	Christian	Muslim	No Affiliation
No	36 (56%)	29 (36%)	10 (37%)
Yes	30 (44%)	52 (64%)	17 (63%)

Note. $\chi^2 = 1.44$, df = 3. Numbers in parentheses indicate column percentages.

*p < .05

An independent samples t-test was used to examine the mean difference of the total shisha use questionnaire score across religious groups. There was a significant difference in shisha smoking between Muslims and Christians ($t_{51.16} = -2.85$, $p < .05$). The average shisha use for Christians was significantly lower than the average shisha use for Muslims (table 5.5).

Table 5.5

Mean Scores of Substance Use as a Function of Participants' Religious Group

	Religious Group					
	Christian		Muslim		No Affiliation	
Substance Use	*M*	*SD*	*M*	*SD*	*M*	*SD*
Shisha Score	8.29	1.76	10.06	2.73	11.50	3.54
AUDIT	5.69	4.33	2.74	5.77	7.00	5.66
FTND	3.11	3.55	2.89	3.68	3.50	4.95

Overall Religiosity Measure

An exploratory factor analysis was conducted to examine the relationship between variables of the religiosity measure. A principal component analysis was conducted on the six subscales of religiosity. The Kaiser-Meyer-Olkin measure verifies the sampling adequacy for the analysis, KMO= .89, and all KMO values for individual items were > .74, which is above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity x^2 (15) = 438.826, $p < .001$, indicated that correlations between all items were sufficiently large. One component had an eigenvalue over Kraiser's criterion of 1 and in combination explained 81.48% of the variance. Table 5.6 shows the significant high correlations between all of the variables. Given these results indicating that the subscales of the religiosity measure cluster together, we will retain one component for subsequent analyses.

Table 5.6

Exploratory Factor Analysis: Correlation Table

	1	2	3	4	5	6
Construct						
1.Daily spiritual experiences	-					
2. Values and beliefs	.82***	-				
3. Private religious practices	.83***	.72***	-			
4. Religious and spiritual coping	.74***	.82***	.70***	-		
5. Overall self-ranking	.85***	.83***	.88***	.78***	-	
6. Organizational religiousness	.77***	.75***	.83***	.65***	.76***	-

Data for full sample are presented in the following table (N = 80); * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5.7
Factor Loadings from Principal Component Factor Analysis: Eigenvalue and Percentage of Variance for Categories of the BMMRS

	Factor loading
Item	Overall Religiosity
Daily spiritual experiences	**.93**
Overall self-ranking	**.94**
Religious and spiritual coping	**.86**
Private religious practices	**.91**
Values and beliefs	**.91**
Organizational religiousness	**.88**
Eigenvalues	4.89
% of variance	81.48

Note: Factor loadings over .40 appear in bold.

Bivariate correlations and descriptive statistics

Descriptive statistics and bivariate correlations are presented in Table 5.8 below. The means and standard deviations calculated included all of the participants (N=80). Correlations between personality traits, overall religiosity and substance use were analysed for the whole sample. The analysis revealed associations between personality variables and problematic alcohol use. Individuals' total scores on the AUDIT were significantly positively related to all of the subscales of the UPPS questionnaire (negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency). The analysis also revealed a negative correlation between individuals' total scores on the AUDIT and overall religiosity. As for nicotine use, participants' total scored on the FTND was also significantly positively associated with all variables of the UPPS questionnaire measuring impulsivity. Reward responsiveness, gender and religiosity were both negatively associated with individuals' total score on the

FTND. None of the personality variables were associated with the total shisha use score. All of these associations are reported in table 5.8 below.

Table 5.8

Bivariate correlations and descriptive statistics

	1	2	3	4	5	6	7	8	9	10
1. Gender	-									
2. Nicotine Total	-.23*	-								
3. Shisha Use Total	-.33**	.39***	-							
4. Negative Urgency	-0.01	.44***	0.1	-						
5. Lack of Premeditation	-0.14	.42***	0.13	.57***	-					
6. Lack of Perseverance	-0.21	.39***	0.1	.51***	.75***	-				
7. Sensation Seeking	-.33**	.37***	0.23	.52***	.55***	.33**	-			
8. Positive Urgency	-0.16	.39***	-0.15	.79***	.53***	.45***	.55***	-		
9. Reward Responsiveness	0.06	-.39***	-0.08	-.23*	-.54***	-.55***	-0.06	-0.14	-	
10. Religiosity Total	.27*	-.29*	0.1	-.27*	-.52***	-.44***	-.68***	-.42***	0.23	-
Mean		3.08	9.19	28.96	21.82	18.61	36.42	29.13	17.92	50.72
SD		3.65	2.49	7.86	5.72	4.45	8.3	8.73	2.22	26.21

Data for full sample are presented in the following table (N=80): * $p<.05$, ** $p<.01$, *** $p<.001$.

Gender coded as female = 2, male = 1.

Personality variables and shisha use

In this analysis, we conducted two different hierarchical regression analyse to examine the relationship between personality variables and shisha use. Given that negative urgency and positive urgency were highly correlated, we separated the variables and conducted two separate analyses alongside the other subscales of the UPPS and the reward responsiveness variables of the BAS.

The first hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age, gender and nicotine dependence (FTND total) as control variables and UPPS-P (excluding positive urgency) and reward responsiveness personality traits as independent variables. Age, gender and nicotine dependence were entered as predictors at step 1. Negative urgency, lack of premeditation, lack of perseverance, sensation seeking and reward responsiveness were entered at step 2. As shown in table 5.9, lack of perseverance ($\beta = .46$, $p < .05$) was a predictor of shisha use. The standardized beta coefficient was positive which indicated that the more an individual scores high on the lack of perseverance facet, the more the individual is likely to smoke shisha (table 5.9). This effect should be treated cautiously as the findings differed where lack of perseverance was combined with the second set of variables as shown in table 5.10.

Table 5.9

Hierarchical Regression Analysis Summary for Personality Variables Predicting Shisha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.13	
Gender of Participants	-1.24	.61	-.25*		
Age of Participants	.02	.14	.02		
Nicotine Dependence	.15	.08	.22		
Step 2				.21*	.08
Gender of Participants	-1.67	.66	-.34*		
Age of Participants	.06	.14	.05		
Nicotine dependence	.15	.10	.23		
Negative urgency	.05	.05	.16		
Lack of premeditation	.09	.10	.21		
Lack of perseverance	-.26	.12	-.46*		
Sensation seeking	-.02	.05	-.08		
Reward Responsiveness	-.05	.18	-.04		

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

The second hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age, gender and nicotine dependence (FTND total) as control variables and UPPS-P (excluding negative urgency) and reward responsiveness personality traits as independent variables. Age, gender and nicotine dependence were entered as predictors at step 1. Positive urgency, lack of premeditation, lack of perseverance, sensation seeking and reward responsiveness were entered at step 2. As shown in table 5.9, none of the personality variables were associated with shisha use.

Table 5.10
Hierarchical Regression Analysis Summary for Personality Variables Predicting Shisha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.11	
Gender of Participants	-1.14	.56	-.25*		
Age of Participants	.06	.13	.06		
Nicotine Dependence	.11	.08	.18		
Step 2				.26*	.15
Gender of Participants	-1.19	.58	-.26*		
Age of Participants	.10	.13	.09		
Nicotine dependence	.17	.09	.28		
Lack of premeditation	.11	.09	.30		
Lack of perseverance	-.18	.10	-.35		
Sensation seeking	.04	.05	.15		
Positive urgency	.10	.16	.09		
Reward responsiveness	-.09	.04	-.34		

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

Religiosity and shisha use

A hierarchical regression analysis was conducted using the shisha use questionnaire as the criterion variable, with separate steps in the model for age and gender as control variables and BMMRS religiosity variable. Age and gender were entered as predictors at step 1. Religiosity was entered at step 2. The analysis revealed that religiosity was not a significant predictor of shisha use. Gender was a predictor of shisha use (β = -.36, p < .01); (the standardized beta coefficient is negative which indicated that males were more likely to smoke shisha that female participants (table 5.11).

Table 5.11
Hierarchical Regression Analysis Summary for Religiosity Predicting Shisha Use (N=80)

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.13*	
Gender of Participants	-1.98	.69	-.36**		
Age of Participants	.03	.15	.02		
Step 2				.16*	0.03
Gender of Participants	-2.16	.70	-.39**		
Age of Participants	.07	.16	.06		
Religiosity	.02	.01	.18		

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

Religiosity as a moderator of the relationship between impulsivity and shisha use

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, negative urgency (UPPS facet), religiosity (BMMRS total) and the interaction between negative urgency and religiosity. Age and gender were entered as predictors at step 1. Negative urgency and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between religiosity and negative urgency was a predictor of shisha consumption ($\beta = .28$, $p < .01$) (table 5.12).

Table 5.12
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Negative Urgency and Shisha Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.12*	
Gender of Participants	-1.95	.71	-.35**		
Age of Participants	.05	.16	.04		
Step 2				.16	.04
Gender of Participants	-2.15	.72	-.38**		
Age of Participants	.07	.16	.06		
Religiosity	.02	.02	.20		
Negative Urgency	.04	.05	.09		
Step 3				.22*	.06*
Gender of Participants	-2.25	.70	-.40**		
Age of Participants	.06	.16	.05		
Religiosity	.02	.02	.18		
Negative Urgency	.06	.05	.16		
Religiosity x Negative Urgency	.01	.01	.27*		

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

The interaction term of negative urgency and religiosity was significant. Simple slopes analysis indicated that at -1 standard deviation of religiosity scores the slope of the relationship between negative urgency and shisha use was b = -.05, SE b = .06, t = -.82. When religiosity was moderate, the slope of the relationship between negative urgency and shisha was b = .05, SE b = .05, t = 1.02 and at +1 standard deviation of religiosity scores the slope was b = .15, SE b = .07, t = 2.07, $p < .05$. The results suggest that the strongest association between negative urgency and shisha use occurs when religiosity is high, as demonstrated by the steep positive association in figure 5.1. On

the other hand, when religiosity is low, the relationship between negative urgency and shisha use is no longer significant. This weak association is shown by the flat slope in figure 5.1.

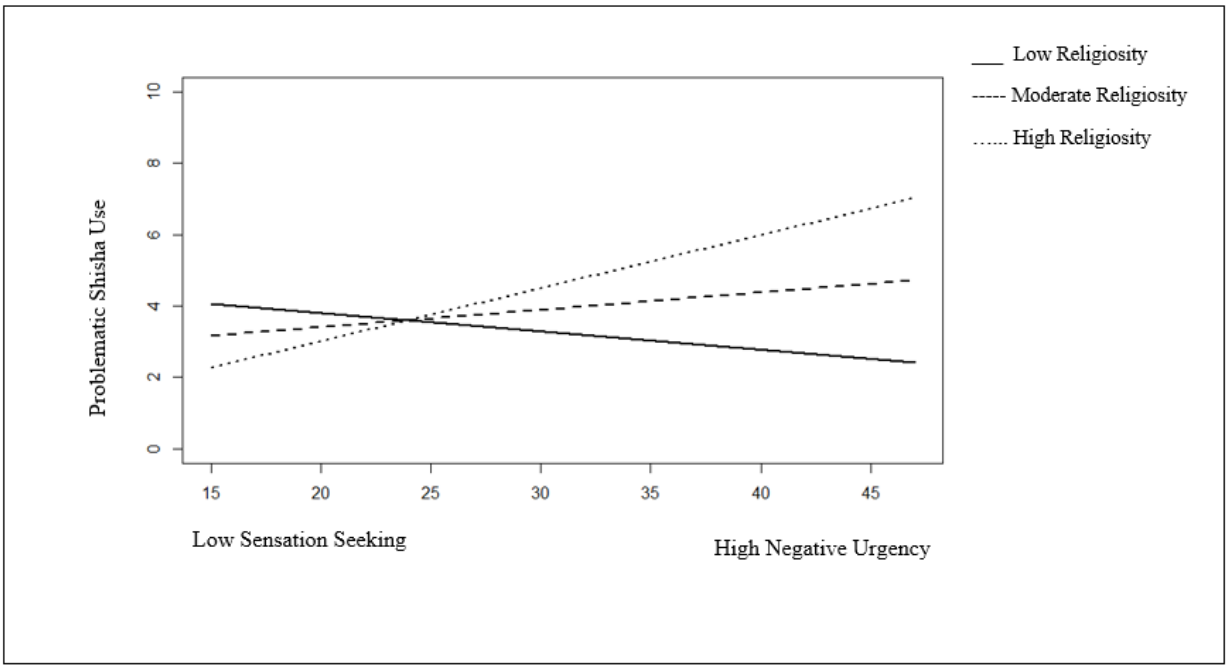

Figure 5.1. Moderation effect of religiosity on the relationship between negative urgency and shisha use.

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, lack of premeditation (UPPS facet), religiosity (BMMRS total) and the interaction between lack of premeditation and religiosity. Age and gender were entered as predictors at step 1. Lack of premeditation and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between

religiosity and lack of premeditation was not a predictor of shisha consumption (β = .05, p = n.s) (table 5.13).

Table 5.13
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Premeditation and Shisha Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.13*	
Gender of Participants	-1.99	.70	-.36**		
Age of Participants	.03	.16	.03		
Step 2				.17*	
Gender of Participants	-2.1	.70	-.38**		.05
Age of Participants	.12	.17	.09		
Lack of Premeditation	.08	.07	.16		
Religiosity	.03	.02	.27		
Step 3				.18	.01
Gender of Participants	-2.1	.71	-.37**		
Age of Participants	.12	.17	.09		
Lack of Premeditation	.08	.07	.16		
Religiosity	.03	.02	.26		
Religiosity x Lack of Premeditation	.01	.01	.05		

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

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, lack of perseverance (UPPS facet), religiosity (BMMRS total) and the interaction between lack of perseverance and religiosity. Age and gender were entered as predictors at step 1. Lack of perseverance and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between

religiosity and lack of perseverance was not a predictor of shisha consumption (β = .16, p = n.s) (table 5.14).

Table 5.14
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Lack of Perseverance and Shisha Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.13*	
Gender of Participants	-1.98	.69	-.36**		
Age of Participants	.03	.15	.02		
Step 2				.16*	0.03
Gender of Participants	-2.13	.71	-.38**		
Age of Participants	.07	.16	.06		
Lack of Perseverance	.02	.02	.20		
Religiosity	.02	.09	.03		
Step 3				.22*	.06*
Gender of Participants	-2.03	.69	-.36**		
Age of Participants	.10	.15	.08		
Lack of Perseverance	.02	.02	.18		
Religiosity	.04	.09	.07		
Religiosity x Lack of Perseverance	.01	.01	.16		

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

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, sensation seeking (UPPS facet), religiosity (BMMRS total) and the interaction between sensation seeking and religiosity. Age and gender were entered as predictors at step 1. Sensation seeking and religiosity were entered at step 2 and the interaction between both variables

was entered at step 3. The analysis revealed that the interaction between religiosity and sensation seeking was not a predictor of shisha consumption (β = -.05, p = n.s) (table 5.15).

Table 5.15
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Sensation Seeking and Shisha Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.12*	
Gender of Participants	-1.92	.70	-.34**		
Age of Participants	.01	.16	.01		
Step 2				.24**	.12*
Gender of Participants	-1.69	.68	-.30*		
Age of Participants	.07	0.15	.05		
Religiosity	.05	.02	.44**		
Sensation Seeking	.14	.06	.41*		
Step 3				.24**	.00
Gender of Participants	-1.70	.69	-.31*		
Age of Participants	.07	.16	.06		
Religiosity	.05	.02	.46**		
Sensation Seeking	.15	.06	.42*		
Religiosity x Sensation Seeking	-.01	.01	-.05		

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

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, positive urgency (UPPS facet), religiosity (BMMRS total) and the interaction between positive urgency and religiosity. Age and gender were entered as predictors at step 1. Positive urgency and religiosity were entered at step 2 and the interaction between both variables

was entered at step 3. The analysis revealed that the interaction between religiosity and positive urgency was not a predictor of shisha consumption (β =.13, p = n.s) (table 5.16).

Table 5.16
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Positive Urgency and Shisha Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.12*	
Gender of Participants	-1.74	.65	-.34**		
Age of Participants	.08	.15	.07		
Step 2				.16	.04
Gender of Participants	-1.94	.66	-.37**		
Age of Participants	.09	.15	.08		
Religiosity	.01	.02	.04		
Poitive Urgency	-.05	.04	-.18		
Step 3				.17	.01
Gender of Participants	-1.91	.66	-.37**		
Age of Participants	.08	.15	.07		
Religiosity	.01	.02	.05		
Poitive Urgency	-.03	.05	-.11		
Religiosity x Positive Urgency	.01	.01	.13		

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

A moderated hierarchical regression analysis was conducted using the shisha use questionnaire total as the criterion variable, with separate steps in the model for age and gender as control variables, reward responsiveness (BIS/BAS scale), religiosity (BMMRS total) and the interaction between reward responsiveness and religiosity. Age and gender were entered as

predictors at step 1. Reward responsiveness and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between religiosity and reward responsiveness was not a predictor of shisha consumption (β =-.17, p = n.s) (table 5.17).

Table 5.17
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Reward Responsiveness and Shisha Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.13*	
Gender of Participants	-1.98	0.69	-.36**		
Age of Participants	0.03	0.15	.02		
Step 2					
Gender of Participants	-2.14	0.69	-.38**	.16*	.04
Age of Participants	0.09	0.16	.07		
Religiosity	0.02	0.02	.20		
Reward Responsiveness	-0.10	0.16	-.08		
Step 3				.19*	.03
Gender of Participants	-1.94	0.71	-.35**		
Age of Participants	0.04	0.16	.03		
Religiosity	0.02	0.02	.17		
Reward Responsiveness	-0.12	0.16	-.10		
Religiosity x Reward Responsiveness	-0.01	0.01	-.17		

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

Discussion

Our analysis revealed that 42.5% of the participants considered themselves to be current shisha smokers. The prevalence rate was higher than the results noted in previous studies conducted with the Emirati population (Asfour et al., 2015; Sreedharan et al., 2015). Smoking shisha to get a pleasurable experience was shown to be one of the leading reasons behind shisha consumption, as was found in Kakodkar and Bansal's study (2013). Socializing was also one of the biggest motives behind shisha consumption in our Emirati sample. The study also revealed that participants had little to no knowledge of the harmful health effects associated with shisha use and many believed shisha is a healthier alternative to cigarette smoking. The findings are in line with previous studies suggesting that young adults have received little education related to shisha use and misuse (Kakodkar & Bansal, 2013; Asfour et al., 2015).

Religiosity was not shown to be associated with shisha use, as opposed to the associations found for cannabis, alcohol and dokha in the previous chapters described in this thesis. Nevertheless, our analysis revealed a significant group difference between Muslim and Christian participants. Muslims were significantly more likely to consume shisha as opposed to Christian participants. This is a new finding which can be explained by the fact that shisha consumption originally started as a cultural habit by communities from the Gulf. Shisha smoking seems to be a popular way of consuming nicotine among Arabs and Muslims in particular. It can also be explained by the fact that alcohol and illegal substances are strictly frowned upon in the Muslim religion.

Moreover, our analysis also revealed that lack of perseverance was related to shisha use. The association was positive which indicated that the more an individual scores highly on these

lack of perseverance, the more they were prone to consume shisha. Nevertheless, as noted in the results section, this finding should be treated cautiously as the combination of personality variables revealed different results and the effect of lack of perseverance was no longer significant when it was not paired with negative urgency. Due to the lack of research conducted in the field of personality and the use of the shisha, we are not able to compare these findings to previous research.

Acting impulsively when feeling good (positive urgency) and the inability to remain focused on a specific task (lack of perseverance) do not seem to increase the likelihood of engaging in shisha use. This is not in line with the findings from chapter 4 which indicated that positive urgency is a predictor of increased alcohol and dokha use, while lack of perseverance was a predictor of cigarette consumption. This could be due to the fact that shisha use is an activity that requires the individual to remain focused on the task as new charcoal needs to be added throughout the smoking process.

On the other hand, our findings also revealed that negative urgency was also significantly related to shisha use. The latter relationship was positive which indicates that individuals who scored highly on this trait were more likely to consume shisha. These results thus show the tendency to experience strong impulses when feeling down (negative urgency) leads to increased shisha use. This is in line with our findings above that indicate that one of the main motives behind shisha use is to get a pleasurable experience.

The moderation analysis result is a novel finding in the field and can be compared to our previous findings examining other substances. Our results suggest that overall religiosity is a significant moderator of the relationship between negative urgency and shisha use. The analysis

suggested that individuals scoring highly on religiosity scale and on the negative urgency scale were significantly more likely to consume shisha. On the other hand, when religiosity is low, the effect of negative urgency on shisha consumption was not significant any more. The combination of high overall religiosity and negative urgency seemed to predict the highest rates of shisha consumption. The following results do not build on the findings established by Galbraith and Conner previously discussed (Chapter 3) and are not in line with our findings in previous chapters, which suggested that high scores on overall religiosity protected individuals from engaging in substance use behaviours. This could also be related to the fact that shisha, unlike other substances that are frowned upon by religious groups, is a social activity that is favoured by the Arab community.

The first study described in this chapter replicated some of the findings previously conducted regarding beliefs, knowledge and reasons for smoking shisha. Yet this is the first study of its kind conducted in an Emirati sample. Additionally, this is the first study that included personality constructs and overall religiosity as a moderator of the relationship between impulsivity and substance use. This study complements our previous chapters including similar findings with a different way of consuming nicotine than regular cigarette smoking. We now have an overview of shisha use in the UAE and have noted that the population needs to be more educated about the health risks associated with continuous use of the substance.

CHAPTER 6

STUDY 2: PERSONALITY DIFFERENCES MEASURED BY THE BALLOON ANALOGUE RISK TASK (BART) AND SUBSTANCE USE IN THE UAE

Overview

This chapter begins with a summary of studies that have examined the association between risk taking as measured by the BART and substance use behaviours. It then goes on to report a study of 80 young adults residing in the Dubai Emirate. These participants completed a self-report questionnaire including measures of impulsivity-related traits, overall religiosity, substance use behaviours and performed the behavioural task on a computer. Religiosity was a protective factor against alcohol use, but not against nicotine use. Hierarchical regression analyses indicated that the adjusted average pumps and total explosions did not predict alcohol use. Moderation analyses did not generate significant findings.

Introduction

The studies described in the previous chapters included two different self-report questionnaires measuring impulsive behaviours as risk factors associated with increased substance use. Self-report measures and behavioural tasks differ greatly. While self-report measures examine an individual's attitudes about their personality or their intent to behave in a certain way (Calvi, 2011); behavioural tasks examine the specific behaviour in a controlled setting (Calvi, 2011). Findings suggest that behavioral tasks and self-report tasks mention different aspects of risk-taking and impulsivity. In a meta-analysis reviewing 27 published studies that have examined the similarities and differences between self-report measures of impulsivity alongside behavioral tasks, results revealed that there was little overlap between these measures but that overall, the constructs measure different variables (Cyders & Coskunpinar, 2011). As mentioned in chapter 1, risk-taking behaviours overlap greatly with impulsivity (Lejuez et al., 2002). Recent findings suggest that an individual's willingness to take risks predicts substance use behaviours (Lejuez et al., 2003; Aklin et al., 2005; Lejuez et al., 2007). The BART measures individuals' impulsive risk taking behaviours. It is a computerized test modelling real-world risk taking behaviours by balancing the potential for reward and risk of loss (Lejuez et al. 2002). Individuals are directed to a screen where they are given the opportunity to pump a balloon and receive a high score while risking that the balloon could explode at any given moment (Lejuez et al. 2002). Each pump thus represents a greater risk all while giving the possibility of getting a higher reward (Lejuez et al. 2002). Lejuez and colleagues (2002) examined the extent to which the BART can be associated with substance use behaviours. Eighty six participants who responded to recruitment ads were included in the study (Lejuez et al., 2002). They were given self-report questionnaires and a

computer to perform the behavioural tasks (Lejuez et al., 2002). One of the main variables of the BART is the total score of pumps that the individual used to blow up the balloon which indicates the likelihood of taking a risk (Lejuez et al., 2002). The results of this study showed that the higher the adjusted average pumps the more that individual consumed alcohol, as indicated by the overall score of the AUDIT (Lejuez et al., 2002). Consistent with these findings, a more recent study underlined the usefulness of the BART as a tool to assess the tendency to take risks across risk-taking behaviours, particularly substance use (Lejuez et al., 2003). The study included 60 undergraduate students aged 18 to 30 years old from the University of Maryland (Lejuez et al., 2003). The students were given a battery of self-report questionnaires and the BART on a computer (Lejuez et al., 2003). Findings suggested that the BART was associated with smoking cigarettes as shown by the significantly higher average number of pumps for current smokers (Lejuez et al., 2003).

MacPherson, Magidson, Reynolds, Kahler and Lejuez (2010) examined the extent to which the BART could predict alcohol consumption amongst early adolescents in Washington DC. The study included 257 youths who completed a self-report questionnaire and the BART (MacPherson et al., 2010). Results showed that the propensity to take risks on the BART predicted higher levels of alcohol consumption among these young adolescents (MacPherson et al., 2010). Similar findings were reported in a study including 287 secondary school students in the region of North West England (Fernie, Peeters, Gullo, Christiansen, Cole, Sumnall & Field, 2013). The study found that risk-taking behaviours as measured by the BART were associated with alcohol use (Fernie et al., 2013). More importantly, the findings suggest that whether or not the monetary

rewards were real, participants' intention of taking risks on the BART predicted increased alcohol consumption (Fernie et al., 2013).

The studies described above underline the reliability of the BART as a measure of risk-takin behaviours and its association with substance use behaviours. To this date, most of the studies conducted included Western samples, mainly in the United States and United Kingdom. We have conducted a similar study within a Middle Eastern community to understand whether or not this individual difference trait predicts substance use behaviours. As mentioned in the first study of this chapter, most of the data regarding substance use in the UAE mainly centres on prevalence rates in young adult samples of participants. There is a dearth of research examining risk factors that could be associated with the use of alcohol or nicotine among young populations.

The current study

The aims of this study are: (a) to examine rates of alcohol and nicotine use in a sample of young adults in the UAE; (b) to examine associations between risk-taking behaviours (BART) and alcohol and nicotine use; (c) to examine whether or not overall religiosity acts as a protective factor against substance use and abuse; (d) to examine the moderating effect of religiosity on the relationship between risk-taking behaviours and alcohol and nicotine use. It is hypothesized that individuals who score highly on risk-taking behaviours will consume significantly more alcohol and nicotine. It is also hypothesized that religiosity will be negatively associated with alcohol use. For the moderation analysis, it is predicted that participants who are highly religious would show weaker associations between risk-taking behaviours and substance use.

Method

Participants

The participants for the following sample were the same as those described in the first study of the chapter. Eighty emerging adults residing in the UAE were included in the analysis. For additional information about the demographics of the participants, please refer to the first part of the chapter.

Measures

Participants were given the battery of tests described in the first part of this chapter. In addition to the self-report questionnaires, individuals were asked to perform a computer-based behavioural task.

Risk-Taking Behaviour

The BART (Lejuez et al. 2002) is a computerized behavioral task where participants were given the opportunity to win or lose potential earnings by clicking on a virtual balloon. Persistent clicks could generate greater gains but at the same time increase the risk of loss on each trial. The task consisted of 30 different balloon trials. Participants were presented with red balloons on a computer screen and were given the opportunity to click on the balloon to pump it and earn potential monetary rewards. On each trial, participants were given the choice to collect the money they earned on the following trial or continuing pumping to earn more money, while risking losing the money from that particular trial. Participants were also able to see to total earnings they have reached from previous trials. The balloons were set to explode on a variable ratio, with an average explosion point of 64 pumps (Lejuez et al. 2003). Based on previous research (Lejuez et al. 2002), our analysis will use the *adjusted average pumps* (the average number of pumps on balloons that did not explode) as the main outcome variable. The participants in the following study were given an incentive to participate and perform well. Every 10 dollars they earned on the BART task was

rewarded with an entry to a draw to win Amazon vouchers worth £200. At the end of the study, 2 participants were randomly selected and offered Amazon vouchers worth £200 each.

Procedure

As mentioned in the first study described in this chapter, the study was approved by the Ethics Committee of the Psychology department at Goldsmiths, University of London. All of the participants gave their written consent to participate in the study and were presented with the BART behavioural task to perform on a portable computer once they had completed the paper-based questionnaires. They were then offered a debriefing sheet including supplementary information about the study and information to contact the researchers should they need to. Participants were also given relevant website links to visit if their participation in the study led them to be concerned about their substance use.

Results

The percentage of participants who reported having consumed a drink containing alcohol in the past year in the following sample was 68.8%, while the remaining 31.2% reported not having consumed alcohol in the past year. 25% of the participants in the following sample who reported having consumed alcohol in the past year had a score equal to or greater than 8 on the AUDIT. Moreover, our analysis showed that the adjusted average pumps on the BART or number of pumps on balloons that did not explode ranged from a minimum of 9 to a maximum of 62 (M= 28.43, SD= 12.06). Total explosions varied from a minimum of 2 balloons per 30 trials to a maximum of 18 balloons in the sample (M= 7.51, SD= 3.72). Individual entries into the draw to win Amazon

vouchers varied from a minimum of 1 entry per person to a maximum of 5 entries per person depending on performance on the BART (M=2.55, SD=1.00).

The analysis of the following part will examine the relationship between alcohol use, risk-taking behaviours and religious affiliation and overall religiosity. We will also investigate the interactions between risk-taking behaviour and religiosity and the effects on alcohol use and misuse. As mentioned in the analysis of the first part of the chapter, we will use the overall religiosity score for the following discussion.

Descriptive statistics and bivariate correlations are presented in Table 6.1 below. The means and standard deviations calculated included all of the participants (N=80). Participants in the sample had a mean score of 4.60 (SD= 5.48) on the alcohol use questionnaire which is moderate on the scale. As for risk taking behaviours, participants had a mean score of 28.43 (SD= 12.06) on the adjusted average pumps and a mean score of 7.51 (SD= 3.72) on total explosions of balloons. Adjusted average pumps scores between 26 and 35 are typical results on the BART (Lejuez et al. 2002).

Correlations between risk-taking behaviours, alcohol use and religiosity were analysed for the whole sample. Firstly, gender was shown to be negatively associated with the adjusted average pumps on the BART task (r = -.35, p < .001). Moreover, alcohol use was significantly positively related with the adjusted average pumps (r = .41, p < .001) and total explosions (r = .49, p < .001) results of the BART behavioural task. The analysis also revealed a negative correlation between alcohol use and overall religiosity (r = -.62, p < .001). Individuals' total scores on the AUDIT also revealed similar significant findings. The AUDIT total was significantly positively related to the adjusted average pumps (r = .37, p < .001) and total explosions results (r = .31, p < .01) of the

BART. There was also a negative correlation between the AUDIT scores and the religiosity total (r = -.40, p < .001). Lastly, our analysis also showed that adjusted average pumps (r = -.44, p < .001) and total explosions (r = -.44, p < .001) were both significantly negatively associated with the religiosity total. All of these associations are reported in table 6.1 below.

Table 6.1

Bivariate correlations and descriptive statistics

	1	2	3	4	5	6
1. Gender	-					
2. Alcohol Use	-.12	-				
3. Audit Total Score	-.18	.52***	-			
4. Adjusted Average Pumps	-.35***	.41***	.37***	-		
5. Total Explosions	-.29**	.49***	.31**	.81***	-	
6. Religiosity Total	.27*	-.62***	-.40***	-.44***	-.44***	-
Mean			4.6	28.43	7.51	50.72
SD			5.48	12.06	3.72	26.21

Data for full sample are presented in the following table (N=80): * p<.05, ** p<.01, *** p <.001. Gender coded as female = 2, male = 1. Alcohol use coded as yes = 1, no= 0.

Religious affiliation and substance use behaviours

Alcohol use

A chi-square analysis was used to examine alcohol consumption (if any) in the past year across religious groups (table 6.2). Results showed that there was a significant association between religious affiliation and whether or not a person drinks alcohol $x^2(3)=28.95$, $p<.001$. As shown in table 6.2, Christians are significantly more likely to have consumed alcohol in the past year than Muslims.

Table 6.2

Results of Chi-square Test and Descriptive Statistics for Alcohol Use by Religious Affiliation

	Religious Affiliation	
Alcohol Use	Christian	Muslim
No	2 (5.6%)	23 (60.5%)
Yes	34 (94.4%)	15 (39.5%)

Note. $c^2 = 28.95$*, df = 3. Numbers in parentheses indicate column percentages.
*p < .05

An independent samples t-test was use to examine the mean difference of the total AUDIT score across religious groups. There was a significant difference in alcohol consumption between Muslims and Christians ($t_{72} = 2.49$, $p < .05$). The average alcohol consumption for Christians was significantly higher than the average alcohol consumption use for Muslims (table 6.3).

Table 6.3
Mean Scores of Substance Use as a Function of Participants' Religious Group

	Religious Group			
	Christian		Muslim	
Substance Use	*M*	*SD*	*M*	*SD*
AUDIT	5.69	4.33	2.74	5.77
FTND	3.11	3.55	2.89	3.68

Nicotine use

A chi-square analysis was used to examine current nicotine use (if any) across religious groups (table 6.4). Results showed that the association between cigarette smoking and religious affiliation was non-significant.

Table 6.4

Results of Chi-square Test and Descriptive Statistics for Nicotine Use by Religious Affiliation

	Religious Affiliation	
Nicotine Use	Christian	Muslim
No	15 (41.7%)	16 (42.1%)
Yes	21 (58.3%)	22 (57.9%)

Note. $\chi^2 = .15$, df = 3. Numbers in parentheses indicate column percentages.
*p < .05

An independent samples t-test was use to examine the mean difference of the total nicotine dependence score across religious groups. The analysis indicated that nicotine use was not significantly different among Muslims and Christians ($t_{71.97} = .26$, n.s.) (table 6.3).

Personality variables and alcohol use

Adjusted average pumps

A hierarchical regression analysis was conducted using the AUDIT as the criterion variable, with separate steps in the model for age and gender as control variables, and the adjusted average pumps variable. Age and gender were entered as predictors at step 1. Adjusted average pumps was entered at step 2. As shown in table 6.5 the analysis indicated that gender was not a predictor of alcohol use. Age however was shown to be associated with alcohol use (β = -.33, p < .05). The standard beta coefficient was negative which indicated that younger participants consumed significantly more alcohol. The results also indicated that the adjusted average pumps of the BART task was not a predictor of alcohol consumption (table 6.5).

Table 6.5
Hierarchical Regression Analysis Summary for Adjusted Average Pumps (BART) Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.122*	
Gender of Participants	-1.95	1.38	-0.18		
Age of Participants	-.77	.32	-.30*		
Step 2				.170*	.048
Gender of Participants	-1.09	1.44	-.10		
Age of Participants	-.85	.32	-.33*		
Adjusted average pumps	.13	.08	.24		

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

Total explosions

A hierarchical regression analysis was conducted using the AUDIT as the criterion variable, with separate steps in the model for age and gender as control variables and the total explosions count variable. Age and gender were entered as predictors at step 1. Total explosions was entered at step 2. As shown in table 6.6, the analysis indicated that gender was not a predictor of alcohol use. On the other hand, age was a predictor of alcohol use (β = -.30, p < .05). The standard beta coefficient was negative which indicated that younger participants consumed significantly more alcohol. The results also indicated that the total explosions average of the BART task was not a predictor of alcohol use (table 6.6).

Table 6.6
Hierarchical Regression Analysis Summary for Total Explosions (BART) Predicting Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.12*	
Gender of Participants	-1.94	1.38	-.18		
Age of Participants	-.77	.32	-.30*		
Step 2				.13	.01
Gender of Participants	-1.78	1.45	-.16		
Age of Participants	-.79	.33	-.31*		
Total explosions	.09	.21	.06		

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

Religiosity as a moderator of the relationship between impulsivity and substance use

Moderated regression analyses were conducted for alcohol use. The analyses included separate steps for age and gender as control variables, our two main outcome variables of the BART task, the total religiosity variable and interactions between each personality trait and religiosity.

A moderated hierarchical regression analysis was conducted using the use disorder identification test total as the criterion variable, with separate steps in the model for age and gender as control variables, adjusted average pumps (BART), religiosity (BMMRS total) and the interaction between adjusted average pumps and religiosity. Age and gender were entered as predictors at step 1. Adjusted average pumps and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between religiosity and adjusted average pumps was not a predictor of alcohol consumption. Nevertheless, as observed in table 6.7 below, religiosity was a predictor of alcohol consumption (β = -.35, p < .01). The standardized beta coefficient was negative which indicated that the more an individual had a high religiosity total, the less they were likely to consume alcohol (table 6.7).

Table 6.7
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Adjusted Average Pumps and Alcohol Use

Step and predictor variable	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.08	
Gender of Participants	-2.04	1.31	-.18		
Age of Participants	-.51	.29	-.20		
Step 2				.26***	.18***
Gender of Participants	-.05	1.33	-.004		
Age of Participants	-.67	.27	-.27*		

Adjusted Average Pumps	.09	.06	.18		
Religiosity	-.08	.03	-.35**		
Step 3				.26***	.00
Gender of Participants	-.05	1.34	-.01		
Age of Participants	-.66	.27	-.26*		
Adjusted Average Pumps	.09	.06	.19		
Religiosity	-.07	.03	-.35**		
Interaction (Adjusted Average Pumps and Religiosity)	.00	.00	.03		

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

A second moderated hierarchical regression analysis was conducted using the use disorder identification test total as the criterion variable, with separate steps in the model for age and gender as control variables, total explosions (BART), religiosity (BMMRS total) and the interaction between total explosions and religiosity. Age and gender were entered as predictors at step 1. Total explosions and religiosity were entered at step 2 and the interaction between both variables was entered at step 3. The analysis revealed that the interaction between religiosity and total explosions was not a predictor of alcohol consumption (table 6.8).

Table 6.8
Hierarchical Regression Analysis Summary for Religiosity as a Moderator of the Relationship Between Total Explosions and Alcohol Use

Step and predictor variable	*B*	*SE B*	*β*	R^2	ΔR^2
Step 1				.08	
Gender of Participants	-2.04	1.31	-.18		
Age of Participants	-.51	.29	-.20		
Step 2				.24***	.16**
Gender of Participants	-.54	1.32	-.05		
Age of Participants	-.66	.27	-.26*		
Total Explosions	.10	.20	.07		

Religiosity	-.08	.03	-.39**		
Step 3				.24**	.00
Gender of Participants	-.53	1.33	-.05		
Age of Participants	-.66	.28	-.27*		
Total Explosions	.10	.20	.07		
Religiosity	-.08	.03	-.39**		
Interaction (Total Explosions and Religiosity)	.00	.01	-.01		

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

Discussion

Our analysis revealed that 68.8% of the sample reported having consumed a drink containing alcohol in the past year. Findings also suggested that 35% of the participants who consumed alcohol drank monthly or less, while 23.8% drank two to four times a month. These new findings suggested high prevalence rates of alcohol consumption among UAE residents. We can compare these findings to the study reported in Chapter 4 indicating that 52.9% of UAE young adults have had a drink in the past year, while 11.1% of these participants consumed alcohol in harmful ways. Most of the research in the literature examining substance use in the UAE and gulf region is focused on shisha and dokha substances. We are thus not able to compare our findings to other previous studies examining alcohol consumption in the UAE. Our analysis also revealed that 42.5% of the sample were current cigarette smokers. This is a very high prevalence rate compared to 8.55% previously found in the national study conducted in the UAE described in chapter 4 (Al-Houqani et al., 2012). This could be due to the fact that our sample is relatively small compared to the nationwide study of Al-Houqani and colleagues.

Alcohol consumption levels were significantly different among religious groups. Muslims were less likely to consume alcohol as opposed to Christians. The findings support results reported in the previous chapters of this dissertation. There were no group differences related to the consumption of nicotine. This is in line with the discussion of chapter 3 examining substance use behaviours in a sample of Lebanese youth.

Our results did not support previous findings suggesting that the adjusted average pumps of the BART predicted alcohol use (Lejuez et al., 2002; Lejuez et al., 2003; MacPherson et al., 2010). Our findings also suggest that there is no significant relationship between the total explosions of balloons on the BART and alcohol consumption. Lastly, our moderated regression analysis examining religiosity as a factor that could influence the relationship between personality traits and substance use, did not generate significant findings. The results of the BART were not as expected. This could be due to the fact that individuals did not receive immediate rewards when performing the task. Future studies including immediate monetary rewards when performing the task could generate different findings. The small sample size could also be a possible explanation as to why the results were not as expected. Our findings did support a previous study conducted with adolescents in the Netherlands where the scores on the BART were not associated with neither substance use behaviours nor sensation seeking as measured by self-report scales (Janssen, Larsen, Peeters, Boendermaker, Vollebergh, & Wiers, 2015).

The study described in this chapter extended previous findings regarding the BART measure as a risk factor associated with substance use behaviours (Lejuez et al., 2002). This is the first study of its kind conducted in the UAE. Findings showed that risk taking behaviours as measured by the

BART were not predictors of alcohol use in a sample of Emirati participants. This may be due to the small sample of participants included in the study.

Our findings could also potentially indicate that behavioural tasks and self-report questionnaires do not measure the same thing. Previous findings have suggested that behavioural tasks and self-report measures were unrelated (Reynolds, Ortengren, Richards & DeWit, 2006). This study also suggested that there were also differences between various behavioral tasks and suggested that behavioral tasks fall under two components: impulsive disinhibition and impulsive decision-making (Reynolds et al., 2006). The BART task was considered to measure impulsive decision-making (Raynolds et al., 2006). Nevertheless, Meda, Stevens, Potenza, Pittman, Gueorguieva, Andrews and Pearlson (2009) found many similarities between behavioral and self-report measures (including the BIS/BAS and BART tasks) suggesting that they could be measuring the same impulsivity domain.

To this date, no prior studies based in the Middle East have examined the relationship between substance use behaviours and a behavioural task. The results can thus be used as a framework to guide future research in the area to draw appropriate comparative measures alongside the literature available from Western communities.

General conclusions

Limitations

First of all there is a potential sampling bias due to the small sample of individuals that participated in the study (N=80). For this reason, these findings cannot be generalized to the broader community and further research is needed to support the findings.

Secondly, another potential limitation in the study is the selection bias. Given that we have chosen a specific location (regional hub where media agencies and organizations are based) to recruit participants, the selection effect could limit generalization. The sociodemographic homogeneity of the sample could also limit generalizability as the individuals who took part of the study were predominantly highly educated individuals working in the media domain.

Moreover, a limitation faced in the first study including the shisha use health risks questionnaire was the ability to provide more nuanced answers such as "I do not know". Participants could have resorted to this form of answering to avoid making mistakes.

Lastly, the participants who took part of this study had an incentive to perform well on the BART as they were able to win entries into a draw to receive Amazon vouchers. This could have lead individuals to behave more cautiously than they usually do to receive a chance of getting the reward and produce maximal earnings. Replicating this study with actual monetary rewards associated to each BART trial alongside a control group who receive no rewards could generate interesting results.

Future directions

From this research, we notice that shisha use was a common activity within the UAE young population. This was the first study that examined risk and resilience factors associated with shisha use in the UAE. Similar replications with bigger samples on a national scales need to be conducted to complement the findings. Current studies in the field have focused on prevalence rates of shisha in the UAE. However, a close look at the factors that can be associated with shisha use and the knowledge of the population are necessary to set forth appropriate intervention measures in the region.

Substance use behaviours are very prevalent in the young population residing in the UAE. The studies described in chapters 5 and 6 were the first to take a closer look at the factors that could predict more substance use and the factors that could protect individuals from engaging in substance use and abuse. Similar studies could generate interesting findings and support the build-up of data available in the Middle East region while helping the development of appropriate intervention strategies among vulnerable populations.

Overall conclusion

The main goal of chapters 5 and 6 was to examine substance use behaviours in the UAE region. The studies included in this chapter supported the findings reported in Chapter 4 by showing that young adults in the UAE engage in various substance use behaviours.

The first study described in chapter 5 showed that some of the facets of impulsivity predicted shisha use among young adults. Negative urgency predicted more shisha use while lack of perseverance and positive urgency predicted less shisha use. Religiosity was not shown to be associated with shisha consumption. However, moderation analyses indicated that religiosity was a significant moderator of the relationship between negative urgency and shisha use. The study also extends the literature by discussing individuals' expectancies and experiences related to shisha use. Pleasurable experiences and socialization were major motivating factors that increase shisha use.

The second study described in chapter 6 strengthened our hypothesis that religiosity is a protective factor against alcohol use behaviours. It extends the literature by examining the association between risk-taking behaviours and alcohol consumption. The findings did not support the hypothesis that the performance on the BART is a significant predictor of alcohol consumption.

GENERAL DISCUSSION

Overview

This chapter will review the main findings of the thesis and consider their implications for current theory and help direct future research in the area and develop appropriate prevention measures. Limitations of the research will be acknowledged with a focus on cultural issues and sampling. Lastly, ideas for further research related to this thesis will be discussed.

Findings

The research studies discussed in this thesis set out to examine impulsivity-related traits and religiosity as risk and protective factors associated with substance use among young adults in multicultural communities. The research also aimed to identify possible interactive effects between impulsivity and religiosity on substance use outcomes. A strong evidence base exists implying impulsivity leads to significantly more young adult substance use while religiosity leads to less consumption. Yet, there has been little evidence examining these relationships in Middle Eastern societies and understanding the interplay of these variables. The studies presented in this thesis used correlational research with a self-report inventory research design and data collection method and cross-sectional designs to address this issue. The main findings are presented below with reference to the four broad aims of the thesis defined in chapter 1.

Aim 1: The first aim of the thesis sought to explore patterns of substance use behaviours in Middle Eastern communities, particularly in Lebanon and the UAE while examining common usage in the region and comparing the findings to Western societies (the United Kingdom). Findings conducted with samples of Lebanese students have found that the most researched substances in Lebanon are alcohol, nicotine and cannabis (Ministry of Public Health, 2015). Most of the findings suggest group differences between Muslim and Christian participants, where Muslims are significantly less likely to use alcohol (Ghandour et al., 2009; Salame et al., 2013). Substance use behaviours among young adults in Lebanon are on the rise (Karam et al., 2010). It was proposed that additional data regarding this issue could shed more light on the problem. Chapter 3 illustrated the scope of the issue and showed that 85% of a sample of university students in Lebanon consumed alcohol with 24.9% consuming high amounts in harmful ways (AUDIT score > 8). The study also

showed that 31.8% of the sample reported having used cannabis in the past six months, while 11.6% consumed cannabis in a harmful way. These findings support previous literature suggesting the need to examine substance use behaviours among Lebanese youth more closely. As for patterns of use in theUAE, previous studies have tended to focus on both dokha and shisha. There is a shortage of studies examining rates of usage among young adults and most studies only include male participants (Shaikh et al., 2012). The study reported in chapter 4 was one of the first to examine alcohol, nicotine and dokha use in a sample of university students in the UAE. Our findings indicated that 45.5% of the sample used dokha in the past six months, 40.3% were current smokers, and 52.9% consumed alcohol in the past year. The rates of alcohol consumption were lower than the findings of chapter 3. As for shisha consumption in the UAE, Chapter 5 indicated that 85% of young adults reported having tried shisha in their lifetime, while 2.7% smoke on a daily basis, 29.6% smoke on a weekly basis and 12.7% smoke on a monthly basis. These findings are significantly higher than prevalence rates reported in previous years and underline the need for more extensive research in the field (Asfour et al., 2015; Sreedharan et al., 2015).

As for substance use rates in the United Kingdom, our study reported in Chapter 2 indicated that 59.2% of our sample of young adults reported having consumed alcohol in the past year while 11.8% consumed alcohol in harmful ways (AUDIT score > 8). Additionally, 28.6% of our sample reported having used cannabis in the past six months while 10.3% consumed cannabis in harmful ways (CUDIT score >8).

The prevalence rates data in chapters, 2, 3 and 4 offer a tentative comparative view on substance use behaviours in multicultural communities. When comparing the United Kingdom and Lebanon, we notice that alcohol use and abuse is higher among Lebanese youth. This underlines the need to

examine substance use behaviours in Middle Eastern communities more extensively. As for cannabis use, consumption was higher in the United Kingdom sample, yet cannabis abuse was higher among Lebanese youth. The UAE was the country with the lowest rate of alcohol use and abuse. Due to ethical restrictions, we do not have data regarding cannabis use in the UAE. Nevertheless, the findings reported in Chapters 4 and 5 show that nicotine, dokha and shisha use are high among the UAE young population and more research in the area is needed.

It was not expected that Lebanon would have considerably larger prevalence rates than Western communities due to the taboo surrounding illegal substance use and the religious views around alcohol use. However, due to the relatively small samples in chapters 2 and 3, definite conclusions cannot be drawn from these findings and further comparative research is required. Overall, these findings support the need for extensive data in the Middle East region to better understand the scope of the substance use problem on a more global scale. The first aim of the thesis was achieved by replicating studies in different parts of the world which contributes to the current literature.

Aim 2: To examine relationships between impulsivity-related personality traits, self-control traits, and risk-taking behaviours linked to substance use. Our findings suggested that the main risk factors related to substance use behaviours were a lack of self-control predicting alcohol and cannabis use behaviours as well as various facets of impulsivity. Fun seeking (as measured by the BIS BAS scale) was shown to be a strong predictor of alcohol, cannabis, dokha and nicotine. Sensation seeking, lack of perseverance, negative urgency and positive urgency (as measured by the UPPS) were also shown to be risk factors leading to increased substance use behaviours.Past research has shown trait impulsivity to be related to substance use behaviours among young adults

(Shin & Chung, 2013). Our findings have shown that specific constructs of impulsivity are related to the use of different substances. This underlines the fact that impulsivity is a multidimensional construct and that distinct dimensions of the impulsivity trait differentially predict substance use behaviours. The BIS/BAS and UPPS frameworks are two of the most widely used measures to assess an individual's impulsive behaviours. The studies reported in chapters 2, 3, 4 and 5 examined substance use behaviours alongside impulsivity-related traits defined by the UPPS and BIS/BAS frameworks. The studies reported in chapters 3, 4 and 5 were the first to examine trait-impulsivity and substance use behaviours in Middle Eastern samples. Results showed that lack of perseverance and sensation seeking were predictors of cannabis use in the sample of UK participants described in Chapter 2. This supports previous findings suggesting that impulsivity traits are more related to illicit substances (Shin & Chung, 2013). Lack of perseverance and sensation seeking were also predictors of nicotine use in our sample of Emirati students reported in Chapter 4. The study reported in Chapter 3 showed different results suggesting that impulsivity was a predictor of alcohol consumption but had no effect on cannabis use among Lebanese youth. Similar results were obtained in the study reported in Chapter 4 with an Emirati population where lack of premeditation and positive urgency were predictors of both alcohol and dokha use. Finally, the first study reported in Chapter 5 showed that negative urgency was associated with increased shisha use, while reward responsiveness and lack of perseverance were associated with less shisha use. This is a novel finding in the literature and contributes to the understanding of substance use behaviours in the Middle East region. Our findings reported in Chapter 2 with the UK sample support existing literature by underlining specific impulsivity-related traits that predict increased cannabis use. Yet the other studies reported in this thesis underline the existence of cross-cultural

differences as the results examining substance use in Lebanon and the UAE show different trends. This novel finding contributes to our understanding of how individual differences drive young adults to engage in substance use behaviours no matter where they come from.

Turning to the relationship between self-control and substance use among young adults, research has consistently shown that high self-control leads to significantly less consumption of legal and illegal substances (Tangney et al., 2004; Will et al., 2009; Pearson et al., 2013). Chapter 2 reported similar findings and underlined the significant protective effect of self-control against both alcohol and cannabis use.

As for risk-taking behaviours, the study reported in Chapter 5 did not support the initial hypothesis that risk-taking will lead to significantly more substance use. Our findings are not in line with the literature underlining the BART as a significant predictor of alcohol consumption (Fernie et al., 2013). As mentioned above, self-report measures of impulsivity showed significant associations with substance use behaviours. The fact that the task did not generate similar results supports previous findings suggesting that behavioural tasks and self-report questionnaires could be measuring different things (Reynolds et al., 2006).

Aim 3: To explore the protective effect of religiosity, spirituality and mindfulness linked to substance use behaviours. The aim of the thesis was to underline resilience factors that could potentially protect young adults from engaging in substance use behaviours. Chapters 2, 3, 4 and 5 examined substance use behaviours alongside individuals' overall religiosity, as defined by the BMMRS framework. The study reported in Chapter 2 underlined the protective effect of high overall religiosity against both alcohol and cannabis use. Chapter 3 supported the findings for

alcohol use exclusively and reported that religiosity did not have any effect on cannabis consumption. The disparity between both studies could be explained by the fact that Chapter 3 included a study conducted with a Lebanese sample where alcohol use is discouraged by the majority Muslim population in the country. Even though illegal substance use, like cannabis use, remains a taboo in the region, it is not associated with religious restrictions the same way that alcohol is. These conclusions are speculative and need to be examined further to draw a more detailed understanding of the finding discussed above. The study reported in Chapter 4 also found that young adults who reported being very religious consumed significantly less dokha and alcohol. Similar findings were reported in Chapter 5 for alcohol consumption but overall religiosity was not a protective factor against nicotine use. This finding was expected as alcohol consumption is considered to be a sin in predominantly Muslim countries of the Gulf region.

The study reported in Chapter 2 also attempted to go one step further in our understanding of resilience factors against substance use by including measures of mindfulness and spirituality. The results did not support the evidence in the literature suggesting that mindfulness and spirituality could protect individuals from engaging in substance use behaviours. A replication of the model with larger sample sizes and similar measures could generate different findings.

Aim 4: To investigate the role of religiosity in moderating the relationship between impulsivity-related traits and substance use, and to link findings to current understandings of risk and protective factors related to substance use behaviours. This fourth and final aim was inspired by recent literature examining interactions between religiosity variables and the relationship between impulsivity and substance use (De Wall et al., 2014; Galbraith & Conner, 2015). Chapter 3 reported moderating effects of religiosity on the relationship between fun seeking and alcohol consumption. Individuals with higher

levels of religiosity showed weaker relationships between these variables. The effect of fun seeking on alcohol use was weakened due to high levels of religiosity. The chapter also reported moderating effects of religiosity on the relationship between reward responsiveness and alcohol and cannabis consumption. Individuals with higher levels of religiosity showed stronger relationships. The effect of high reward responsiveness on alcohol and cannabis consumption was strengthened and the combination of both religiosity and reward responsiveness lead to the lowest consumption of both substances. Chapter 4 reported a replication of this effect on a sample of Emirati young adults. Results indicated that religiosity had a moderating effect on the relationship between negative urgency and alcohol consumption. Individuals with higher levels of religiosity showed weaker relationships. The effect of negative urgency on alcohol use was weakened due to high levels of religiosity. Religiosity was also a moderator of the relationship between positive urgency and alcohol consumption. Individuals with higher levels of religiosity showed weaker relationships. The effect of positive urgency on alcohol use was thus weakened due to high levels of religiosity.

The first study reported in Chapter 5 examined a possible link between religiosity and the relationship between personality traits and shisha consumption. The results showed an opposing effect with shisha use in comparison to the findings described above regarding alcohol. Individuals with higher levels of religiosity showed stronger relationships. The effect of negative urgency was strengthened due to high levels of religiosity. This could be explained by the fact that shisha consumption is a cultural habit in the Gulf region and one of the most prominent social activities among Muslim young adults. The second study reported in Chapter 5 examined possible interactions between religiosity, risk-taking behaviours and alcohol consumption. We did not find significant relationships between the risk-taking variables, religiosity and alcohol consumption. Religiosity was not a significant moderator of the relationships between individual characteristics and alcohol consumption.

It is possible that this is due to the small sample presented in the study. This is a novel finding and further research should be conducted to understand the relationship between risk-taking behaviours and alcohol consumption in Middle Eastern samples of young adults.

Overall, religiosity has been shown to be a protective factor against substance use behaviours. Religiosity could have had this protective effect due to its interaction with the other measures that were included in the studies. There is evidence suggesting that people who tend to be more religious are more likely to have greater self-control (McCullough, & Willoughby, 2009). Findings also show that religiosity has an impact on individuals' behaviours and that increased religiosity promotes better health, well-being and social behaviours (McCullough, & Willoughby, 2009). Religiosity has also been shown to be associated with better mental health and less impulsive behaviours in an experimental study comparing healthy individuals to patients that had been hospitalized in a psychiatric institution (Caribé, Rocha, Junior, Studart, Quarantini, Guerreiro& Miranda-Scippa, 2015). The findings suggest that high overall religiosity could diminish the likelihood of engaging in impulsive behaviours (Caribé et al., 2015).

Implications

In Chapter 1, the literature on risk and resilience factors associated with substance use behaviours was outlined. The importance of replicating current findings in multicultural communities was also discussed.

Risk factors and substance use behaviours

Chapter 2 identified sensation seeking and fun seeking measures to significantly predict cannabis use in young adult samples. The study represents the Western community serving as a

comparison to the remainder of the studies discussed in this thesis. The results contribute to the evidence base suggesting that impulsivity subscales can play different roles in predicting licit and illicit substance use and support the stance that impulsivity is more strongly related to illicit substances (Shin & Chung, 2013). The findings reported in Chapter 3 extend our understanding of risk factors associated with substance use by replicating research models to Middle Eastern communities. It is the first study of its kind and represents a useful step in understanding whether or not the findings are universal and generalizable to a broad range of communities. The study offered further support for the association between impulsivity and alcohol consumption, but did not support the findings for cannabis use. A replication of this model with Lebanese young adults is necessary to examine this relationship further. The findings reported in Chapter 4 with the Emirati sample of young adults complement current theories about impulsivity and substance use by showing that both lack of premeditation and positive urgency significantly predict more dokha and alcohol use while sensation seeking significantly predicts more nicotine use. These findings contribute to the existing literature by underlining that impulsivity is a risk factor related to dokha use as well, a substance that has not been widely researched yet. The results also underline the fact that different facets of the UPPS-P model seem to be associated with the consumption of different substances. The data presented in Chapter 5 offers further support for the separation of trait impulsivity into different facets that predict substance use. Negative urgency was associated with increased shisha use, while lack of perseverance and reward responsiveness were associated with less shisha use. The integration of these findings to the existing literature on young adult substance use contributes to a more intricate understanding of risk-factors that are associated with increased

usage. Incorporating these individual differences into models of emerging adults behaviours should be a focus in the theoretical framework of young adult substance use.

Chapter 2 also identified low self-control as a significant risk factor associated with increased alcohol and cannabis use. Most of the existing findings implementing similar models were conducted with American samples of young adults (Tangney et al., 2004; Wills et al., 2009; Pearson et al., 2013). Our findings support these results in a UK sample and contribute to the literature of individual differences and addictive behaviours.

Resilience factors and substance use behaviours

Research regarding protective factors against substance use and abuse suggest that high religiosity is associated with significantly less consumption (Ford & Hill. 2012; Mason et al., 2015; Luk et al., 2013). Our findings complement current theories by showing that high religiosity was associated with less alcohol across all samples of participants (UK, Lebanon and UAE). It has also been shown that religiosity is associated with less cannabis use in the UK sample, however this result was not significant in a sample of Lebanese young adults. Religiosity was also associated with significantly less dokha use but was not a protector against either cigarette or shisha consumption. These findings contribute to the understanding of the extent to which increased overall religiosity can protect young adults from engaging in substance use behaviours. Religiosity seems to be a predictor of alcohol use across different samples and cultural backgrounds. The findings regarding cannabis use are inconsistent across different cultural groups and additional research focusing on cross-cultural samples is a useful step to broaden our understanding further. The findings regarding dokha use contribute to the evidence base as it is the first study examining dokha in parallel with overall religiosity. As for tobacco consumption, whether in the form of

cigarettes or shisha, our findings add to recent research in the field of addiction by underlining the fact that overall religiosity is not associated with tobacco use.

Religiosity as a moderator of the relationship between impulsivity and substance use

Going one step further in our understanding of risk and resilience factors associated with substance use behaviours, an examination of the interplay of these variables was included in our analytic models. To this date, there is a dearth of research examining similar interactions but recent research has suggested additional work was necessary (De Wall et al., 2014; Galbraith & Conner, 2015). Our findings complement current theories by showing that religiosity diminished the relationship between impulsivity and alcohol use in a sample of Lebanese young adults. Religiosity was also shown to diminish the relationship between reward responsiveness and both alcohol and cannabis use in the sample of Lebanese youth (chapter 3). The findings can now serve as groundwork for future studies examining similar research questions. It is the first study using this model and examining the interplay of risk and protective factors related to substance use behaviours. The findings reported in Chapters 4 and 5 with UAE samples also add to recent findings by showing that high religiosity diminishes the relationship between two facets of impulsivity, namely positive urgency and sensation seeking, and alcohol consumption (chapter 4). It has also been shown that high religiosity and high negative urgency predict significantly lower shisha use (chapter 5). This finding suggests religiosity is a factor that strengthens the relationship between impulsivity and substance use. It complements the current theories by underlining the fact that there may be a different relationship between religiosity and shisha consumption where religiosity seems to act as a risk factor rather than a protective factor.

For intervention

Lack of perseverance, sensation seeking, lack of premeditation and both urgency traits showed relationships with typical consumptions of alcohol, cannabis, dokha and nicotine use across the empirical studies outlined in chapters 2, 3, 4 and 5. These findings show that psychological characteristics can be related to the substance use behaviours. Young adults high in those traits can be prone to consuming substances and experiencing various negative consequences associated with the use of alcohol, cannabis, dokha and nicotine.

The findings regarding individual characteristics that predict substance use behaviours may be useful for the planning of prevention campaigns to reduce the onset and maintenance of substance use among young populations. To this date, effective prevention strategies among high school and university students in countries like Lebanon and the UAE are relatively small and even non-existent. This may be due to the fact that it is a topic that is widely avoided for cultural reasons. Further research is needed to understand the extent to which these traits can predict consumption. Once this is achieved, then we can envision to start investigating ways to help young adults control these impulses and consume substances in more controlled ways. Eventually, pilot studies examining the effectiveness of our strategies could help us create appropriate prevention measures that can be implemented in schools and universities across the region. These prevention programmes could potentially be personality-driven as an alternative to general classroom interventions in high schools. A first step would be to identify high-risk individuals by giving them self-report questionnaires similar to the ones used in the studies described in this thesis. Secondly, using psycho-educational methods to teach students about personality traits and risk behaviours could be effective. Lastly, cognitive-behavioural techniques and exercises could be included

during these prevention programmes to teach youngsters, particularly high-risk individuals, to identify the challenges they face when they face and avoid engaging in risky behaviours.

The findings presented in this thesis suggest that a consideration of individual differences, particularly impulsivity-related traits could help direct prevention strategies in the Middle East region. Our findings have shown how different impulsivity-related traits can be associated with a variety of different substances, particularly substances that are commonly used in the Middle East and Gulf region. Individuals who score high on impulsivity traits and low in self-control seem to be the most vulnerable to engage in substance use and abuse. These individuals could benefit substantially from attempts to teach them how to control their impulses and engage in normative substance use behaviours.

Limitations

The limitations of individual studies were underlined in respective chapters. Predominant restrictions and limitations of the overall thesis will now be discussed. The first limitation faced in both chapters 2 and 3 was a sample bias with a pronounced female proportion of participants. This was due to the fact that significantly more female participants responded to the ads regarding the research that was advertised. It is acknowledged that this overrepresentation of female participants causes difficulties in terms of generalisation of the findings and future studies including more balanced gender ratios are recommended. Chapters 4 and 5 did not face a similar issue and a good proportion of both genders were included in the studies. Due to the low responsiveness rates of various departments and university personnel for studies conducted in both Lebanon and the UAE, the sample sizes were not as large as we had hoped. Participant recruitment methods similar to those available in the UK and the US were not available in the region. It is acknowledged that the

small sample sizes can cause difficulties in terms of generalization of the findings and future studies including national samples in the region are recommended. The low number of individuals reporting problematic substance use, particularly for cannabis in both chapters 2 and 3, means we cannot be certain of the extent to which both personality and religiosity play a role in young adult usage. Future research studies including individuals from treatment facilities may lead to interesting results.

A further limitation was the dearth of research available in the Middle East and Gulf region. Limited preliminary information was available regarding usage, risk factors, prevention measures and strategies implemented in the area. Given the taboo surrounding the topic discussed in Chapter 1, a difficulty discussing the research questions and project to university board members and health authorities limited the scope of the work. A final limitation was the use of novel self-report questionnaires in two studies. In Chapters 4 and 5, the dokha use and shisha questionnaire were based on the AUDIT and CUDIT measures and created specifically for the respective studies. The decision to create these measures was based on a lack of appropriate inventories currently available in the literature for these substances. The lack of rigorous tests of validity and reliability means that the findings gathered are limited and extensive examinations of the validity of the scales are needed.

Future directions

Future directions have been discussed throughout the thesis in each individual chapter. The following section will offer additional suggestions based on broader research themes.

Model of research

The use of the BIS/BAS and UPPS-P frameworks to examine individuals' impulsivity are reliable and valid self-report measures. Yet, to understand whether these correlations can be

assumed to be causal, experimental studies with different groups of participants scoring high or low on impulsivity can broaden our understanding of the relationship between these variables. Longitudinal studies examining individuals going from teenage years to emerging adults and eventually adulthood could also strengthen our understanding of whether or not these impulsive traits are consistent over time and predict substance use and abuse. It has been suggested that personality traits are consistent over a person's lifespan (Roberts & DelVecchio, 2000). Future research examining the effects of these traits from childhood to adulthood, in conjunction with addictive behaviours and other risk behaviours, could extend our understanding further.

Sampling and the Middle East region

One of the biggest challenges this thesis has faced was the recruitment of participants in Eastern communities. Most of the available literature centres on prevalence rates at university levels, yet nationwide sampling efforts need to be made for generalization purposes. Future studies including measures similar to the ones included in this thesis namely, personality variables, religiosity and spirituality are necessary as most of the evidence base are strictly preliminary studies examining rates of usage. Prevention measures and strategies need to be driven by the findings of extensive research investigating the question of risk factors in these Eastern communities and comparisons to the West could broaden our understanding of personality differences and substance use behaviours in general.

Conclusion

The thesis has defined risk and resilience factors associated with young adult substance use in multicultural communities. The various facets of impulsivity-related personality traits

consistently showed to predict alcohol, cannabis, nicotine, shisha and dokha use. The thesis has identified relationships between specific traits and substance consumption showing that various facets of these psychological characteristics can be accountable for a person's likelihood of engaging in substance use and abuse. It has also considered the protective effects of overall religiosity and spirituality on substance use behaviours, showing that religiousness significantly protects individuals from consuming alcohol, cannabis and dokha. Young adults' overall religiosity was not a protecting factor of either shisha or nicotine consumption. Moreover, the thesis considered the interplay of these variables by proposing religiosity as a factor that influences the relationship between individual characteristics and substance use. Findings showed that high religiosity strengthened the relationship between impulsivity traits and alcohol and cannabis consumptions. Finally, it has considered the role of risk-taking behaviours associated with alcohol consumption, proposing future research studies in the field. It is hoped that these modest contributions to the literature can now inform theoretical development and inspire future investigation of risk and resilience factors in cross-cultural populations.

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APPENDIX A: INFORMED CONSENT/DEBRIEFING SHEET

Informed Consent

Kindly read the following before you begin with the questionnaire.

This study is conducted by a PhD student in Psychology at Goldsmiths, University of London. Once you indicate that you agree to participate in the following project, you will be directed to an online questionnaire where you will be asked to answer some questions. The questionnaire will include demographics, questions concerning shisha use (if any), questions concerning your attitudes and beliefs towards shisha, nicotine use (if any), alcohol use (if any) and a personality inventory. Kindly note that all of the information you will provide will remain confidential and that you are not required to give any personal identification as you respond to the questions. The purpose of the study is to investigate risk and resilience factors related to substance use in the United Arab Emirates.

If you have any further questions concerning this project please feel free to contact us through email: Elena Andrioti at psp01ea@gold.ac.uk or Dr. Andrew Cooper at a.cooper@gold.ac.uk. Please note that your participation is strictly voluntary and you may withdraw from the questionnaire at any time. Please click on the "I agree" icon. Once you do so, you will consent to participate in the following research project and authorize the student and her advisor to give you the test procedures. You will acknowledge that:

a) The potential outcomes of the tests or procedures have been explained to you

b) You have been informed that you are free to withdraw from the project at any time for any particular reason

c) This is a student project for the purpose of research

d) You have been informed that the confidentiality of the information you provide will be protected

☐ I agree

Debrief Sheet

Thank you for participating in this study.

The main purpose of the study was to examine the links between alcohol, cannabis use and religious behaviours and outcome expectancies within a sample of participants from the United Kingdom.We used specific tests to compile the questionnaire you were given: basic demographics, alcohol use disorders identification test, cannabis use questionnaire, alcohol rating norms, BIS/BAS personality scales, and a brief multidimensional measure of religiousness/spirituality.

We have chosen to examine the relationship between individual differences and religiosity and alcohol and cannabis use. Previous findings suggested that impulsivity is a risk factor while religiousness is a protective one. We have already collected data from Middle Eastern samples of participants and are aiming to compare our findings with a sample of students from Western societies. Prevalence rates of alcohol and cannabis use and abuse amongst young adults are on the rise. It is of great importance for us to be able to understand what leads an individual to engage in such risky behaviours while investigating specific protective factors. Our findings will allow us to understand this relationship better and help us realize whether or not there are cultural differences

that need to be investigated further. The goal at large is to be able to pinpoint which individuals are more vulnerable to use and abuse of such substances so we can eventually build constructive awareness campaigns.

In this study, after having answered couple of questions about yourself so such as your age, culture and education level; you were asked to answer questions concerning your exposure or non-exposure to alcohol and to rate how much you believe other students drink as well. You were then given a couple of questions concerning cannabis use, if any. After that, you were given a personality questionnaire and some questions about your religious habits. The reason for this is to try and highlight some associations between the variables.

If the expected associations are found between the levels of consumption of both substances, impulsivity and religiosity, the results will allow us to draw better understandings of the following addictive behaviours within a UK sample of participants. We will therefore be able to draw links between the behaviours and contemporary research in addictive behaviours psychology that can serve as ground works for future studies.

Your contribution to this study is thus very valuable and very much appreciated. Your responses will be used to help answer the questions of the links between alcohol and cannabis use and religiosity.

Finally, the data collected in this study will be analyzed in a collective form – your responses will not be singled out; only averaged results will be reported in any future publications. Most importantly, you will remain anonymous. For those of you who may want some information about quitting or reducing their alcohol intake or cannabis use, you may browse through these websites:

http://www.nhs.uk/Livewell/alcohol/Pages/Alcoholsupport.aspx

http://www.talktofrank.com/

Last of all, please do not discuss the matters you have read in this debriefing sheet or any other aspect of this study with other students as it is mandatory that the future participants of this study do not hold any expectations or information of some sort before they answer.

Thank you again for your participation and cooperation.

If you would like more information, or have any further questions about any aspect of this study, then please feel free to contact Dr. Andrew Cooper: a.cooper@gold.ac.uk.

Email: psp01ea@gold.ac.uk

Elena Andriotis

Psychology Student

APPENDIX B: BATTERY OF TESTS

Demographics

Gender

- Male
- Female

Age _____

Highest Level of Education Completed:

- High School Degree or Equivalent
- Bachelor's Degree
- Master's Degree
- Doctoral Degree
- Professional Degree
- Other

Marital Status:

- Single
- Married

- Divorced
- Other: _____

How long have you been living in Dubai? _____

Income (Per annum):

- No income
- Less than 10,000 AED
- 10,000 to 30,000 AED
- 30,000 to 70,000 AED
- More than 70,000 AED
- Would rather not specify

Religious Affiliation:

- Christian
- Muslim
- Jewish
- Buddhist
- Hindu
- No religious affiliation

Ethnic Origin:

- Arab
- Indian
- Chinese
- Other Asian
- Black
- White/Caucasian
- Multiracial

- Would rather not specify
- Other

BIS/BAS SCALES

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following four response options:

1 = very true for me

2 = somewhat true for me

3 = somewhat false for me

4 = very false for me

1. A person's family is the most important thing in life. ___
2. Even if something bad is about to happen to me, I rarely experience fear or nervousness. ___
3. I go out of my way to get things I want. ___
4. When I'm doing well at something I love to keep at it. ___

5. I'm always willing to try something new if I think it will be fun. ___

6. How I dress is important to me. ___

7. When I get something I want, I feel excited and energized. ___

8. Criticism or scolding hurts me quite a bit. ___

9. When I want something I usually go all-out to get it. ___

10. I will often do things for no other reason than that they might be fun. ___

11. It's hard for me to find the time to do things such as get a haircut. ___

12. If I see a chance to get something I want I move on it right away. ___

13. I feel pretty worried or upset when I think or know somebody is angry at me. ___

14. When I see an opportunity for something I like I get excited right away. ___

15. I often act on the spur of the moment. ___

16. If I think something unpleasant is going to happen I usually get pretty "worked up." ___

17. I often wonder why people act the way they do. ___

18. When good things happen to me, it affects me strongly. ___

19. I feel worried when I think I have done poorly at something important. ___

20. I crave excitement and new sensations. ___

21. When I go after something I use a "no holds barred" approach. ___

22. I have very few fears compared to my friends. ___

23. It would excite me to win a contest. ___

24. I worry about making mistakes. __

UPPS – Impulsive Behavior Scale

Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. If you Agree Strongly circle 1, if you Agree Somewhat circle 2, if you Disagree somewhat circle 3, and if you Disagree Strongly circle 4. Be sure to indicate your agreement or disagreement for every statement below.

I have a reserved and cautious attitude toward life.	1	2	3	4
I have trouble controlling my impulses.	1	2	3	4
I generally seek new and exciting experiences and sensations.	1	2	3	4
I generally like to see things through to the end.	1	2	3	4
When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.	1	2	3	4
My thinking is usually careful and purposeful.	1	2	3	4
I have trouble resisting my cravings (for food, cigarettes, etc.).	1	2	3	4
I'll try anything once.	1	2	3	4
I tend to give up easily.	1	2	3	4
When I am in great mood, I tend to get into situations that could cause me problems.	1	2	3	4
I am not one of those people who blurt out things without thinking.	1	2	3	4
I often get involved in things I later wish I could get out of.	1	2	3	4
I like sports and games in which you have to choose your next move very quickly.	1	2	3	4
Unfinished tasks really bother me.	1	2	3	4
When I am very happy, I tend to do things that may cause problems in my life.	1	2	3	4
I like to stop and think things over before I do them.	1	2	3	4
When I feel bad, I will often do things I later regret in order to make myself feel better now.	1	2	3	4

I would enjoy water skiing.	1	2	3	4
Once I get going on something I hate to stop.	1	2	3	4
I tend to lose control when I am in a great mood.	1	2	3	4
I don't like to start a project until I know exactly how to proceed.	1	2	3	4
Sometimes when I feel bad, I can’t seem to stop what I am doing even though it is making me feel worse.	1	2	3	4
I quite enjoy taking risks.	1	2	3	4
I concentrate easily.	1	2	3	4
When I am really ecstatic, I tend to get out of control.	1	2	3	4
I would enjoy parachute jumping.	1	2	3	4
I finish what I start.	1	2	3	4
I tend to value and follow a rational, "sensible" approach to things.	1	2	3	4
When I am upset I often act without thinking.	1	2	3	4
Others would say I make bad choices when I am extremely happy about something.	1	2	3	4
I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	1	2	3	4
I am able to pace myself so as to get things done on time.	1	2	3	4
I usually make up my mind through careful reasoning.	1	2	3	4
When I feel rejected, I will often say things that I later regret.	1	2	3	4
Others are shocked or worried about the things I do when I am feeling very excited.	1	2	3	4
I would like to learn to fly an airplane.	1	2	3	4
I am a person who always gets the job done.	1	2	3	4
I am a cautious person.	1	2	3	4
It is hard for me to resist acting on my feelings.	1	2	3	4
When I get really happy about something, I tend to do things that can have bad consequences.	1	2	3	4
I sometimes like doing things that are a bit frightening.	1	2	3	4
I almost always finish projects that I start.	1	2	3	4

Before I get into a new situation I like to find out what to expect from it.	1	2	3	4
I often make matters worse because I act without thinking when I am upset.	1	2	3	4
When overjoyed, I feel like I can't stop myself from going overboard.	1	2	3	4

I would enjoy the sensation of skiing very fast down a high mountain slope.	1	2	3	4
Sometimes there are so many little things to be done that I just ignore them all.	1	2	3	4
I usually think carefully before doing anything.	1	2	3	4
When I am really excited, I tend not to think of the consequences of my actions.	1	2	3	4
In the heat of an argument, I will often say things that I later regret.	1	2	3	4
I would like to go scuba diving.	1	2	3	4
I tend to act without thinking when I am really excited.	1	2	3	4
I always keep my feelings under control.	1	2	3	4
When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.	1	2	3	4
Before making up my mind, I consider all the advantages and disadvantages.	1	2	3	4
I would enjoy fast driving.	1	2	3	4
When I am very happy, I feel like it is ok to give in to cravings or overindulge.	1	2	3	4
Sometimes I do impulsive things that I later regret.	1	2	3	4
I am surprised at the things I do while in a great mood.	1	2	3	4

BMMRS (Brief Multidimensional Measure of Religiousness / Spirituality)

The following questions deal with possible spiritual experiences. To what extent can you say you experience the following?

1) I feel god's presence

- Many times a day
- Every day
- Most days
- Some days
- Once in a while
- Never or almost never

2) I find strength and comfort in my religion

- Many times a day
- Every day
- Most days
- Some days
- Once in a while
- Never or almost never

3) I feel deep inner peace or harmony

- Many times a day
- Every day
- Most days
- Some days

- Once in a while
- Never or almost never

4) I desire to be closer to or in union with God

- Many times a day
- Every day
- Most days
- Some days
- Once in a while
- Never or almost never

5) I feel God's love for me, directly or through others

- Many times a day
- Every day
- Most days
- Some days
- Once in a while
- Never or almost never

6) I am spiritually touched by the beauty of creation

- Many times a day
- Every day
- Most days
- Some days
- Once in a while
- Never or almost never

7) I believe in a God who watches over me

- Strongly Agree
- Agree
- Strongly Disagree
- Disagree

8) I feel a deep sense of responsibility for reducing pain and suffering in the world

- Strongly Agree
- Agree
- Strongly Disagree
- Disagree

9) How often do you pray privately in places other than houses of worship?

- More than once a day
- Once a day
- A few times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

10) Within your religious or spiritual tradition, how often do you meditate?

- More than once a day
- Once a day
- A few times a week
- Once a week
- A few times a month

- Once a month
- Less than once a month
- Never

11) How often do you watch or listen to religious programs on TV or radio?

- More than once a day
- Once a day
- A few times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

12) How often do you read religious literature?

- More than once a day
- Once a day
- A few times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

13) How often are prayers or grace said before or after meals in your home?

- At all meals
- Once a day

- At least once a week
- Only on special occasions
- Once a month
- Never

14) I think about how my life is part of a larger spiritual force.

- A great deal
- Quite a bit
- Somewhat
- Not at all

15) I work together with God as partners.

- A great deal
- Quite a bit
- Somewhat
- Not at all

16) I look to God for strength, support, and guidance.

- A great deal
- Quite a bit
- Somewhat
- Not at all

17) I feel God is punishing me for my sins or lack of spirituality.

- A great deal
- Quite a bit

- Somewhat
- Not at all

18) I wonder whether God has abandoned me.

- A great deal
- Quite a bit
- Somewhat
- Not at all

19) I try to make sense of the situation and decide what to do without relying on God.

- A great deal
- Quite a bit
- Somewhat
- Not at all

20) To what extent is your religion involved in understanding or dealing with stressful situations in any way?

- Very involved
- Somewhat involved
- Not very involved
- Not involved at all

21) To what extent do you consider yourself a religious person?

- Very religious
- Moderately religious
- Slightly religious
- Not religious at all

22) To what extent do you consider yourself a spiritual person?

- Very spiritual
- Moderately spiritual
- Slightly spiritual
- Not spiritual at all

23) How often do you attend religious services?

- Never
- Less than once a year
- About once or twice a year
- Several times a year
- About once a month
- 2-3 times a month
- Nearly every week
- Every week
- Several times a week

24) Besides religious services, how often do you take part in other activities at a place of worship?

- Never
- Less than once a year
- About once or twice a year
- Several times a year
- About once a month
- 2-3 times a month
- Nearly every week
- Every week
- Several times a week

Nicotine Use Questionnaire (Karl Fagerstrom Nicotine Tolerance Questionnaire)

Are you a smoker?

- Yes
- No (If your answer is no, you may skip the following 6 questions)

How many cigarettes do you smoke per day?

- 10 or less
- 11-20
- 21-30
- 31 or more

How soon after you wake up do you smoke your first cigarette?

- 0-5 min
- 30 min
- 31-60 min
- After 60 min

Do you find it difficult to refrain from smoking in places where smoking is not allowed (e.g. hospitals, government offices, cinemas, libraries etc)?

- Yes
- No

Do you smoke more during the first hours after waking than during the rest of the day?

- Yes
- No

Which cigarette would you be the most unwilling to give up?

- First in the morning
- Any of the others

Do you smoke even when you are very ill?

- Yes
- No

Alcohol use disorders identification test (AUDIT)

How often do you have a drink containing alcohol?

- Never
- Monthly or less
- Two to four times a month
- Two or three times a week
- Four or more times a week

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

- 1 or 2
- 3 or 4
- 5 or 6
- 7 to 9
- 10 or more

How often do you have six or more drinks on one occasion?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past year have you found that you were not able to stop drinking once you had started?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past year have you failed to do what was normally expected of you because of drinking?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past year have you had a feeling of guilt or remorse after drinking?

- Never

- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past year have you been unable to remember what happened the night before because you had been drinking?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

Have you or has someone else been injured as a result of your drinking?

- No
- Yes, but not in the past year
- Yes, during the past year

Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?

- No
- Yes, but not in the past year
- Yes, during the past year

CUDIT-R

The Cannabis Use Disorder Identification Test - Revised (CUDIT-R) Have you used any cannabis over the past six months? YES / NO

If YES, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use over the past six months

How often do you use cannabis?

- Never
- Monthly or less
- 2-4 times a month
- 2-3 times a week
- 4 or more times a week

How many hours were you “stoned” on a typical day when you had been using cannabis?

- Less than 1
- 1 or 2
- 3 or 4
- 5 or 6
- 7 or more

How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?

- Never
- Less than monthly
- Monthly
- Weekly

- Daily or almost daily

How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children:

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

Have you ever thought about cutting down, or stopping, your use of cannabis?

- Never
- Yes, but not in the past 6 months

- Yes, during the past 6 months

Dokha Use Questionnaire:

"Dohka" is a traditional Arabic tobacco that includes no chemical additives, preservatives, pesticides or herbicides. The "dokha" substance comes in hundreds of strengths, and flavors. The main strengths are cold (barid), warm (daffi) and hot (har). These designations refer to the harshness of the tobacco and not the amount of buzz or head spin the blend may impart. When answering the following questions regarding dokha use, please consider any of the above behaviours applicable.

Have you ever used dokha? (if your answer is no you may proceed to the next page)

- Yes
- No

At what age did you first use dokha?

_____

Have you used dokha over the past 6 months?

- Yes
- No

How often do you use dokha?

- Never
- Monthly or less

- 2-4 times a month
- 2-3 times a week
- 4 or more times a week

In a typical week when you are using dokha, how often do you feel your head spinning or feel dizziness?

- Every single time I smoke dokha
- Daily
- 2 – 3 times a week
- Never

How would you describe your current dokha use?

- Non-user
- Light user
- Average user
- Heavy user
- Previous light user
- Previous average user
- Previous heavy user

Have you ever tried cutting down your dokha use but were not able to?

- Yes
- No

Shisha Use Questionnaire

1) Have you ever smoked shisha?

- Yes
- No

2) At what age did you first use shisha? _____

3) Have you smoked shisha at least once in the last 30 days?

- Yes
- No

4) How often do you usually smoke shisha?

- Smoked once
- Don’t smoke anymore
- Less than monthly
- Monthly
- Weekly
- Daily

5) How many pots of shisha tobacco (shisha heads) do you smoke in a typical session?

- 1
- 2
- 3
- 4 or more

- Don’t know
- Not Applicable (smoked only once)

6) How many times have you felt the urge to smoke shisha in the past 24 hours?

- Not at all
- Sometimes
- Most of the time
- All the time

7) In general, how strong have these urges to smoke shisha been?

- Not applicable (no urges)
- Slight
- Moderately strong
- Very strong
- Extremely strong

8) Have you ever felt the need to cut down or control your shisha smoking, but found it difficult?

- Yes
- No
- Not applicable

9) Did you feel that you needed help/support to stop smoking shisha?

- Yes
- No
- Not applicable

10) How would you describe your current shisha use?

- Non-user
- Light user
- Average user
- Heavy user
- Previous light user
- Previous average user
- Previous heavy user

11) If you smoke, shisha where do you typically smoke it

- At home alone
- At home with family
- In a café or restaurant with friends
- At a bar or night club

Perceptions about Shisha Smoking in Comparison to Cigarette Smoking

1) Hookah smoking is less dangerous than cigarette smoking

- Yes
- No
- Don’t know

2) Tobacco toxins are filtered out by the water in the pipe and hence hookah smoking is less dangerous

- Yes
- No
- Don’t know

3) Hookah smoking is less irritating and therefore less toxic to the respiratory tract.

- Yes
- No
- Don’t know

4) In Hookah smoking you breathe more deeply because of the less irritating nature of moisturized smoke

- Yes
- No
- Don’t know

5) Hookah smoking releases higher concentration of smoke than cigarette smoking

- Yes
- No
- Don’t know

6) Tobacco and other flavouring substances are used in hookah smoking

- Yes
- No
- Don’t know

7) Hookah has less nicotine than cigarette

- Yes
- No
- Don’t know

8) Hookah smoke contains carbon monoxide which is harmful to health

- Yes
- No
- Don’t know

Perceptions of the Smoker about the Harmful Effects of Hookah Smoking

Does Hookah Smoking lead to any of the following health risks? (Circle your answer in the table on the right)

9) Lung cancer

- Yes
- No
- Don’t know

10) Gastrointestinal cancer

- Yes
- No
- Don’t know

11) Bladder cancer

- Yes
- No
- Don’t know

12) Lip cancer

- Yes
- No
- Don’t know

13) Infections

- Yes
- No
- Don’t know

14) Cardiovascular disease

- Yes
- No
- Don’t know

15) Alterations in chromosomes

- Yes
- No
- Don’t know

For the following questions, you can tick more than one option.

16) Reason for water-pipe smoking

- Pleasurable experience
- Adds to intimacy in social gathering
- Friends demand
- Socializing
- Habit
- Helps to deal with pressure
- Time availability and boredom
- Social status
- Any others

17) Positive feeling about hookah smoking

- Sweet smell
- Relaxation
- Gives a kick
- Any other

18) Negative feeling about hookah smoking

- Pollution

- Smoke production
- Harmful to health
- Any other

Mindfulness Scale MAAS

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1 Almost Always
2 Very Frequently
3 Somewhat Frequently
4 Somewhat Infrequently
5 Very Infrequently
6 Almost Never

I could be experiencing some emotion and not be conscious of it until some time later.

1 2 3 4 5 6

I break or spill things because of carelessness, not paying attention, or thinking of something else.

1 2 3 4 5 6

I find it difficult to stay focused on what's happening in the present.

1 2 3 4 5 6

I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.

1 2 3 4 5 6

I tend not to notice feelings of physical tension or discomfort until they really grab my attention.

1 2 3 4 5 6

I forget a person's name almost as soon as I've been told it for the first time.

1 2 3 4 5 6

It seems I am "running on automatic," without much awareness of what I'm doing.

1 2 3 4 5 6

I rush through activities without being really attentive to them.

1 2 3 4 5 6

I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.

1 2 3 4 5 6

I do jobs or tasks automatically, without being aware of what I'm doing.

1 2 3 4 5 6

I find myself listening to someone with one ear, doing something else at the same time.

1 2 3 4 5 6

I drive places on ‘automatic pilot’ and then wonder why I went there.

1 2 3 4 5 6

I find myself preoccupied with the future or the past.

1 2 3 4 5 6

I find myself doing things without paying attention.

1 2 3 4 5 6

I snack without being aware that I’m eating.

1 2 3 4 5 6

Spirituality Assessment Scale

Directions: Please indicate your response by circling the appropriate letters indicating how you respond to the statement.

Mark:

"SA" if you STRONGLY AGREE
"A" if you AGREE
"AM" if you AGREE MORE than DISAGREE
"DM" if you DISAGREE MORE than AGREE
"D" if you DISAGREE
"SD" if you STRONGLY DISAGREE
There is no "right" or "wrong" answer. Please respond to what you think or how you feel at this point in time.

I have a general sense of belonging.

SA A AM DM D SD

I am able to forgive people who have done me wrong.

SA A AM DM D SD

I have the ability to rise above or go beyond a physical or psychological condition.

SA A AM DM D SD

I am concerned about destruction of the environment.

SA A AM DM D SD

I have experienced moments of peace in a devastating event.

SA A AM DM D SD

I feel a kinship to other people.

SA A AM DM D SD

I feel a connection to all of life.

SA A AM DM D SD

I rely on an inner strength in hard times.

SA A AM DM D SD

I enjoy being of service to others.

SA A AM DM D SD

I can go to a spiritual dimension within myself for guidance.

SA A AM DM D SD

I have the ability to rise above or go beyond a body change or body loss.

SA A AM DM D SD

I have a sense of harmony or inner peace.

SA A AM DM D SD

I have the ability for self-healing.

SA A AM DM D SD

I have an inner strength.

SA A AM DM D SD

The boundaries of my universe extend beyond usual ideas of what space and time are thought to be.

SA A AM DM D SD

I feel good about myself.

SA A AM DM D SD

I have a sense of balance in my life.

SA A AM DM D SD

There is fulfillment in my life.

SA A AM DM D SD

I feel a responsibility to preserve the planet.

SA A AM DM D SD

The meaning I have found for my life provides a sense of peace.

SA A AM DM D SD

Even when I feel discouraged, I trust that life is good.

SA A AM DM D SD

My life has meaning and purpose.

SA A AM DM D SD

My innerness or an inner resource helps me deal with uncertainty in life.

SA A AM DM D SD

I have discovered my own strength in times of struggle.

SA A AM DM D SD

Reconciling relationships is important to me.

SA A AM DM D SD

I feel a part of the community in which I live.

SA A AM DM D SD

My inner strength is related to a belief in a Higher Power or Supreme Being.

SA A AM DM D SD

I have goals and aims for my life.

SA A AM DM D SD

Self-Control Scale

First, please read the following 10 statements and for each, check the box that best represents you.

I have a hard time breaking bad habits.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

I get distracted easily.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

I say inappropriate things.

- Not at all like me
- A little like me

- Somewhat like me
- Mostly Like Me
- Very much like me

I refuse things that are bad for me, even if they are fun.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

I'm good at resisting temptation.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

People would say that I have very strong self-discipline.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

Pleasure and fun sometimes keep me from getting work done.

- Not at all like me

- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

I do things that feel good in the moment but regret later on.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

Sometimes I can’t stop myself from doing something, even if I know it is wrong.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me

I often act without thinking through all the alternatives.

- Not at all like me
- A little like me
- Somewhat like me
- Mostly Like Me
- Very much like me