

Alcohol use, coping strategies, extraversion and their relationship to Irish sleep-wake activity and life satisfaction

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Abstract

The present study aimed to determine whether alcohol consumption, alcohol use as a coping strategy, extraversion, age, and gender would predict levels of sleep-wake activity and life satisfaction in Irish individuals ($N = 135$). A quantitative correlational research design was employed to assess how each predictor variable related to sleep-wake activity criteria excessive daytime sleepiness (EDS) and nocturnal sleep (NS), as well as criterion satisfaction with life. Standard multiple regression results indicated that the combined predictor variables explained about 14% ($p < .001$) of the variance in satisfaction with life scores, with alcohol use as a coping mechanism and extraversion level significantly predicting 10% ($p < .001$) and 8% ($p = .001$) of the variance respectively. Participant age also significantly predicted EDS scores, explaining 3% ($p = 0.042$) of the variance. The predictor variables did not significantly associate with NS quality. Results suggest that avoidance-coping strategies such as alcohol consumption decrease life satisfaction, and that personality trait extraversion positively moderates satisfaction with life in individuals. Results also suggest that EDS decreases with age. Limitations of the current study are also discussed.

1 Introduction

The present study aimed to determine whether alcohol consumption, alcohol use as a coping strategy, extraversion, age, and gender would predict levels of sleep-wake activity and life satisfaction in Irish individuals. Previous research has shown that individual differences in the above predictor variables do relate to levels of sleep activity and life satisfaction in people.

However, no studies have looked specifically at the Irish population in particular in relation to these variables. Considering the extensive use of alcohol in Ireland today, the current study felt it important to gain an insight into the effects of gender and age demographics, alcohol use, and individual coping style on sleep quality and life satisfaction in 21st Century Ireland.

1.1 The Importance of Sleep

The benefit of a good night's sleep is not contested. We spend almost a third of our lives sleeping, with sleep being essential for good health, good quality of life and optimum performance during the day (World Health Organisation, 2004). Allgower, Wardle, & Steptoe (2001) suggested that 7-9 hours of sleep per night is a healthy adult amount. According to Pinel (2011), theories on the purpose of sleep can be divided into recuperation and adaption theories. Recuperation theories propose that being awake disrupts our body's homeostasis and sleep is required to restore our physiological stability, allowing humans to recover from physical and mental fatigue. Adaption theories suggest that humans have evolved to sleep to avoid accidents and predators during the night, with hunting and travelling easier and safer during daylight. The human circadian rhythm has therefore adapted to earth's 24 hour cycle of light and dark.

Passer & Smith (2011) suggest that sleep may enhance memory consolidation (transfer of information into long term memory), and that Rapid Eye Movement (REM) sleep may keep the

brain healthy using high brain activation, offsetting the low brain arousal during restful slow-wave sleep. Regardless of which theory is correct, sleep itself is important. But what happens if humans are sleep deprived?

1.2 Sleep Disturbance and Deprivation

The main consequences of sleep deprivation include physical effects such as sleepiness, fatigue, and hypertension, along with cognitive impairment including deterioration in performance, attention, and motivation (World Health Organisation, 2004). Passer & Smith (2011) state that 5 hours of sleep or less on consecutive nights can cause mood disorders, with recovery from extended sleep deprivation taking several continuous nights of healthy sleep. Sleep disturbance, occurring when working time exceeds 50 hours per week, may lead to serious consequences according to Lusa, Häkkänen, Luukkonen, & Viikari-Juntura (2002). The study found that fire-fighters working more than a 70 hour week quadrupled the risk of occupational accidents compared to those not working more than a 50 hour week. A long weekly working time may predict sleep disturbance and occupational accidents.

Allgower et al (2001) found that irregular sleep hours (less than 7 hours or more than 9 hours) and unconventional waking hours were linked to depressive symptoms such as sedentary behaviour, habitual alcohol use, smoking, and not eating breakfast. Finn, Young, Palta, & Fryback (1998) also found that modest and chronic sleep-disordered breathing are independently related to lower general health status when adjusted for age, sex, body mass index, smoking status, alcohol usage, and cardiovascular conditions, suggesting that sleep quality is important in a patient's perception of their health. Liu et al (2000) asserted that sleep disturbance is also

universal, with levels of sleep loss and excessive daytime sleepiness in Japan comparable to that in Western countries.

The current study therefore investigated how a number of variables, namely alcohol consumption, alcohol use for coping, extraversion, age, and gender affect an individual's sleep-wake activity, specifically excessive daytime sleepiness. According to Rosenthal, Roehrs, & Roth (1993), excessive daytime sleepiness, or the tendency to fall asleep at inappropriate times, is a common manifestation of sleep disorders, and related to increased vehicular accidents, decreased work productivity, and marital distress. Determining the psychological, demographic, and environmental factors that predict sleep-wake activity and excessive daytime sleepiness is therefore important.

1.3 Sleep and Life Satisfaction

Research suggests that sleep-wake activity and life satisfaction (or how happy a person is – Brand et al, 2010) are related. Brand et al (2010) studied the effects of work-related emotional and physical exhaustion, i.e., burnout. They found that low satisfaction with life from emotional and physical exhaustion was positively correlated with sleep complaints. Kelly (2004) found that college students who reported habitually attaining less sleep were also significantly likely to report lower life satisfaction.

The sleep-wake activity and life satisfaction link meant this study felt it important to investigate the variables that predict an individual's satisfaction with life as well as sleep-wake activity.

1.4 Sleep and Coping with Stress

Bergdahl & Bergdahl (2002) asserted that high stress is associated with sleep disturbances, although at very high stress levels, sleep disturbance decreases with suicidal risk increasing. Friedman, Brooks, Bliwise, Yesavage, & Wicks (1995) measured self reported life stress and sleep perceptions of good and poor sleepers. The study suggested that poor sleepers with higher life stress had greater difficulty falling asleep, with less early morning waking, compared to poor sleepers with low life stress. According to Benham (2010), psychological stress (life events and perceived stress), daytime sleepiness, and poor sleep quality all negatively associate with good health. The study indicates the importance of sleep, the link between sleep, stress appraisal, and coping, and that sleep measures may benefit health and stress studies.

In relation to coping with stress, Hoyt, Thomas, Epstein, & Dirksen (2009) found that avoidance coping (alcohol consumption for example) as a stress mediator led to greater sleep disturbance symptoms and interference with daily functioning. Sadeh, Keinan, & Daon (2004) reported that high emotion-focused coping predicted sleep reduction during high stress periods, while Jean-Louis et al (2007) found that increased repressive coping resulted in reduced insomnia symptoms.

All studies support the view that coping style moderates the stress-sleep relationship. This study looked at alcohol use a coping mechanism in particular and how it mediated the stress and sleep-wake activity relationship as well as life satisfaction.

1.5 Sleep and Alcohol Consumption

According to Roehrs & Roth (2001), alcohol's effect on sleep has been studied since the 1930s. Studies suggest that sleep quality and alcohol consumption are related. Vinson et al

(2010) stated that while moderate and hazardous drinking were not significantly associated with sleep problems, using alcohol to sleep was strongly associated with hazardous drinking. Sleep-deprived college students also reported greater alcohol use and negative mood, possibly related to their emotional response to stress (Yang, Wu, Hsieh, Liu, & Lu, 2003).

Foster, Powell, Marshall, & Peters (1999) argued that a high degree of alcohol consumption resulted in waking often, waking tired/worn out, difficulty falling asleep, and waking early. The report also asserted that sleep remains disturbed after alcohol detoxification and that this disturbed sleep was a predictor of relapse in alcohol-dependent individuals. Roehrs & Roth (2001) suggested that occasional use of alcohol initially improves sleep, but high doses of alcohol causes sleep disturbances during the second half of one's sleep period. The study also stated that tolerance to the sedative effects of alcohol develops quickly, with alcohol increasing daytime sleepiness, impairing reaction-time performance, and affecting physiological functions during sleep.

Research supports the link between alcohol and sleep impairment. Therefore, this study investigated this relationship by measuring the effect of alcohol consumption on sleep-wake activity, not only in students, but in the general population of Ireland.

1.6 Sleep and Extraversion

Sato (2005) stated that the personality trait extraversion, according to Eysenck's Introversion-Extroversion theory (Eysenck & Eysenck, 1992), is synonymous with the seeking of stimulating activities and action, as well as positive emotionality (Gray & Watson, 2002). Extraverts assert social dominance and possess positive affect (Robinson & Oishi, 2006).

In relation to sleep, Orme (1972) found that extraversion was associated with shorter sleep duration, supporting the late-evening, party-goer stereotype. Soehner, Kennedy, & Monk (2007) also suggested that extraverts have a later circadian phase than introverts and go to bed later on weekends. Killgore, Richards, Killgore, Kamimori, & Balkin (2007) stated that cortical arousal (controlling sociability, emotional warmth, and stimulation seeking) underlies the introversion-extraversion personality dimension, specifically the reticulo-thalamic-cortical activation system, with introverts becoming easily over-aroused as stimulation increases. The study found that higher extraversion was significantly related to decline in response speed and frequent attention lapses following sleep deprivation, supporting this study's hypothesis that extraverts are more likely to report daytime sleepiness.

Gray & Watson (2002) found that extraversion/positive emotionality was negatively correlated with subjective sleep inefficiency, reduced sleep quality, reduced sleep duration, increased sleep disturbances, and increased daytime dysfunction. Soehner, Kennedy, & Monk (2007) found no relationship between extraversion and sleep quality.

However, this study supported the hypothesis that extraverts have reduced sleep quality and duration compared to introverts, and investigated whether there would be a significant difference in excessive daytime sleepiness on the introvert-extravert personality domain.

1.7 Sleep and Gender

Gender differences in sleep-wake activity have also been found. Mateo, Díaz-Morales, Barreno, Prieto, & Randier (2012) reported that adolescent females prefer evenings, have a greater tendency towards evening preference, rise earlier on weekdays, but rise later and sleep longer on weekends. Lindberg et al (1997) showed that females sleep significantly longer hours

than males, have more difficulty maintaining sleep, are less refreshed after sleep, and have more excessive daytime sleepiness. The report asserted that this difference could not be explained by higher anxiety levels in females alone.

Vela-Bueno et al (2008) found that Spanish male students were more likely to take daytime naps than females, with napping indicating an irregular sleep-wakefulness pattern and being related to excessive daytime sleepiness in individuals. Taking naps may be a coping strategy for insufficient sleep and daytime sleepiness in males. The absence of napping in females may also explain higher reported excessive daytime sleepiness compared to males. Jean-Louis, Kripke, Ancoli-Israel, Klauber, & Sepulveda (2000) suggested that while females have better sleep quality than men, their shorter sleep latency period (transition from wakefulness to sleep) results in higher excessive daytime sleepiness. This is supported by the Jean-Louis, Mendlowicz, von Gizycki, Zizi, & Nunes (1999) study.

In a Northern Ireland study, Nugent et al (2001) identified that snoring was the biggest risk factor of excessive daytime sleepiness in males. The study reported high excessive daytime sleepiness and insomnia in Northern Irish males but the study is limited in that Northern Irish females were not measured for gender differences; perhaps daytime sleepiness is related to socioeconomic or cultural factors? Pallos, Yamada, Doi, & Okawa, (2004) found no significant difference between male and female levels of excessive daytime sleepiness. However, the study only measured 219 Japanese students between 22 and 39 years old so cultural influences may apply.

Huang et al (2002) also found no gender differences in the sleep patterns (actual sleep time, sleep efficiency, sleep latency, and nighttime awakening) of a young to old sample, while Hume, Van, Watson, & Hume (1998) only found significant gender differences in shallow sleep (higher

in males) and deep sleep (higher in females). Voderholzer, Al-Shajlawi, Weske, Feige, & Riemann (2003) argued that insomnia is more prevalent in females, not because of gender differences in sleep quality, duration, or efficiency, but due to gender differences in anxiety and depression.

Research strongly supported the present study hypothesis that gender moderates sleep-wake activity and that there would be a significant difference between male and female sleep-wake activity.

1.8 Sleep and Aging

When investigating how age predicts sleep-wake activity, Mateo et al (2012) found increased irregular sleep patterns and a progressive tendency towards eveningness (a “nightowl”) with increasing age among adolescents, possibly due to psychosocial factors such as decreased parental monitoring and later rising times.

Huang et al (2002) proposed that sleep and circadian rhythm alter with age, with daytime naps significantly increasing with age. Hume et al (1998) showed that there is a shortening in both nocturnal total sleep period and total sleep time with age, with 70 year olds sleeping 46 minutes less on average than 20 year olds. Jean-Louis et al (2000) found that there was no age trend in sleep duration, only sleep activity, but overall sleep duration had declined in the American population.

Based on the evidence, this study put forward the hypothesis that participant age would predict sleep-wake activity.

1.9 Alcohol in the Republic of Ireland

According to Alcohol Action Ireland (2011), the Republic of Ireland (Ireland) ranks among the highest consumers of alcohol in the E.U., drinking about 20 per cent more than the average European. Alcohol consumption rates have increased by approximately 145 per cent since 1960, with the average Irish person over 15 years of age consuming 11.7 litres of pure alcohol (equivalent to 10 pints of beer per week) in 2011 (Alcohol Action Ireland, 2011). Ireland's alcohol consumption was the highest among the OECD (Organisation for Economic Co-operation and Development) countries in 2001 and 2005, and was only exceeded by Austria, Czech Republic, and France in 2008 (Foley, 2012).

Although alcohol consumption has decreased from 14.4 litres in 2001 to approximately 12 litres per adult in 2011 (Estimates of Average Adult Alcohol Consumption 2001-2011 and International Comparison, 2012), consumption figures are still significant to place Ireland in the mid-ranked OECD countries today (Drink Aware, 2010a). Research indicates that alcohol consumption is prevalent in Ireland.

1.10 Alcohol and Coping

Studies suggest that alcohol use is related to coping. Carney & Armeli (2000) examined 83 regular drinkers and found that higher levels of desire to drink and actual alcohol consumption were positively associated with positive and negative non-work events, and negatively associated with positive and negative health events. Evidence for the mediating effects of perceived stress was also found, with men reporting higher levels of drinking to cope.

Aarstad, Aarstad, & Olofsson (2007) suggested that drinking to cope is a task-specific avoidance coping strategy and connected to increased drinking, with drinking to cope levels significantly correlating with alcohol consumption rate after adjustment for age, gender and neuroticism. Alcoholism in males and females is related to increased automatic destructive thinking as a result of poor coping strategies according to Brechting & Giancola (2006).

Holahan, Moos, Holahan, Cronkite, & Randall (2003) found that drinking to cope strengthened the link between depressive symptoms and drinking behaviour, with alcohol removing negative affect and negatively reinforcing alcohol use. The study showed that alcohol use predicts more drinking to cope behaviour.

In relation to personality, optimism (robust, adaptive, and flexible characteristics) also moderates the use of alcohol to cope. Harju & Bolen (1998) asserted that high optimists use positive reframing, seek emotional support, and use more flexible coping styles compared to more pessimistic individuals who used more alcohol to cope with problems. Gerrard et al (2012) found that substance use (including alcohol) as a coping mechanism moderated perceived racial discrimination and substance use in African-American adolescents. In the Rice & Van Arsdale (2010) study, maladaptive perfectionists (high standards and high discrepancy (personal blame for failing to meet own standards)) reported significantly higher levels of stress and drinking to cope than adaptive perfectionists (high standards and low discrepancy) and non-perfectionists (low standards and low discrepancy). Females were also found more likely to drink to cope than males. The same study suggested that healthy levels of high standards may mediate between stress and alcohol consumption.

Clearly, there is evidence to support the hypothesis that the use of alcohol to cope is related to increased alcohol consumption, and that personality type and gender may moderate this

link. The current study therefore measured alcohol consumption and level of drinking to cope in individuals as moderators of sleep-wake activity and life satisfaction.

1.11 Life Satisfaction

In general, life satisfaction can be measured by how happy an individual is and how satisfied they are with their life (Brand et al, 2010). Condition specific measures of life satisfaction can measure specific life domains such as health or finance, whereas other measures such as the Satisfaction with Life Scale (SWLS) use generic measures, allowing the individual to integrate and weight domains however way they choose (Pavot & Diener, 1993). The same study suggested that life satisfaction is a cognitive component of subjective well-being, with an individual comparing their own perceived circumstances in life to a self-imposed set of standards, and it is the degree to which the individual's circumstances match these criteria, that they report their own level of life satisfaction.

1.12 Life Satisfaction and Alcohol Consumption

Murphy, McDevitt-Murphy, & Barnett (2005) measured the impact of alcohol use on life satisfaction in student-relative domains such as society, school, family, and relationships. The study reported that females have significantly higher levels of life satisfaction than males, with males consuming more alcohol per week. However, alcohol consumption was associated with diminished life satisfaction in both males and females. Abstainers from alcohol also reported higher levels of general satisfaction than both heavy and moderate drinkers. Murphy et al (2005) also recognised the perceived positive outcomes of alcohol consumption, that is, students drink for the positive social consequences.

Kohan & O'Connor (2002) found that higher alcohol consumption is associated with lower life satisfaction and higher job stress in police officers, with the study dividing life satisfaction into positive and negative affect. The study suggested that positive affect may be important for the maintenance of adaptive coping strategies among substance (alcohol) users, but no association was actually found between alcohol and positive affect in the study.

Grant, Wardle, & Steptoe (2009) have criticised the life satisfaction-alcohol consumption link. The study measured health behaviours in young adults (smoking, exercise, alcohol consumption, sun protection, fruit intake, fat intake, and fiber intake) and reported that life satisfaction was positively associated with all health behaviours except alcohol consumption and fibre intake, after adjusting for age and gender. However, the study also admitted that associations between life satisfaction and alcohol intake may only emerge when the majority of participants tested are heavy drinkers, which was not the case in the study (self-reported abstainers and moderate alcohol drinkers made up 63% of the sample).

The present study predicted, based on previous research, that alcohol consumption would be a predictor of life satisfaction, with gender moderating the alcohol-life satisfaction link.

1.13 Life Satisfaction and Extraversion

According to Robinson & Oishi (2006), extraverts frequently report being more satisfied with life than introverts. Schimmack, Radhakrishnan, Oishi, Dzokoto, & Ahadi (2002) suggested that extraversion influences life satisfaction in individuals, albeit mediated by personal affect and moderated by culture. The study also found that extraversion correlates with life satisfaction in individualistic cultures (USA, Hong Kong) more than collectivistic cultures (Japan, Ghana); possibly because individualists and extraverts think more about their life satisfaction.

Huebner (1991a) found that children who reported high life satisfaction tended to rate themselves higher in personality characteristics such as extraversion, where global life satisfaction did not associate with demographic variables age, school grade, gender, parental marital status, or parental occupational status. Robinson & Oishi (2006) suggested that extraversion can be looked upon as a cognitive function, and the extraversion-life satisfaction link may be particular to individuals incapable of categorising events.

The present study hypothesised that level of extraversion would moderate the level of life satisfaction in individuals.

1.14 Life Satisfaction and Coping

In relation to coping styles, Deniz (2006) found that life satisfaction is positively correlated with problem-focused coping and seeking social support, but that life satisfaction does not correlate with avoidance coping styles such as alcohol use for coping. Life satisfaction is also consistent across adult age groups according to Hamarat, Thompson, Steele, Matheny, & Simons (2002), who found that older individuals coped as least as effectively as younger adults in the domains of self-disclosure, self-directedness, confidence, social support, physical health, and stress monitoring.

Hamarat et al (2001) reported that the combination of perceived stress and coping resource availability measures better predicted global life satisfaction (albeit moderately), rather than when each predictor variable was considered separately. Coping resource effectiveness was also found to be a better predictor of life satisfaction in older adults but perceived stress better predicting life satisfaction in younger adults.

Research suggests that individual coping style and life satisfaction are related. Therefore, the current study hypothesised that alcohol use as a coping strategy would moderate the level of life satisfaction in individuals.

1.15 Life Satisfaction and Gender

The majority of research suggests that gender and life satisfaction are unrelated. Pavot & Diener (1993) reviewed the SWLS and found that gender is unrelated to this life satisfaction scale. Huebner (1991b) measured global life satisfaction in children (7-14 years of age) and reported that life satisfaction scores did not differ as a function of gender. These studies are supported by Fugl-Meyer, Melin, & Fugl-Meyer (2002) who found that life satisfaction in relation to domains such as vocation, leisure, sexual life, family life, somatic health, and psychological health, was gender independent in participants aged between 18 and 64 years.

Neto (1993) did however find that gender and life satisfaction were related in adolescents, with males showing a higher satisfaction with life than females. The study was limited in that it only measured Portuguese adolescents using the SWLS and Neto (1993) also questioned whether the findings could be generalised to other countries. Montepare & Lachman (1989) also found that life satisfaction was related to gender, with decreased age predicting happiness in females but not males. The present study therefore hypothesised that a gender difference in Irish life satisfaction would be found, especially among younger participants, thus examining the potential generalisation of the Neto (1993) findings to Irish culture.

1.16 Life Satisfaction and Aging

As with gender, a large extent of research suggests that there is no relationship between chronological age and life satisfaction. Pavot & Diener (1993) argued that age is not related to life satisfaction using the SWLS, and life satisfaction was found to be consistent across age groups in the Hamarat et al (2002) study. Huebner (1991b) measured global life satisfaction in children (7-14 years of age) and reported that life satisfaction scores did not differ as a function of age. An earlier study by Edwards & Klemmack (1973) suggested that when variables such as socioeconomic status and perceived health status are considered, the supposed relationship between life satisfaction and age (as well as marital status and family size), disappears.

However, Montepare & Lachman (1989) found that subjective age was a significant predictor of life satisfaction in younger males but not older men, with subjective and actual age both predicting life satisfaction in females (younger females were happier than older females). McAdams, Lucas, & Donnellan (2012) also asserted that life satisfaction in domains such as one's social life increases with age, but life satisfaction in domains such as health, decreases with age. The study suggested that multiple life domains (positive and negative) balance each other out with increasing age so that life satisfaction does not decline sharply.

Thus the present study hypothesised that when considering the moderating effects of gender, alcohol consumption, alcohol use as a coping strategy, and personality type, there would be a significant relationship between age and life satisfaction in Irish individuals.

1.17 Research Rationale

The current study aimed to determine whether alcohol consumption, alcohol use as a coping strategy, extraversion, age, and gender would predict levels of sleep-wake activity and life

satisfaction in Irish individuals, with alcohol's effects on excessive daytime sleepiness being the focal point of the study. Previous research has shown that the above predictor variables moderate sleep-wake activity and life satisfaction levels. However, the researcher found no previous studies that investigated these predictor variables on sleep-wake activity and life satisfaction in the Irish population specifically.

Reynolds & Kupfer (1987) looked at deviations in NREM and REM sleep of depressed patients in North America and Europe, but not Ireland specifically. Janson et al (1995) only investigated sleep disturbances in Iceland, Sweden, and Belgium. The effect of breathing-related sleep disorders on sleep efficiency has also been extensively researched on Europeans (Finn et al, 1998; Fulda & Schulz, 2001; Ohayon, 2003), but again, not Irish residents specifically and not taking into account this study's predictor variables on excessive daytime sleepiness and life satisfaction. Murphy, King, & Rice, (2009) did study the significant effects of noise pollution on residents and workers at nighttime in Dublin, Ireland, but alcohol's effect on nighttime disturbances was not considered. Therefore, there is a gap in research into whether alcohol consumption, alcohol use as a coping strategy, extraversion, age, and gender predict levels of sleep-wake activity and life satisfaction in Irish individuals.

The present study has identified that alcohol use is prevalent in Ireland and therefore its effects on sleep-wake behaviour and life satisfaction warrants investigating, while taking into account moderating variables extraversion, age, and gender.

1.18 Main Hypotheses

Previous research indicated that alcohol consumption and alcohol use to cope on sleep-wake activity and life satisfaction in individuals is mediated by personality type, with level of

alcohol consumption, level of extraversion, gender, and age also moderating for sleep quality and satisfaction with life. The current study therefore presented 10 hypotheses ($H_1 - H_{10}$) based on previous findings:

H_1 hypothesised that gender would significantly associate with excessive daytime sleepiness and nocturnal sleep scores, with females having increased excessive daytime sleepiness and poorer nocturnal sleep compared to males.

H_2 predicted that gender would also significantly associate with satisfaction with life scores, with males having increased satisfaction with life compared to females.

H_3 suggested that increased age would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep in participants.

H_4 hypothesised that increased age would also significantly associate with lower satisfaction with life among participants.

H_5 hypothesised that higher alcohol consumption among participants would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep.

H_6 predicted that higher alcohol consumption would also significantly associate with lower satisfaction with life among participants.

H_7 suggested that increased alcohol consumption as a coping mechanism would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep among participants.

H_8 hypothesised that increased alcohol consumption as a coping mechanism among participants would significantly associate with lower satisfaction with life scores.

H_9 predicted that higher extraversion levels in participants would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep.

Finally, H_{10} hypothesised that higher extraversion levels would also significantly associate with higher satisfaction with life scores among participants.

2 Method

2.1 Participants

A non-probability convenience and snowball sample consisting of the general public, financial institution employees, part-time final year undergraduate psychology students, chemistry PhD students, and employees from an internet technology company participated in the study voluntarily, outside of work or classroom hours. There was no monetary incentive offered by the researcher to individuals to participate in the research, therefore all participants completed the same questionnaire voluntarily.

The total sample size was $N = 135$, aged between 19 and 75 years (mean age = 33.53, SD = 9.94), comprising of 70 males (51.9%, mean age = 33.11, SD = 10.59) and 65 females (48.1%, mean age = 33.98, SD = 9.24). 160 hard copy surveys in total were handed out with 15 individuals either declining to partake in the study or returning a blank survey, meaning that there was a 90.6 per cent response rate. Two participants were excluded from further analysis due to having missing values to the required question of residency status in their completed surveys. Eight participants were also removed because they indicated that they were a non-resident of Ireland.

All participants included in the study were residents of Ireland but did not have to be an Irish citizen. Other inclusion criteria for the study were that participants (male or female) were aged 18 years or older (legal drinking age in Ireland), were able to understand the questionnaire instructions, and provided informed consent. Exclusion criteria included individuals who did not provide informed consent (by not completing the survey), individuals under 18 years of age, individuals who were not residents of Ireland, and those individuals belonging to a vulnerable group (children, very elderly, individuals with an intellectual/learning disability, groups receiving

help through the voluntary sector, and individuals in a subordinate position to the researcher). Socioeconomic status, education level, and employment status were not considered or elicited.

Participants were recruited either directly by the researcher via convenience sampling or on behalf of the researcher via snowball sampling. All participants were therefore approached directly by the researcher or on behalf of the researcher and no internet survey was used.

2.2 *Design*

A quantitative, non-experimental correlational research design was employed by the researcher to measure covariation between variables among the sample. The 6 predictor variables measured in the study were Gender (nominal demographic measure), Age (scale demographic measure in chronological years), Alcohol Consumption (scale measure – total standard units consumed over 31 days in December 2012), Alcohol use as a Coping Mechanism (scale measure – high to low score), Extraversion level (scale measure – high to low score), and Irish Residency (nominal demographic measure used as inclusion criterion).

There were 3 criterion variables in the study; Excessive Daytime Sleepiness (scale measure – high to low score), Nocturnal Sleep (scale measure - high to low score), and Satisfaction with Life (scale measure with high to low ranges of Highly Satisfied, Going Well, Generally Satisfied, Below Average, Dissatisfied, and Extremely Dissatisfied).

Participants were all considered as a single group, with Irish residency being the shared characteristic, as the study was interested in a sample from this population only.

2.3 *Materials*

All participants were issued a pen along with a survey printed on A4 size paper. The completed surveys were then collected and stored in a secure locker only accessible to the researcher. Once survey collection was completed, the survey data were entered into statistics program PASW 18 (formerly SPSS). The PASW software was installed on to a Dell Inspiron laptop which ran on Windows Vista (32-bit) Home Basic edition. The laptop was password protected with survey data only accessible to the researcher.

All participants were issued a survey which elicited demographical information of gender (Male or Female), Age (in numerical years), and Residency status (Yes or No to Irish Residency). The survey also contained 5 separate questionnaires combined into a single survey, with instructions on how to answer each section. Sections 2.3.1 to 2.3.5 describe each questionnaire separately.

2.3.1 *The Big Five Inventory (BFI) – Extraversion subscale.*

The Big Five Inventory (BFI) (John, Donahue, & Kentle, 1991, as cited in John, Naumann, & Soto, 2008) (See Appendix B) was used to measure the level of extraversion in participants. The BFI is a 44 item questionnaire but Extraversion on the BFI can be independently measured using an 8 item Extraversion subscale of the BFI (John et al, 2008).

The BFI Extraversion subscale measures 4 central extraversion facets: activity, gregariousness, warmth, and positive emotions (John et al, 2008). Participants were requested to write a number next to 8 statements (such as ‘I am someone who...Is outgoing, sociable’ or ‘I am someone who...Is talkative’) indicating the extent to which they agreed with each statement. The

BFI Extraversion subscale employed a Likert scale that used an equidistant five-level Likert item for each of the 8 statements. Participants rated their agreement with each statement, that is, 1 = Disagree strongly, 2 = Disagree a little, 3 = Neither agree nor disagree, 4 = Agree a little, and 5 = Agree strongly. Each ordinal item score was added to make a total Extraversion level subscale score. Total Extraversion level subscale scores therefore ranged from 8 to 40.

Participants scoring higher on the Extraversion level scale were deemed to have stronger traits in activity, energy, dominance, sociability, expressiveness, and positive emotions (Benet-Martínez & John, 1998), with lower scores indicating weaker levels of these traits.

In relation to reliability of the BFI, the scale has been found to show good inter-rater agreement (DeYoung, 2006; John et al, 2008), test-retest reliability (Benet-Martínez & John, 1998; Hampson & Goldberg, 2006), convergence reliability, and good internal consistency (John et al, 2008). In relation to validity, the BFI scale has shown substantial convergent validity (John et al, 2008) and good discriminative validity (Benet-Martínez & John, 1998) with other OCEAN instruments. Research therefore suggests that the BFI Extraversion subscale is reliable and has good validity.

2.3.2 *The COPE Inventory – Substance Use subscale.*

The COPE Inventory Substance Use subscale (Carver, Scheier, & Weintraub, 1989; Fontaine, Manstead, & Wagner, 1993; Carver, 2007) (See Appendix C) was used to assess the level of alcohol use to cope in participants. The modern dispositional COPE Inventory (60 items across 15 cope domains (Carver, 2007)) includes 4 items on the alcohol and drugs scale (Fontaine et al, 1993), measuring alcohol-drug disengagement in individuals.

Participants were requested to write a number next to each of the 4 statements (such as ‘I use alcohol or drugs to make myself feel better’ or ‘I use alcohol or drugs to help me get through it’) indicating which number was most accurate for themselves. The COPE substance use subscale employed a Likert scale that used an equidistant four-level Likert item for each of the 4 statements. Participants rated their agreement with each statement, that is, 1 = I usually don’t do this at all, 2 = I usually do this a little bit, 3 = I usually do this a medium amount, and 4 = I usually do this a lot. Each ordinal item score was added to make an Alcohol to Cope scale score. The Alcohol to Cope subscale scores therefore ranged from 4 to 16, with higher scores indicating higher usage of alcohol or drugs to cope.

In terms of reliability, the COPE Inventory has high Cronbach’s alpha reliability coefficients (Carver et al, 1989; Carver & Scheier, 1994), good test-retest reliability (Carver et al, 1989), and acceptable internal consistency (Fontaine et al, 1993). The COPE Inventory also has good convergent and discriminant validity (Carver et al, 1989). Research therefore supports the reliability and validity of the COPE Inventory and substance use subscale.

2.3.3 The Satisfaction with Life Scale (SWLS).

The Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985) (See Appendix E) was used to measure the level of life satisfaction in participants. The SWLS is a 5 item questionnaire, asking participants to measure their concept of life satisfaction by giving an overall judgement of their life in relation to 3 factors: positive affect, negative affect, and satisfaction (Diener et al, 1985).

Participants were requested to write a number next to 5 statements (such as ‘In most ways my life is close to ideal’ or ‘I am satisfied with my life’) indicating the extent to which they agreed with each statement. The SWLS employed a Likert scale that used an equidistant seven-level Likert item for each of the 5 statements. Participants rated their agreement with each statement, that is, 7 = Strongly agree, 6 = Agree, 5 = Slightly agree, 4 = Neither agree nor disagree, 3 = Slightly disagree, 2 = Disagree, and 1 = Strongly disagree. Each ordinal item score was added to make a total Satisfaction with Life scale score, with satisfaction with life degree cutoff scores of Extremely satisfied (31 – 35), Satisfied (26 - 30), Slightly satisfied (21 – 25), Neutral (20), Slightly dissatisfied (15 – 19), Dissatisfied (10 -14), and Extremely dissatisfied (5 – 9).

The SWLS has a good level of internal consistency according to Diener et al (1985), as well as acceptable test-retest reliability (decreasing over longer periods of time), strong internal reliability, and moderate temporal stability (Pavot et al, 1993). In terms of validity, the SWLS has moderately strong correlations with subjective well-being scales, as well as good criterion validity (Diener et al, 1985). Pavot et al (1993) stated that the SWLS also has good convergent and construct validity. Overall, the SWLS has been shown to have adequate reliability and validity for use as a psychometric tool.

2.3.4 The Sleep-Wake Activity Inventory (SWAI) – EDS and NS subscales.

The Sleep-Wake Activity Inventory (SWAI) (Rosenthal et al, 1993) Excessive Daytime Sleepiness (EDS) and Nocturnal Sleep (NS) subscales (See Appendix D) were both used to assess the level of EDS (the tendency to fall asleep at inappropriate times) in participants. The

EDS and NS factors consisted of 9 items (Items 1, 2, 4, 6, 8, 9, 10, 11, and 12) and 3 items (Items 3, 5, and 7) respectively (See Appendix D).

Based on the past 7 days, participants were requested to circle a number next to 12 statements (such as 'I doze off while watching tv' or 'It takes me less than 5 min to fall asleep') indicating the extent to which they agreed with each statement. The SWAI EDS and NS subscales employed a Likert semi-continuous scale that used a nine-level Likert item for each of the 12 statements. Participants rated their agreement with each statement from 1 = Always to 9 = Never. Each ordinal item score on the EDS and NS subscales were added to make total EDS and NS subscale scale scores respectively. Total EDS subscale scores ranged from 9 (indicating maximum level of sleepiness) to 81 (minimum level of sleepiness) (Rosenthal et al, 1993). Total NS subscale scores ranged from 3 (higher level of energy, increased ability to relax, and better sleep) to 27 (lower level of energy, reduced ability to relax, and poorer sleep) (Rosenthal et al, 1993). The lower the EDS and the higher the NS subscale scores, the higher the level of daytime sleepiness and poorer nighttime sleep in the participants.

According to Rosenthal et al (1993), the EDS and NS factors of the SWAI have adequate internal consistency and construct validity, being the best predictors of daytime sleepiness among the SWAI factors. The EDS subscale validity has also been supported by Smith & Trinder (2001) in comparison with other sleep measures.

2.3.5 *The Timeline Followback (TLFB) scale.*

The Timeline Followback (TLFB) scale (Sobell & Sobell, 1992) (See Appendix F) was used to measure the total number of standard units of alcohol (1 standard drink = 10 grams of

pure alcohol) (Drink Aware, 2010b) consumed by each participant in the month of December 2012. The TLFB measures alcohol consumption retrospectively, and participants completed the questionnaire in January 2013 to aid recall. The TLFB scale in this study was a 31 item questionnaire, that is, one item for each day in December 2012.

The TLFB scale employed a visible calendar where participants could enter the number of consumed standard drinks (scale score) for each day/date in December 2012; entering a number avoided recall exaggeration (example, 'I drank a little' or 'I drank a lot'). Research suggests that the use of a visible calendar and the listing of key dates such as December 25th (Christmas Day) and December 31st (New Year's Eve) also aided participant recall (Sobell et al, 1992). The TLFB can be used to record daily drinking for up to 12 months prior to completing the questionnaire (Sobell et al, 1992; Gioia, Sobell, Sobell, & Simco, 2012), so the present study predicted reasonably accurate recall scores from participants on a 1 month TLFB scale.

The questionnaire listed commonly consumed alcohol types such as beer, wine, and spirits, along with different measures and equivalent standard drink values. Participants were requested to calculate and enter a standard drink value for each day in December, and to enter a 0 for non-drinking days. The number of standard drinks consumed for the month of December was then calculated to create an Alcohol Consumption scale score.

In relation to reliability, the TLFB has been shown to elicit high test-retest reliability across multiple populations of heavy and light drinkers (Sobell et al, 1992), as well as being reliable under different settings such as in groups or by phone (Roy et al, 2008). The TLFB also shows good concurrent validity with other alcohol consumption measures and has good external criterion validity (Sobell et al, 1992). The TLFB scale has therefore been shown to have good reliability and validity as an alcohol consumption measure.

2.4 Procedure

For the convenience sampling of the general public, financial institution employees, and psychology students, the researcher approached each individual either privately or in a group, depending on the given opportunity. General public participants were recruited on weekends under social circumstances. Financial institution employees were recruited during lunch breaks and asked to complete the survey at home and return the document to the researcher 3 days from the recruitment date so as not to contravene employment policy. Psychology students were approached before class commencement on Tuesday evenings; completing and returning the survey immediately.

Each participant was asked to participate in a study as part of the researcher's undergraduate psychology degree. The participants were told that the purpose of the study involved the exploration of alcohol consumption, personality, and their relationship with sleep-wake activity and satisfaction with life in Irish people. The participants were told that the survey may yield significant results in relation to these areas and would take less than 10 minutes to complete. The researcher did not use deception at any point and answered any questions from participants in relation to the nature of the study truthfully to alleviate individual concerns.

The participants were informed orally that the study would take the form of a survey which they would be asked to read and complete should they wish to participate. Participants were also informed orally that participation in the study was completely voluntary and that they would remain anonymous as no personal details would be elicited other than gender and age. Each individual was told that they had the right to withdraw from the survey at any time until they completed and returned the survey, which at that point, due to anonymity, would mean that

their survey could no longer be identified. The participants were therefore reminded that submission of their survey would constitute informed consent on the part of the participant.

The participants were requested to read the cover letter (See Appendix A) on the first page of the survey before progressing which would reiterate what the researcher had just explained regarding the nature of the study, researcher contact details, right to withdraw, participant anonymity, confidentiality, and data security. Once each participant returned a completed survey, they were each reminded that their details would remain confidential and their survey and related data stored in a secure locker and password protected computer respectively.

The researcher recorded the average completion time of the survey to be approximately 7.5 minutes. Debriefing took the form of answering any questions participants may have had following completion of the survey and providing reassurance that no deception was/would be employed by the researcher at any time. The majority of participant questions related to alcohol consumption and what was considered by medical experts and psychologists to be healthy in relation to standard units per day/week as this information was elicited from the participants as part of the survey. The survey included a list of Support Services (See Appendix G) to contact should the participant have been affected by content or questions raised in the study. The participants were reminded during debriefing that should they have any concerns, to contact one or more of these Support Services (in confidence) immediately.

Due to the nature of the study, the researcher identified several ethical issues, mainly the potential risk of distress that may be caused by requesting personal information about alcohol consumption from participants. Participants were requested to give informed consent as indicated previously, confirming their understanding of the purpose and nature of the study, the benefits and risks, and the option to refuse or withdraw from the research at any time. Alcohol

consumption can be seen as a sensitive subject and therefore the researcher felt it more ethical to only request the gender and age of participants to ensure anonymity. No other personal information was requested. The researcher was also aware of the boundaries of their own competence studying psychology at an undergraduate level and did not exceed these boundaries by attempting to provide treatment intervention or clinical evaluation of participants. Participants who were concerned with their alcohol intake or other personal circumstances were instructed to contact a professional Support Service.

The researcher also identified the minimal risk of the potential inconvenience that may be caused to individuals participating in the study, that is, the impact to their personal schedule. Although the researcher felt that the research would satisfy the risk/benefit ratio (the stress involved would not outweigh similar stress encountered in real life situations), the participants were informed of the approximate time it would take to complete the survey and that they could withdraw at any time.

For the snowball sample (PhD students, internet company employees, and financial institution employees) collected by associates of the researcher, the individuals acting on behalf of the researcher were instructed to recruit participants by informing them of the nature of the study and that by partaking in the study, they would be assisting an undergraduate in their thesis. Each participant was then given a survey to complete outside of work/college hours and told to return the completed survey 3 days after the recruitment date. The individuals acting on behalf of the researcher collected all surveys in a single brown envelope to promote anonymity and returned these to the researcher who added them randomly to the other collected surveys (again, to ensure anonymity and confidentiality).

Participants who completed the survey as part of the snowball sample were instructed to contact the researcher or the researcher's supervisor should they have any questions, with contact details provided on the survey cover letter (See Appendix A).

3 Results

3.1 Descriptive Statistics

Table 1 presents the descriptive statistics, means, and standard deviations of each of the psychological measures. Gender and Age statistics are outlined in detail in the Method section. The mean Extraversion level score was 22.97 (SD = 5.49) (See Table 1), indicating that the majority of participants (69.6%) were more extraverted (scoring 21 or higher) than introverted. The lowest Extraversion level score was 9 ($N = 2$, highly introverted) and the highest was 34 ($N = 3$, highly extraverted) (See Appendix H for histogram of Extraversion level scores).

The mean Alcohol to Cope score was 5.68 (SD = 2.60) (See Table 1), which indicated that using alcohol to cope was not prevalent in the sample, with 4 (47.4%, $N = 64$, lowest use of alcohol to cope) being the most common score among participants. Alcohol to Cope scores did range from 4 to 16 ($N = 3$, high use of alcohol to cope) however. Appendix H includes the histogram of positively skewed and leptokurtic distribution of Alcohol to Cope scores.

In relation to alcohol consumption, only one participant failed to complete the scale. The average number of standard drinks consumed by the participants over the month of December 2012 was 66.87 (or 2.16 standard units per day, equivalent to just over a pint of beer), with a very large standard deviation from the mean of 68.59 (See Table 1), indicating a large variation in alcohol consumption scores across the sample. Appendix H includes the histogram of positively skewed and leptokurtic distribution of alcohol consumption scores. Males (mean = 84.32, SD = 83.88) interestingly drank more on average than females (mean = 48.35, SD = 40.31), but a mode of 0 suggests that on the majority of days, participants did not drink any alcohol. Notably, one male participant skewed the distribution of scores by drinking 564 standard units (or 18.19 units on average each day), and six participants (4.5%) drank 0 standard units across the whole month.

Results showed that three participants did not complete the Excessive Daytime Sleepiness (EDS) scale completely, and that the mean EDS score was 60.26 (SD = 12.83) (See Table 1), meaning most participants had low levels of excessive daytime sleepiness (91.7% of participants scored higher than 40). The lowest EDS score was 16 and the highest was 81 (see Appendix H for histogram of scores). Males (mean = 60.91) reported lower levels of EDS than females (mean = 59.56).

In relation to Nocturnal Sleep (NS), only one participant failed to complete the NS scale, and the average NS score was 16.63 (SD = 3.76) (See Table 1), indicating slightly low levels of energy and poorer sleep across participants in the group (61.2% of participants scored higher than the midpoint of 15 on the scale). The lowest NS score was 9 and the highest was 27 (see Appendix H for histogram of scores). Males (mean = 16.14) reported better levels of NS than females (mean = 17.15).

Finally, the mean Satisfaction with Life Scale (SWLS) score was 23.31 (SD = 6.17) (See Table 1). Appendix H includes a histogram showing SWLS scores which were broken down as follows: four participants (2.9%) fell into the 'Extremely dissatisfied' cutoff score, ten (7.3%) into 'Dissatisfied', twenty-two (16.3%) into 'Slightly dissatisfied', six (4.4%) into 'Neutral', thirty-one (22.9%) into 'Slightly satisfied', forty-eight (35.5%) into 'Satisfied', and fourteen (10.3%) into the 'Extremely satisfied' cutoff score. Results indicated that 26.5 per cent of participants were dissatisfied to some degree with their life, while 68.7 per cent were satisfied to some degree with their life. Males (mean = 23.86) had higher Satisfaction with Life scores than females (mean = 22.72).

Table 1: *Descriptive statistics of the psychological variables*

	Gender	Age	Extraversion level	Alcohol to Cope	Alcohol Consumption ^a	EDS ^b	NS ^c	Sat. with Life
N	135	135	135	135	134	132	134	135
Missing	0	0	0	0	1	3	1	0
Mean	-	33.53	22.97	5.68	66.87	60.26	16.63	23.31
Median	-	30.00	23.00	5.00	47.00	61.00	17.00	25.00
Mode	1 ^d	28	21	4	0	58	18	26
SD	-	9.94	5.49	2.60	68.59	12.83	3.76	6.17
Minimum	-	19	9	4	0	16	9	7
Maximum	-	75	34	16	564	81	27	34

^aTotal Standard Units December 2012

^bExcessive Daytime Sleepiness

^cNocturnal Sleep

^dMale = 1, Female = 2

3.2 Testing for Normal Data

The criterion variables were checked for normal distribution. EDS, NS, and Satisfaction with Life scores were slightly negatively skewed, with Shapiro-Wilk significance scores of $p = 0.01$, $p = 0.16$, and $p = 0.01$ respectively. EDS and NS scores had relatively mesokurtic (normal) curves, with Satisfaction with Life having a slightly leptokurtic curve and negative skew (See Appendix H). The EDS, NS, and Satisfaction with Life QQ Plot scores did not deviate significantly from the line and there were no extreme outliers. Therefore, parametric tests were carried out on the data.

To test for relationships between each of the predictor variables (Age, Extraversion level, Alcohol to Cope, and Alcohol Consumption) on each of the criterion variables (EDS, NS, and Satisfaction with Life), scatterplots were used to check for a linearity assumption (See Appendix I) followed by standard multiple regressions (See Section 3.3).

3.3 Inferential Statistics – Standard Multiple Regression Results

Standard multiple regressions were carried out for each of the five predictor variables (Age, Gender, Extraversion level, Alcohol to Cope, and Alcohol Consumption) on each of the three criterion variables (EDS, NS, and Satisfaction with Life), respectively. Scores from eight participants were considered outliers and were removed from regression analysis because each had a Mahalanobis value which exceeded 20.52, the critical value when considering five predictor variables. The correlation scores for each multiple regression on each criterion variable are included in Appendix J.

Appendix K includes the regression standardised residual histogram, normal P-P plot, and relevant partial regression plots of predictor variables on Satisfaction with Life and EDS. Scores were considered to be somewhat normally distributed which allowed for a multiple regression. Predictor variables Alcohol to Cope and Extraversion level had notable correlation scores of -0.28 and 0.26 with Satisfaction with Life respectively. Correlation scores between each of the predictor variables did not exceed 0.7 so multicollinearity between predictor variables was not considered an issue.

Table 2 presents the standardised regression coefficients and statistical significance of each predictor variable on Satisfaction with Life. In a simultaneous multiple regression where ratio of cases to predictors was 25.2 to 1, predictor variables explained about 14 per cent of the variance in Satisfaction with Life ($R^2 = 0.14$, $F(5, 120) = 4.94$, $p < 0.001$). It was found that Alcohol to Cope scores significantly predicted Satisfaction with Life scores ($\beta = -0.347$, $p < 0.001$, 95% CI = -1.717 – -0.527), as did Extraversion level ($\beta = 0.298$, $p = 0.001$, 95% CI = 0.138 – 0.526), where $\beta = \text{Beta}$.

The Beta coefficient for Alcohol to Cope indicated a negative relationship with Satisfaction with Life scores, with Alcohol to Cope explaining about 10 per cent of the variance. The Beta coefficient for Extraversion level indicated a positive relationship with Satisfaction with Life scores, with Extraversion level explaining about 8 per cent of the variance. Tolerance values all exceeded 0.1 (lowest value was 0.72) so again, multicollinearity was found not to be an issue with the variables.

Table 3 displays the standardised regression coefficients and statistical significance of each predictor variable on EDS. In a simultaneous multiple regression where the ratio of cases was 24.6 to 1, predictor variables together at 2 per cent did not significantly explain the variance in EDS scores ($R^2 = 0.02$, $F(5, 118) = 1.49$, $p = 0.199$). However, Age did significantly predict about 3 per cent of the variance in EDS scores ($\beta = 0.189$, $p = 0.042$, 95% CI = 0.009 – 0.529), with increased age associating with lower EDS. Tolerance values all exceeded 0.1.

It was found that none of the five predictor variables significantly predicted the variance in NS scores ($R^2 = 0.01$, $F(5, 119) = 1.30$, $p = 0.269$). Table 4 displays the standardised regression coefficients and statistical significance of each predictor variable on NS.

Table 2: *Standardised Beta coefficients and t-value significance of predictor variables on Satisfaction with Life*^a

Variable	B	Standard error b	Beta	t	Significance of t	Part Correlation
Alcohol to Cope	-1.12	0.30	-0.347	-3.74**	0.000	-0.31
Extraversion level	0.33	0.10	0.298	3.40*	0.001	0.28
Alcohol Consumption ^b	0.01	0.01	0.075	0.77	0.445	0.06
Age	-0.02	0.06	-0.036	-0.42	0.678	-0.04
Gender	-0.24 ^c	1.09	-0.020	-0.22	0.825	-0.02

^a Criterion variable – Satisfaction with Life

^b Total Standard Units December 2012

^c Male = 1, Female = 0

^d $R^2 = 0.14$

* p significant at .01 level, ** p significant at .001 level

Table 3: *Standardised Beta coefficients and t-value significance of predictor variables on Excessive Daytime Sleepiness^a*

Variable	B	Standard error b	Beta	t	Significance of t	Part Correlation
Age	0.27	0.13	0.189*	2.05	0.042	0.18
Alcohol to Cope	-1.10	0.68	-0.161	-1.61	0.111	-0.14
Gender	2.35 ^c	2.48	0.092	0.95	0.346	0.08
Extraversion level	-0.20	0.22	-0.086	-0.91	0.365	-0.08
Alcohol Consumption ^b	0.02	0.03	0.074	0.70	0.484	0.06

^a Criterion variable – Excessive Daytime Sleepiness

^b Total Standard Units December 2012

^c Male = 1, Female = 0

^d $R^2 = 0.02$

* p significant at .05 level

Table 4: *Standardised Beta coefficients and t-value significance of predictor variables on Nocturnal Sleep^a*

Variable	B	Standard error b	Beta	t	Significance of t	Part Correlation
Extraversion level	-0.08	0.07	-0.12	-1.29	0.199	-0.12
Gender	-0.73	0.73	-0.10	-1.00	0.319	-0.10
Alcohol Consumption ^b	-0.01	0.01	-0.11	-1.00	0.320	-0.10
Age	-0.02	0.04	-0.05	-0.58	0.561	-0.05
Alcohol to Cope	0.03	0.20	0.01	0.14	0.889	0.01

^a Criterion variable – Nocturnal Sleep

^b Total Standard Units December 2012

^c Male = 1, Female = 0

^d $R^2 = 0.01$

4 Discussion

4.1 Summary

The aim of the present study was to determine whether alcohol consumption, alcohol use as a coping strategy, extraversion, age, and gender related to levels of sleep-wake activity and life satisfaction in Irish individuals. Sleep-wake activity was assessed using excessive daytime sleepiness levels and nocturnal sleep quality in individuals.

Results indicated that alcohol use to cope was not prevalent among the sample, and that participants drank on average just over 2 standard units of alcohol for each day in December 2012, with male alcohol consumption notably higher than in females. Alcohol consumption figures were lower than what was found in the Alcohol Action Ireland (2011) study (approximately 14 versus 20 standard units per week on average). Participants were slightly more extraverted than introverted, with low levels of excessive daytime sleepiness, but there were notable levels of low energy and poor nocturnal sleep among the sample. In terms of life satisfaction, the majority of participants were satisfied with their life.

H₈ hypothesised that increased alcohol consumption as a coping mechanism among participants would significantly associate with lower satisfaction with life scores. The present study found a significant negative relationship between Alcohol to Cope and Satisfaction with Life scores, after controlling for the presence of the other predictor variables. Therefore, the null hypothesis for H₈ was rejected. Deniz (2006) found that life satisfaction did not correlate with avoidance coping styles such as alcohol use but other studies asserted that individual coping style and life satisfaction are related (Hamarat et al, 2001; Hamarat et al, 2002), with those who reduced their alcohol intake (to cope with stress) having enhanced life satisfaction (Laudet, Morgen, & White, 2006). These findings were supported in the current study.

H₁₀ predicted that higher extraversion levels would significantly associate with higher satisfaction with life scores among participants. All research in this area suggested that the alternative hypothesis for H₁₀ would be accepted with extraverts being more satisfied with life across different individualistic cultures (such as Ireland) and age groups, perhaps because extraverts possess higher positive personal affect (Huebner, 1991a, Schimmack et al, 2002; Robinson et al, 2006). Results showed that Extraversion level scores were significantly positively correlated with Satisfaction with Life scores. Therefore the null hypothesis for H₁₀ was rejected. Results also support the use of the BFI Extraversion subscale and SWLS measures.

Results indicated that increased age significantly predicted reduced EDS levels which conflicted with H₃ and Huang et al (2002) who found that daytime naps increase with age. Increased age was also associated with poorer NS as expected (Hume et al, 1998) but not significantly so. The null hypothesis for H₃ was therefore accepted. The mean age of the sample was just over 33 years of age so perhaps an increase in older participants in the sample would have yielded different results.

In relation to H₃, Bixler et al (2005) found that EDS is actually more prevalent in younger individuals under 30 years suggesting unmet sleep needs in the young, and Lavie (1981) stated that EDS complaints in their sample did not relate to age so perhaps the present study's original hypothesis did not have enough empirical support to begin with. Future research may want to further investigate the exact relationship between age and EDS, while controlling for the amount of physical activity engaged in by participants as exercise has been shown to improve sleep in older adults (Buman, Hekler, Bliwise, & King, 2011).

H₁ hypothesised that gender would significantly associate with excessive daytime sleepiness and nocturnal sleep scores, with females having increased excessive daytime

sleepiness and poorer nocturnal sleep compared to males. Results indicated that males had notably higher EDS scores and lower NS scores, corresponding to lower EDS and better NS than females. However, although there was a good gender split in the sample, gender did not significantly predict EDS or NS scores. Therefore the null hypothesis for H_1 was accepted.

The majority of research supported the H_1 hypothesis, that is, females would report more sleep disturbance and higher EDS (Lindberg et al, 1997; Jean-Louis et al, 1999; Jean-Louis et al, 2000; Voderholzer et al, 2003; Mateo et al, 2012), but Nugent et al (2001) did find high EDS in Northern Irish males due to snoring and Vela-Bueno et al (2008) found high rates of napping in Spanish male students. Studies suggest that males do suffer from EDS and cope through napping (Moreno et al, 2003; Yang et al, 2003; Vela-Bueno et al, 2008) which may mean that EDS is not gender specific. Several studies could find no gender differences in EDS or sleep patterns (Hume et al, 1998; Huang et al, 2002; Pallos et al, 2004) which could explain why no significant gender differences were found in the current study.

H_2 predicted that gender would significantly associate with satisfaction with life scores, with males having increased satisfaction with life compared to females. After the removal of outliers and controlling for the influence of other predictors, male Satisfaction with Life scores were lower than females. This may have been due to alcohol consumption differences (Murphy et al, 2005). However, gender did not significantly predict Satisfaction with Life. Therefore the null hypothesis for H_2 was accepted. This finding is in line with previous research (Huebner, 1991b; Pavot et al, 1993; Fugl-Meyer et al, 2002) and so the Neto (1993) evidence of gender differences in Portuguese satisfaction with life was not found to exist in Irish individuals.

H_4 hypothesised that increased age would significantly associate with lower satisfaction with life among participants. Montepare et al (1989) found that age predicted life satisfaction in

females while McAdams et al (2012) found age differences in satisfaction with life domains such as social life and health. However, the majority of research suggested that there is no age-life satisfaction relationship (Edwards et al, 1973; Huebner, 1991b; Pavot et al, 1993; Hamarat et al, 2002). Supporting this research, the current study found that satisfaction with life decreased with age but this was not significant. Therefore, the null hypothesis for H₄ was accepted. Future studies may want to employ condition specific measures of life satisfaction as in the McAdams et al (2012) study if they aim to yield significant results.

H₅ hypothesised that higher alcohol consumption among participants would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep. This hypothesis was supported by several studies (Foster et al, 1999; Yu et al, 2003), with significant results expected due to alcohol consumption rates in Ireland being above average (Alcohol Action Ireland, 2011).

Alcohol consumption did not significantly associate with EDS or NS scores, with respective positive and negative relationships with alcohol consumption suggesting that increased alcohol consumption actually minutely reduced EDS and improved NS. This finding is supported by low alcohol consumption rates among the sample compared to the national average (Alcohol Action Ireland, 2011) and Roehrs et al (2001) who suggested that occasional alcohol intake actually improves sleep. Wilkinson & Colquhoun (1968) also found that moderate alcohol consumption acts as a depressant rather than an arouser in sleep-deprived individuals which may result in increased sleep duration.

The null hypothesis for H₅ was therefore accepted with the researcher finding one study (Vinson et al, 2010) which found no relationship between alcohol consumption and sleep problems. The distribution of Alcohol Consumption scores was severely positively skewed towards lower alcohol consumption so a larger population sample with normally distributed

scores that include light and heavy drinkers is probably required to fully measure the effect of alcohol consumption on sleep-wake activity as proposed in the Grant et al (2009) study.

Research supported the alternative hypothesis for H₆ which predicted higher alcohol consumption associating with lower satisfaction with life scores among participants (Kohan et al, 2002; Murphy et al, 2005), but as with sleep-wake activity, there may not have been enough heavy drinkers in the sample to find a significant relationship between alcohol consumption and life satisfaction. The present study found a notable positive non-significant relationship between alcohol consumption and satisfaction with life and therefore the null hypothesis for H₆ was accepted. Future research may want to ensure that heavy drinkers are included by eliciting participation from alcohol dependent individuals such as members of the AA (Alcoholics Anonymous Ireland, 2013).

H₇ suggested that increased alcohol consumption as a coping mechanism would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep among participants. Increased Alcohol to Cope scores correlated with increased EDS and poorer NS as expected, but not significantly so, meaning the null hypothesis for H₇ was accepted.

Research suggested that alcohol consumption as part of avoidance coping resulted in greater sleep disturbances (Hoyt et al, 2009) but it must be noted that this area has not been heavily researched with studies such as Morin, Rodrigue, & Ivers (2003) only stating that coping skills mediate sleep quality but not investigating the influence of alcohol. Geddes (2005) even argued that humans may be able to tap into an evolutionary physiological potential to cope without sleep as seen in the animal kingdom with whales and birds. Therefore, more studies in this field are warranted in order to better understand the relationship between alcohol use to cope and sleep-wake activity.

Finally, H₉ predicted that higher extraversion levels in participants would significantly associate with excessive daytime sleepiness and poorer nocturnal sleep. There was a good extravert-introvert split in the present sample so significant results were expected. Results indicated that Extraversion level scores negatively correlated with both EDS and NS scores, meaning increased extraversion in individuals was associated with increased EDS but better NS, thus partly supporting the alternative hypothesis. The Extraversion level relationship with EDS and NS scores was not significant however, meaning the null hypothesis for H₉ was accepted.

The researcher found evidence to support the late night, party-going extravert stereotype who sleeps shorter hours (Orme, 1972), possesses a different circadian rhythm to introverts (Soehner et al, 2007), and has lower cortical arousal resulting in a need for more stimulation (Killgore et al, 2007), resulting in reduced sleep and excessive daytime sleepiness. But other studies criticised this link suggesting that extraversion is in fact positively correlated with good sleep quality, longer sleep duration, and increased daytime functioning (Gray et al, 2002), or even that no relationship exists between sleep quality and the extraversion-intraversion personality dimension (Soehner et al, 2007), supporting the null hypothesis for H₉.

4.2 Research limitations

Out of the 10 hypotheses originally presented in the current study, all but 2 of the null hypotheses were accepted. The previous section has already highlighted some issues with the original hypotheses and the normal distribution of the research data.

As reported, no alternative hypotheses involving EDS and NS were accepted, with only Age significantly predicting EDS scores in H₃. While the SWAI EDS subscale has previously shown to be a significant predictor of EDS, the NS measure has not (Rosenthal et al, 1993). The

researcher recommends that to better measure EDS in a sample, future studies employ the use of multiple EDS measures in conjunction with the SWAI EDS subscale such as the Multiple Sleep Latency Test (MSLT), the Maintenance of Wakefulness Test (MWT), and Epworth Sleepiness Scale (Johns, 2000), while discarding the NS scale as an EDS measure.

The present study also attempted to measure alcohol consumption in individuals over a one month period. While one month drinking recall calendars (Sobell et al, 1992) and drinking diaries (Williams, Aitken, & Malin, 1985) have proved to be valid and reliable measures, Poikolainen (2006) found that drinkers underestimated their alcohol intake by up to 12 per cent depending on the amount of alcohol consumed, even when only 1-2 days had passed before recall occurred.

One issue with the validity of self-report alcohol measures is that participants may deny the extent of their involvement with alcohol and knowingly under-report their alcohol consumption, perhaps in an effort to conceal their drinking (Midanik, 1982). The fact that a convenience and snowball sample were used in the current study and that participants knew the researcher, may have increased the risk of participants lying about their alcohol consumption, therefore skewing the data and preventing significant results from being revealed. This theory is also supported by the fact that average alcohol consumption in the sample was considerably less than the national average.

Future studies may want to use breathalyzer and/or blood alcohol measures (Midanik, 1982) in conjunction with alcohol self-reports, and use an anonymous internet survey, to increase the likelihood of receiving valid data from participants.

Each psychological measure in the present study employed Likert scales to measure participant agreement with statements and to create scale totals for statistical analysis. Lee, Jones,

Mineyama, & Zhang (2002) have argued that there are cultural differences in the response patterns and error rates completing Likert scales. This study suggests that certain participants may be more likely to incorrectly complete a measure that uses Likert scales, subsequently invalidating results. Further research into the response/error patterns of Irish individuals in completing Likert scales is recommended.

Another weakness of this study is that only residents of Ireland were included. To ensure that significant results can be contributed to Irish residents only, future research may want to carry out a between-participants design where comparisons between Irish residents and non-Irish residents can be made.

To measure a sample of the Irish population, the convenience and snowball sampling took place in Dublin which may not be a true representation of the Irish population. Sampling of participants from each Irish county is recommended for future research, using internet or postal surveys.

This study also recommends that socio-economic status (Edwards et al, 1973), working hours (Lusa et al, 2002), sleep apnea (Finn et al, 1998), perceived stress (Bergdahl et al, 2002), marital stress (Rosenthal et al, 1993), and exercise levels (Buman et al, 2011) be included in future regression models of EDS and satisfaction with life as these factors have previously shown to be significant. The inclusion of these predictors would require a much larger sample than in the present study however.

Although the results of the current study were not significant in relation to predictors of excessive daytime sleepiness in Irish individuals (with the exception of Age on EDS), future studies that take into consideration this study's recommendations when measuring the relationship between alcohol use and personality on sleep-wake activity, may yield better results.

The use of alcohol to cope was found to be significantly associated with lower satisfaction with life and suggests that the coaching of more problem-focused coping strategies such as seeking social support (Bischof, Rumpf, Hapke, Meyer, & John, 2003; Deniz, 2006) to individuals who drink to cope as an avoidance-coping strategy, may result in an increase in their perceived life satisfaction.

4.3 Conclusion

In conclusion, the current study found that the use of alcohol to cope significantly reduced satisfaction with life in individuals, while individuals who were higher in extraversion were found to have a higher satisfaction with life than introverts, which may be related to an individualistic attitude. Significantly higher EDS levels in younger participants suggest that young Irish people are not getting sufficient sleep which needs future investigation.

Gender, age, and alcohol consumption did not significantly predict satisfaction with life. No significant relationships were found between gender, alcohol consumption, extraversion, using alcohol to cope, and Irish sleep-wake activity. Limitations in the present study may have resulted in the lack of evidence to support a relationship between each of the predictor variables on criterion variables sleep-wake activity and satisfaction with life, which warrants future research in these areas.

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Appendix

Appendix A

Cover Letter

<p style="text-align: center;">Alcohol use, coping strategies, extraversion and their relationship to Irish sleep-wake activity and life satisfaction</p>
--

My name is James Smith and I am conducting research in the DBS Department of Psychology that explores alcohol consumption, personality, and their relationship with sleep-wake activity and satisfaction with life in Irish people. This research is being conducted as part of my studies and will be submitted for examination.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey. While the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and confidential. Thus responses can not be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored and data from the questionnaires will be transferred from the paper record to electronic format and stored on a password protected computer.

It is important that you understand that by completing and submitting the questionnaire that you are consenting to participate in the study.

Should you require any further information about the research, please contact me at [REDACTED] or [REDACTED]. My supervisor Dr Garry Prentice can be contacted at [REDACTED]

Thank you for taking the time to complete this survey.

Appendix B

The Big Five Inventory (BFI) - Extraversion Subscale

Here are a number of characteristics that may or may not apply to you. Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who...

1. _____ Is talkative
2. _____ Is reserved
3. _____ Is full of energy
4. _____ Generates a lot of enthusiasm
5. _____ Tends to be quiet
6. _____ Has an assertive personality
7. _____ Is sometimes shy, inhibited
8. _____ Is outgoing, sociable

Appendix C

The COPE Inventory - Substance Use Subscale

This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Please try to respond to each item separately in your mind from each other item. Please answer every item items by writing a number next to each statement. Indicate what YOU usually do when YOU experience a stressful event.

1 = I usually don't do this at all

2 = I usually do this a little bit

3 = I usually do this a medium amount

4 = I usually do this a lot

1. I use alcohol or drugs to make myself feel better. _____

2. I try to lose myself for a while by drinking alcohol or taking drugs. _____

3. I drink alcohol or take drugs, in order to think about it less. _____

4. I use alcohol or drugs to help me get through it. _____

Appendix D

Sleep/Wake Activity Inventory (SWAI) -

Excessive Daytime Sleepiness (EDS) and Nocturnal Sleep (NS) Subscales

Using the scales to the right of each item, circle the one number which most closely describes you for the last seven days. For example, if you were asked to judge how frequently you fall asleep while having a meal, circling a “1” means you believe it is always; circling a “9” means never; circling a “5” means sometimes, and so on.

Remember: base your answers on the last seven days

		ALWAYS	NEVER
1.	I doze off while watching TV	1----2----3----4----5----6----7----8----9	
2.	I can take a nap anywhere	1----2----3----4----5----6----7----8----9	
3.	I have difficulty with falling asleep	1----2----3----4----5----6----7----8----9	
4.	I fall asleep during a conversation	1----2----3----4----5----6----7----8----9	
5.	Even if I take a nap, I sleep well at night	1----2----3----4----5----6----7----8----9	
6.	I get drowsy driving a few minutes	1----2----3----4----5----6----7----8----9	
7.	It takes me less than 5 min to fall asleep	1----2----3----4----5----6----7----8----9	
8.	I get drowsy within 10 min when I sit still	1----2----3----4----5----6----7----8----9	
9.	I fall asleep when visiting with friends	1----2----3----4----5----6----7----8----9	
10.	I get sleepy after reading for 15 min	1----2----3----4----5----6----7----8----9	
11.	I doze off when relaxed	1----2----3----4----5----6----7----8----9	
12.	I fall asleep when riding as a passenger	1----2----3----4----5----6----7----8----9	

Appendix E

The Satisfaction with Life Scale

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Neither Agree nor Disagree	5 Slightly Agree	6 Agree	7 Strongly Agree
----------------------------------	----------------------	----------------------------------	---	-------------------------------	-------------------	-------------------------------

_____ In most ways my life is close to my ideal.

_____ The conditions of my life are excellent.

_____ I am satisfied with my life.

_____ So far I have gotten the important things I want in life.

_____ If I could live my life over, I would change almost nothing.

Appendix F

The Timeline Followback (TLFB) Scale

- A blank calendar is attached. Please write in the number of **Standard Drinks** that you had each day in the month of December 2012.
- Please note that:
 - **1 x Pint of beer/lager/cider/stout = 2 Standard Drinks**
 - **1 x 500 ml can of beer/lager/cider/stout = 2 Standard Drinks**
 - **1 x 330 ml bottle of beer/lager/cider/stout = 1 Standard Drink**
 - **1 x 275 ml bottle of alcopop = 1 Standard Drink**
 - **1 x 150 ml glass of wine = 1 Standard Drink**
 - **1 x 35.5 ml measure of spirit/liquor = 1 Standard Drink**
- On days when you did not drink, you should write a “0”.
- In estimating your drinking, please be as accurate as possible.

2012	SUN	MON	TUES	WED	THURS	FRI	SAT
							1
D	2	3	4	5	6	7	8
E	9	10	11	12	13	14	15
C	16	17	18	19	20	21	22
	23	24 Christmas Eve	25 Christmas	26	27	28	29
	30	31 New Year's Eve					

Appendix G

Survey - Support Services

Thank you for taking the time to complete this survey!

If you have been affected by any of the questions raised in this survey, please contact any of the following Support Services:

Samaritans – Ireland (Open 24 Hrs, 365 Days)

Tel – 1850 60 90 90

Samaritans – Dublin Branch (Open 24 Hrs, 365 Days)

Tel – 1850 60 90 90

Text – 087 2 60 90 90

Email – jo@samaritans.org

Write/Call in to 112 Marlborough St, Dublin 1.

Alcoholics Anonymous Ireland

General Service Office of Alcoholics Anonymous,

Unit 2, Block C,

Santry Business Park,

Swords Road, Dublin 9.

Tel - 01 8420700

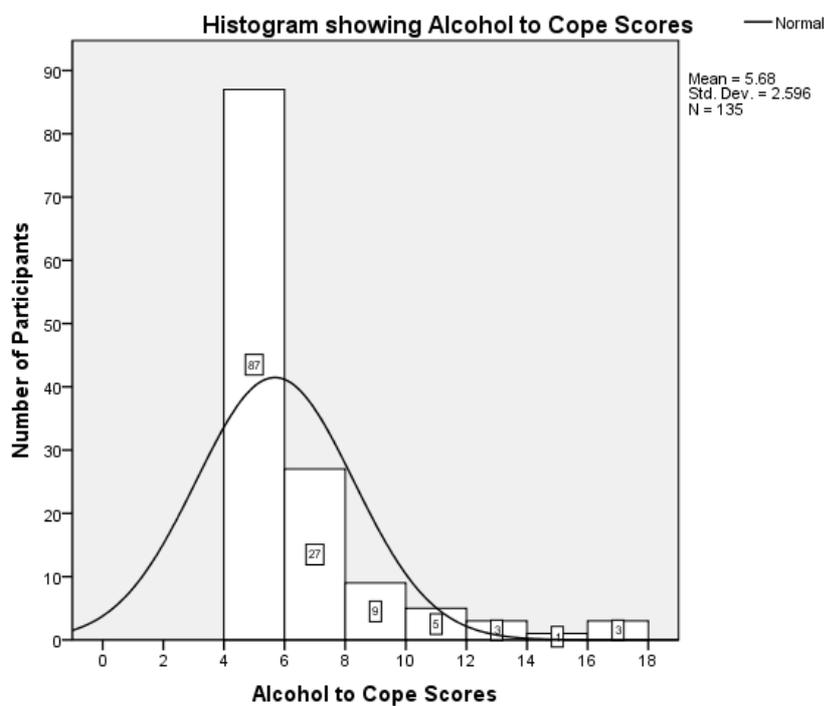
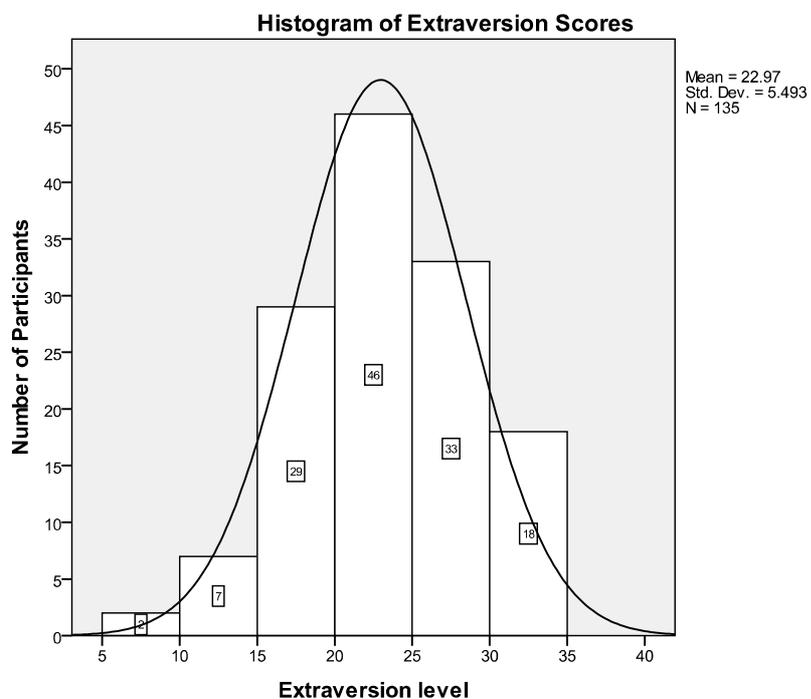
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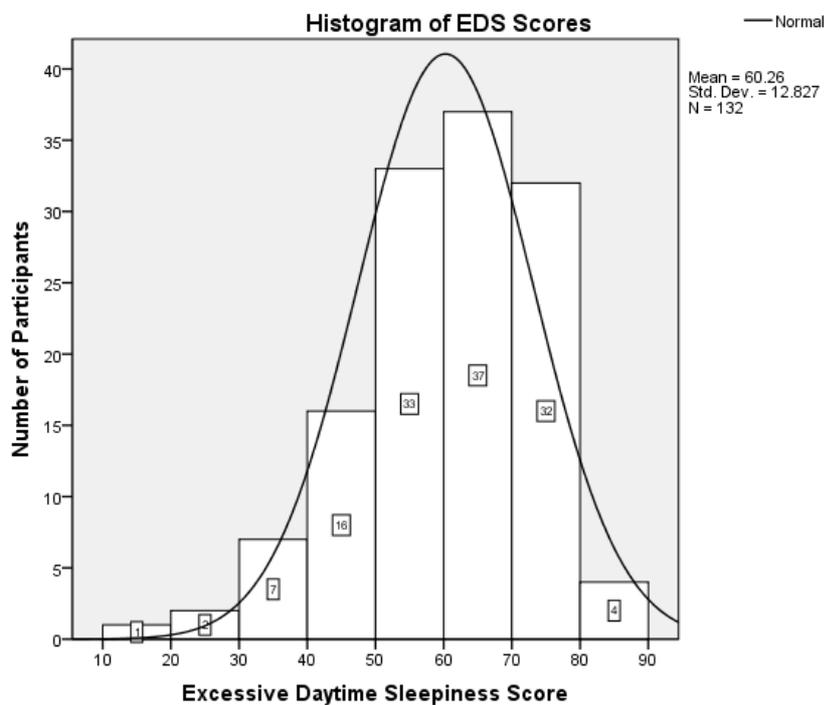
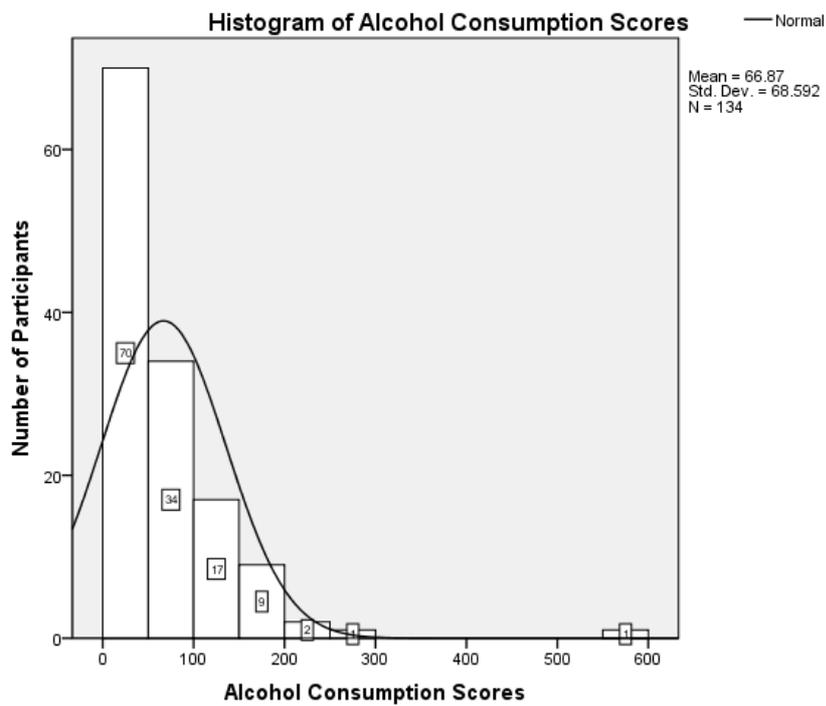
DrinkAware.ie

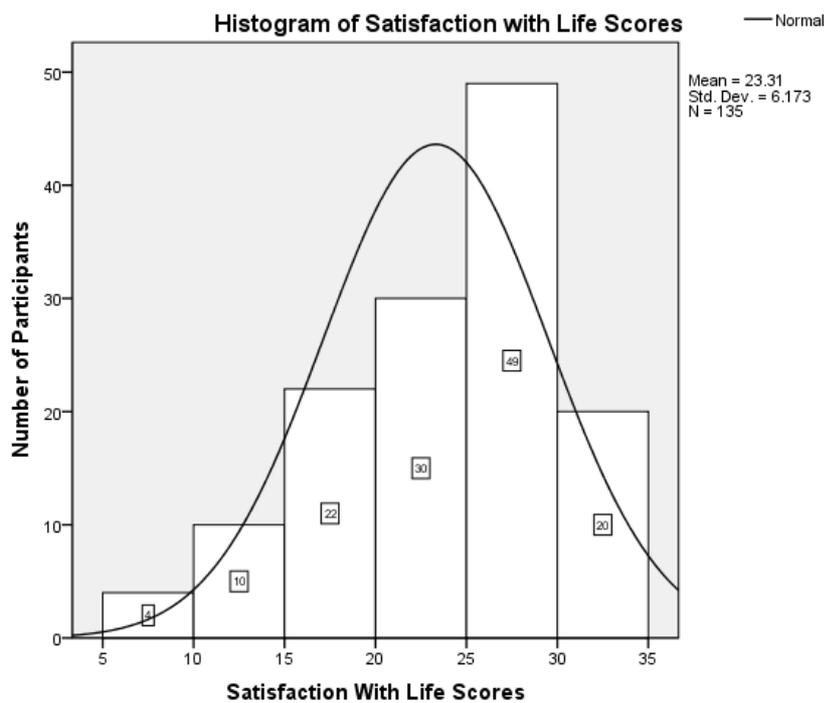
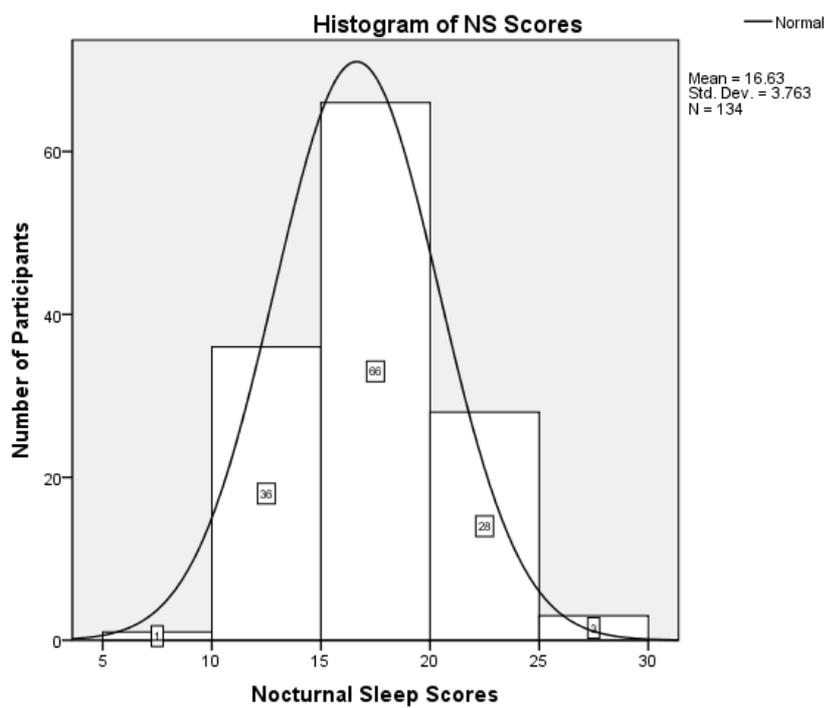
www.drinkaware.ie

Appendix H

Histograms displaying scores and distribution curves for each variable

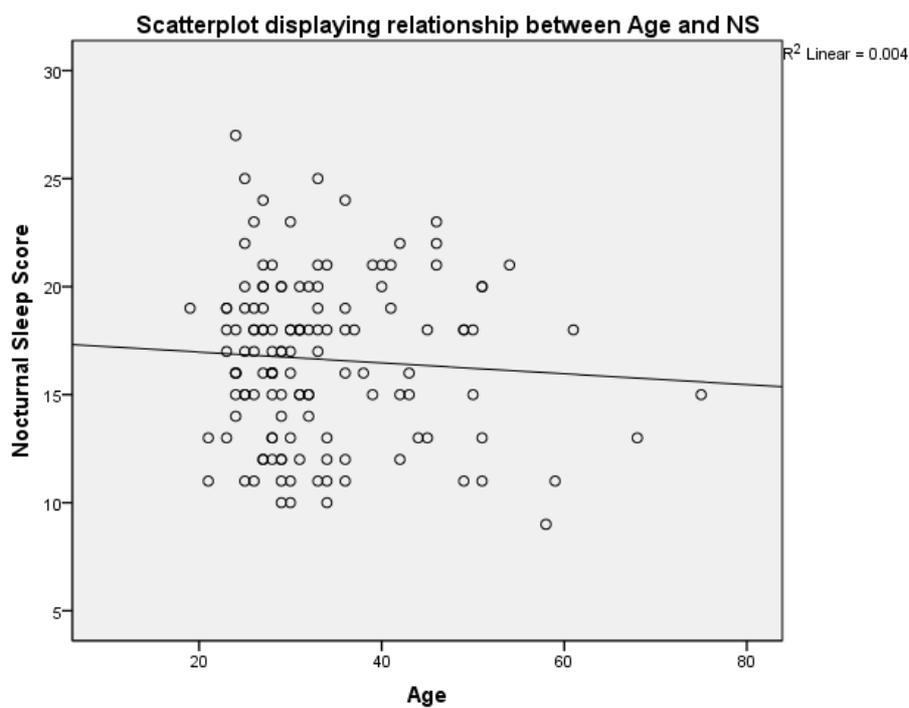
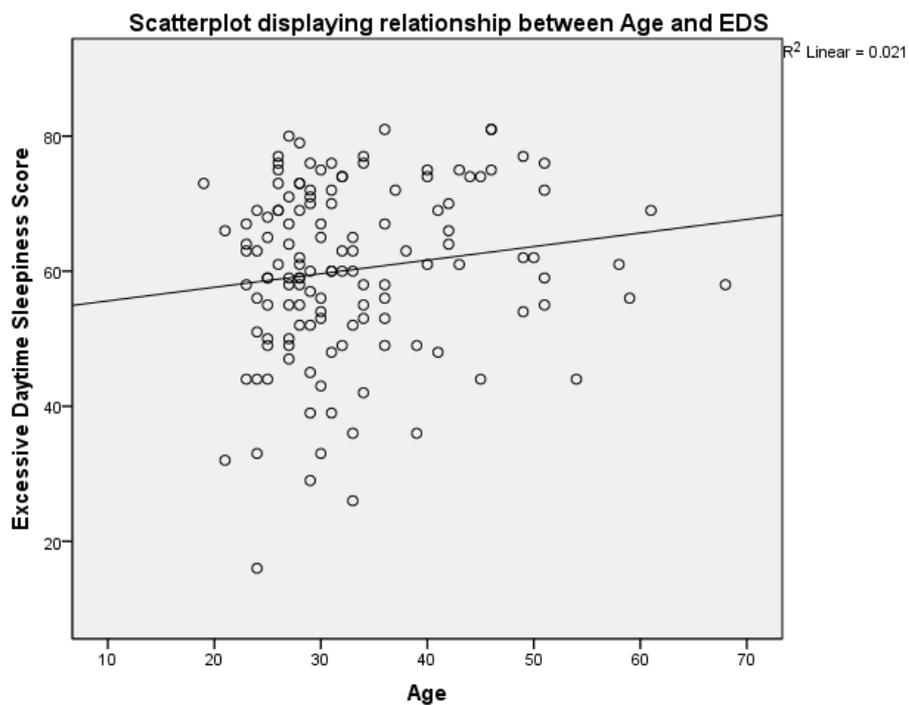




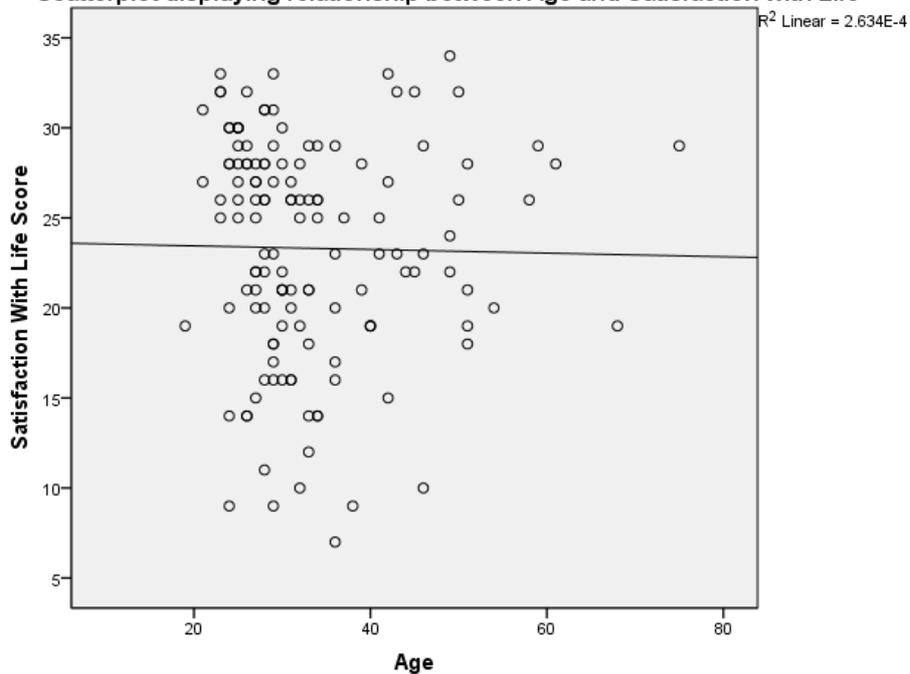


Appendix I

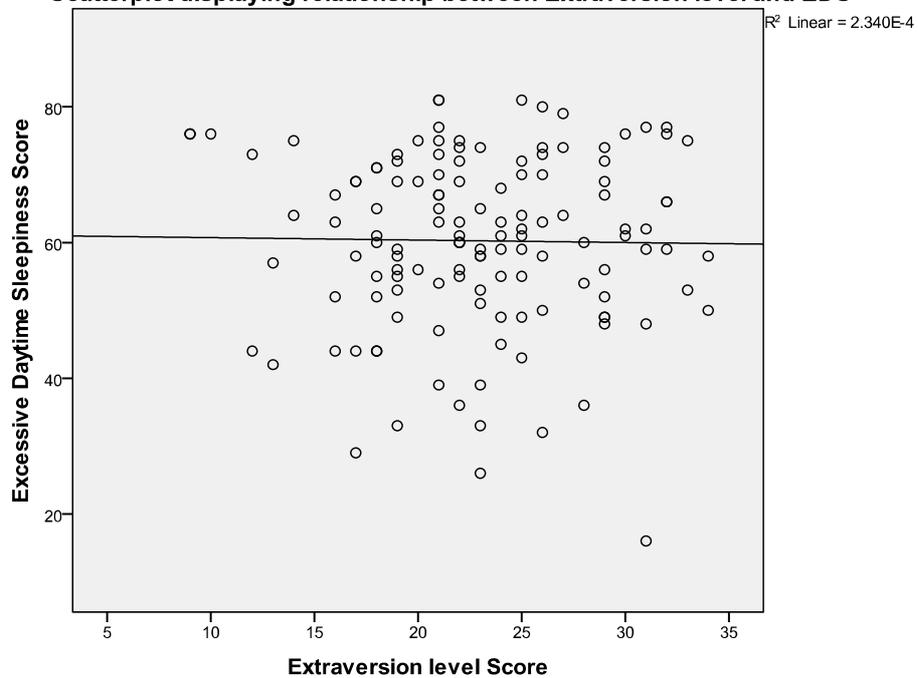
Scatterplots of each predictor variable on each criterion variable

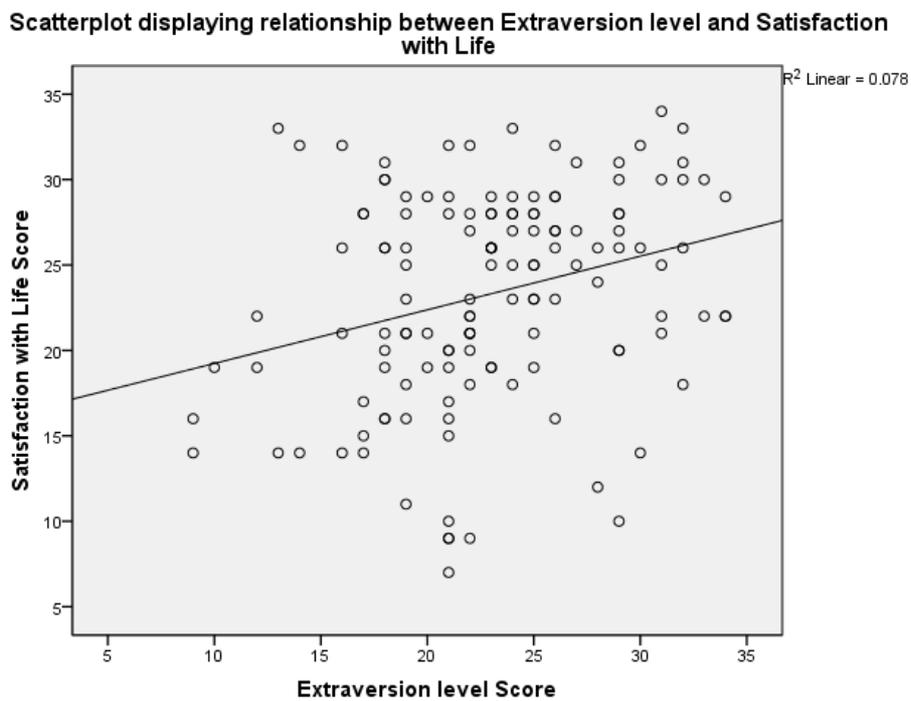
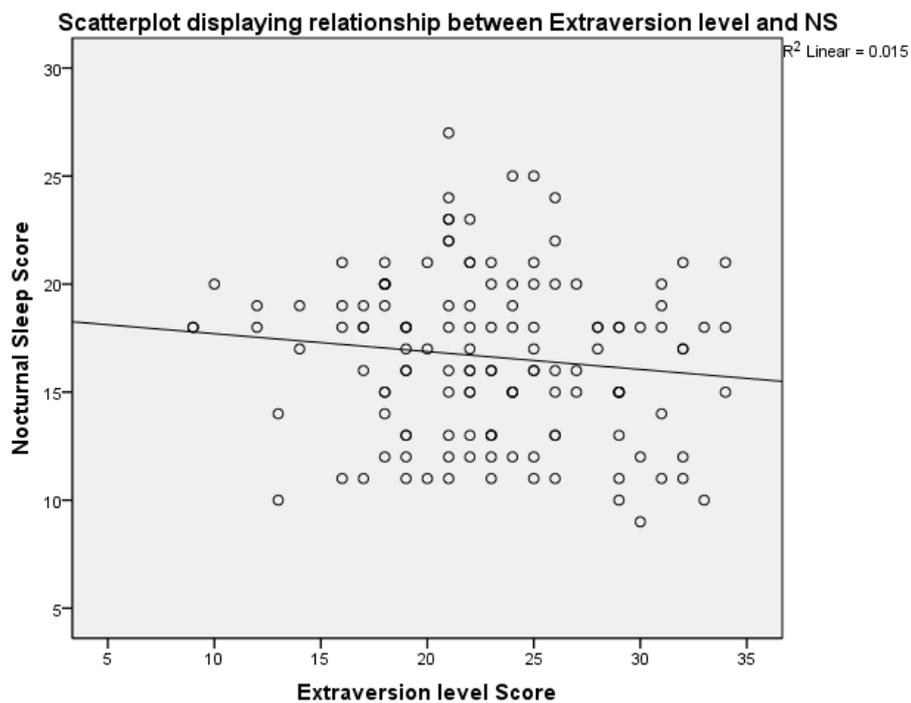


Scatterplot displaying relationship between Age and Satisfaction with Life

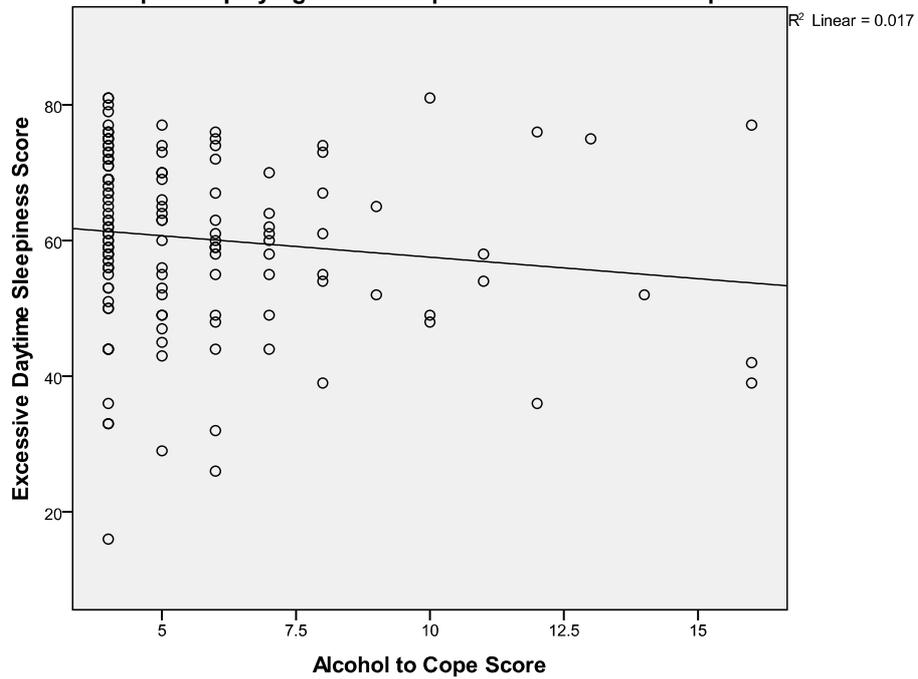


Scatterplot displaying relationship between Extraversion level and EDS

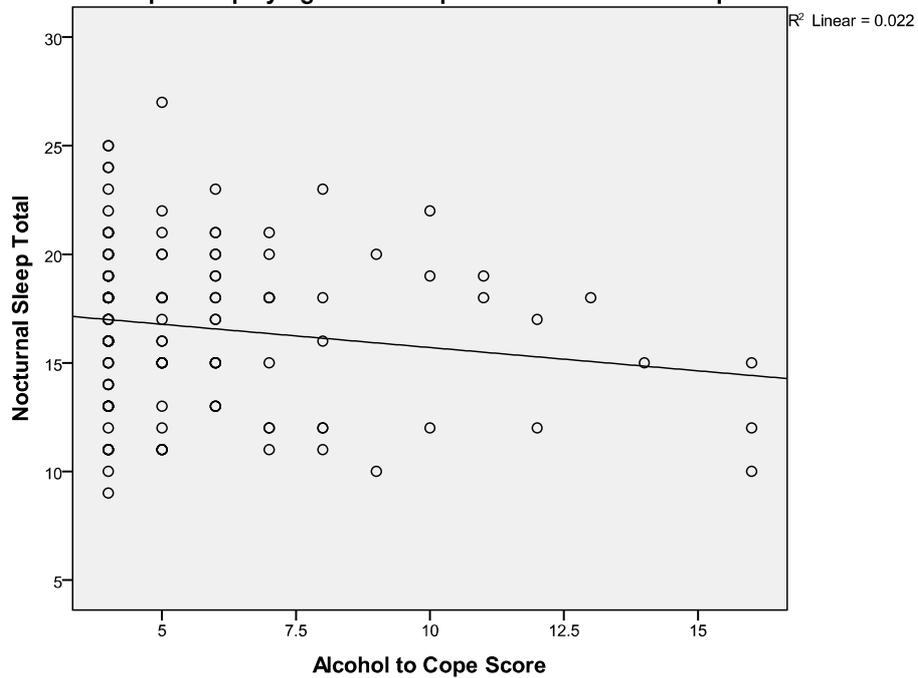




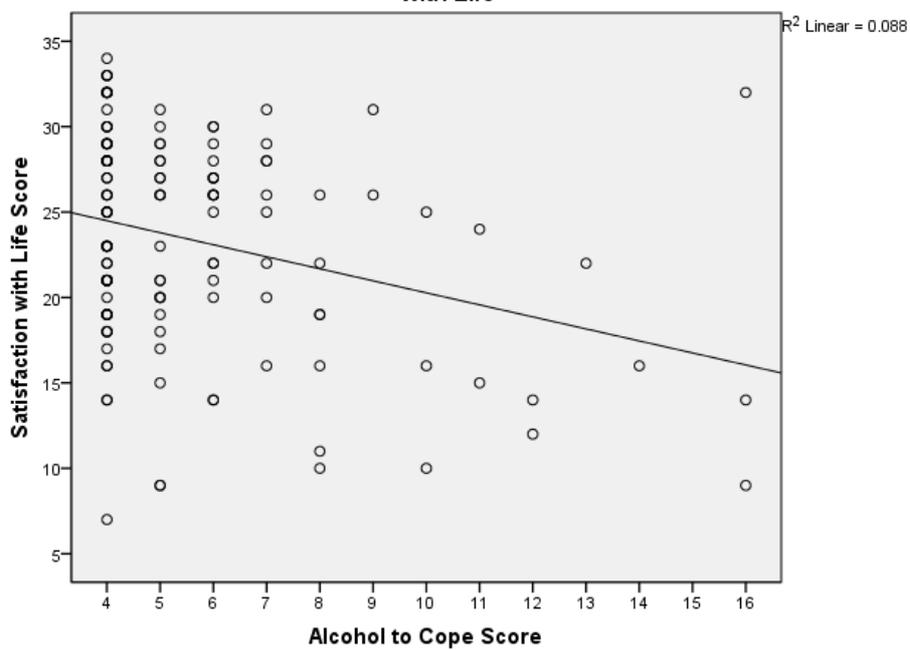
Scatterplot displaying relationship between Alcohol to Cope and EDS



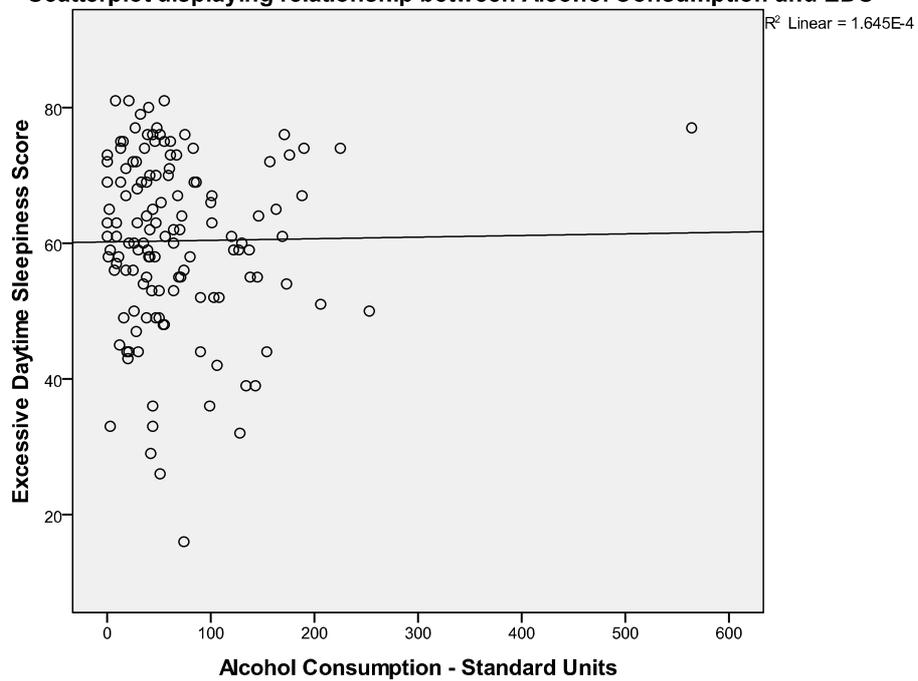
Scatterplot displaying relationship between Alcohol to Cope and NS



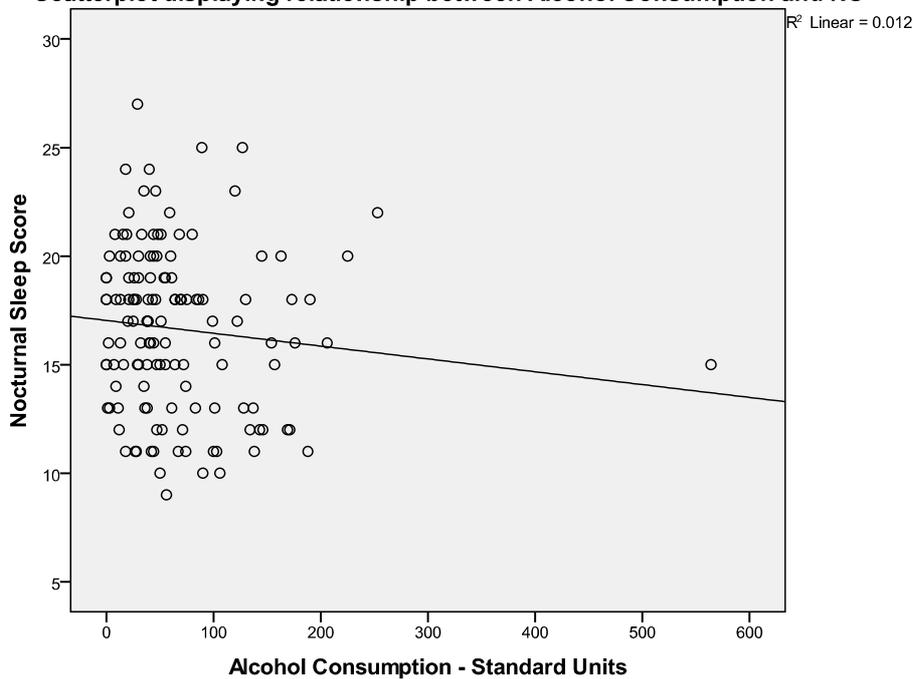
Scatterplot displaying relationship between Alcohol to Cope and Satisfaction with Life



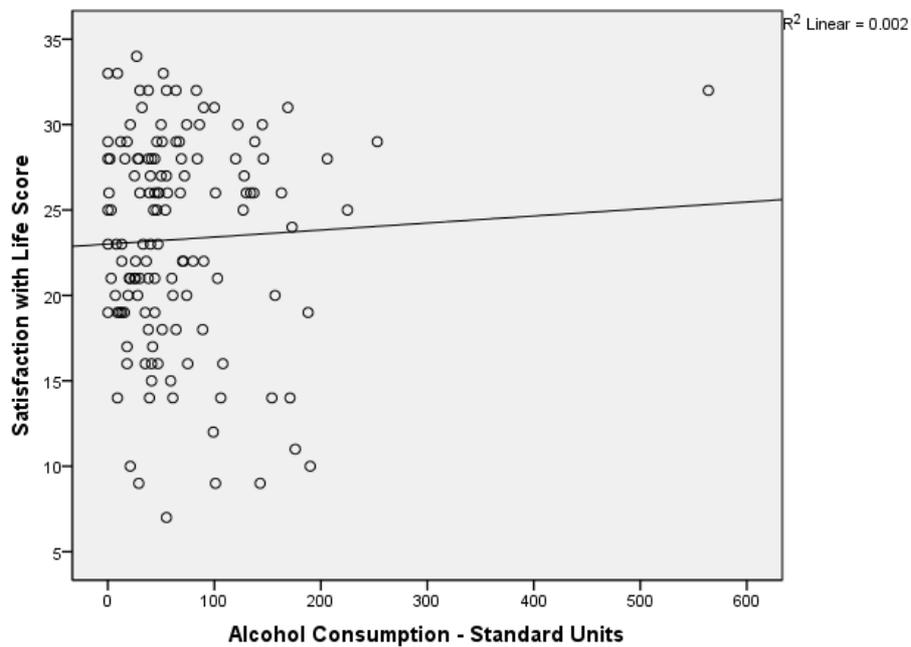
Scatterplot displaying relationship between Alcohol Consumption and EDS



Scatterplot displaying relationship between Alcohol Consumption and NS



Scatterplot displaying relationship between Alcohol Consumption and Satisfaction with Life



Appendix J

Multiple Regression Correlation Scores

Means, Standard Deviations and Regression Correlations for five predictor variables on Satisfaction with Life

	Mean	SD	Satisfaction with Life	Age	Gender	Extraversion level	Alcohol to Cope
Satisfaction with Life ^a	23.41	6.06					
Age	33.21	8.98	-0.03				
Gender	0.51	0.50	0.05	-0.10			
Extraversion level	22.91	5.42	0.26	0.05	0.28		
Alcohol to Cope	5.36	1.87	-0.28	-0.01	0.11	0.13	
Alcohol Consumption ^b	61.61	50.67	-0.02	-0.19	0.30	0.13	0.44

^a Criterion variable – Satisfaction with Life^b Total Standard Units December 2012*Means, Standard Deviations and Regression Correlations for five predictor variables on Excessive Daytime Sleepiness*

	Mean	SD	EDS	Age	Gender	Extraversion level	Alcohol to Cope
EDS ^a	60.58	12.74					
Age	33.08	8.92	0.16				
Gender	0.51	0.50	0.05	-0.12			
Extraversion level	22.94	5.45	-0.05	0.07	0.30		
Alcohol to Cope	5.37	1.89	-0.13	-0.01	0.11	0.13	
Alcohol Consumption ^b	61.64	50.94	-0.02	-0.18	0.31	0.17	0.44

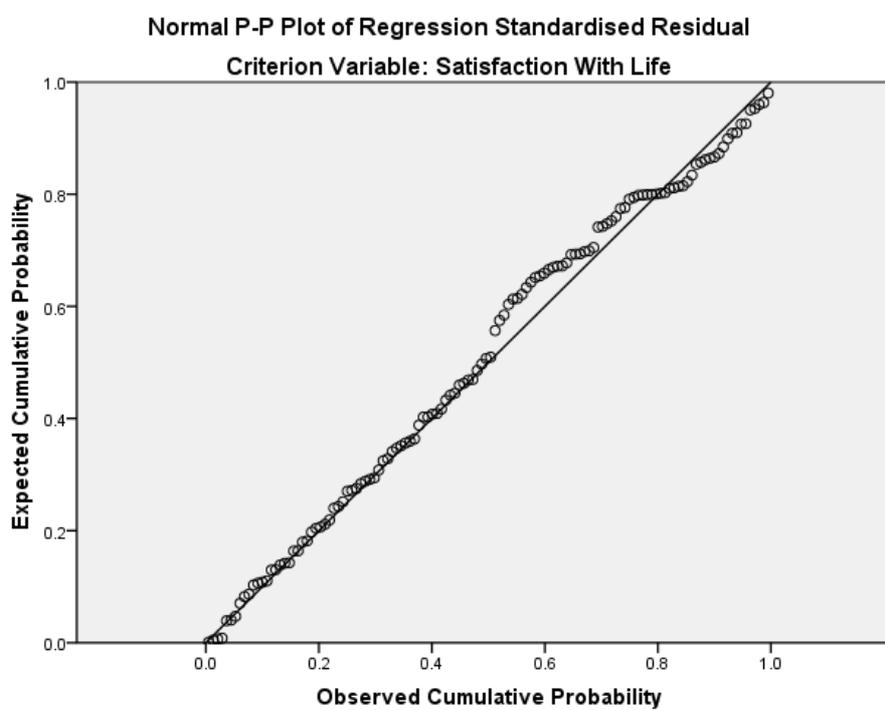
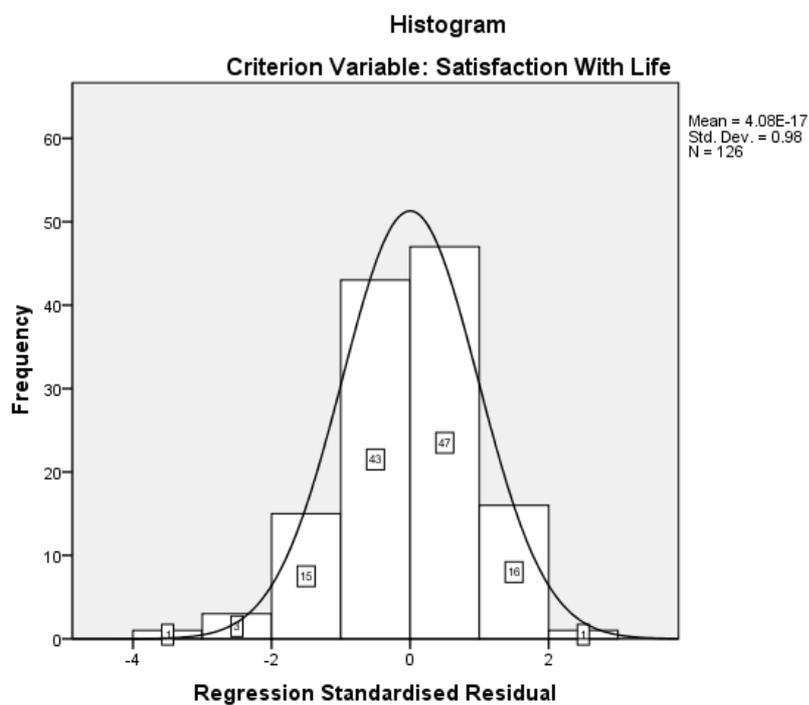
^a Criterion variable - Excessive Daytime Sleepiness^b Total Standard Units December 2012*Means, Standard Deviations and Regression Correlations for five Predictor variables on Nocturnal Sleep*

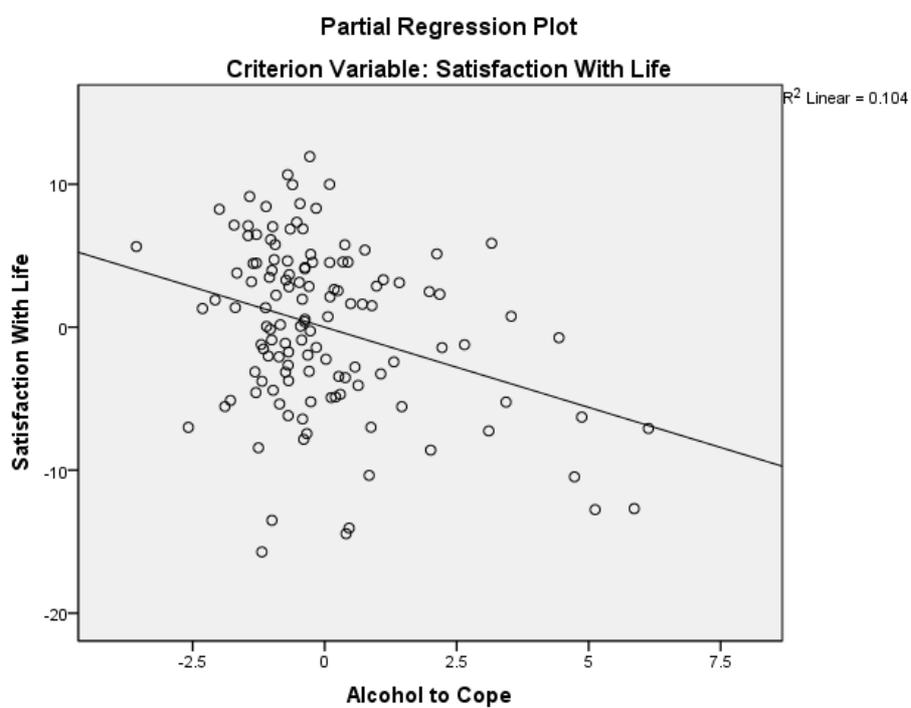
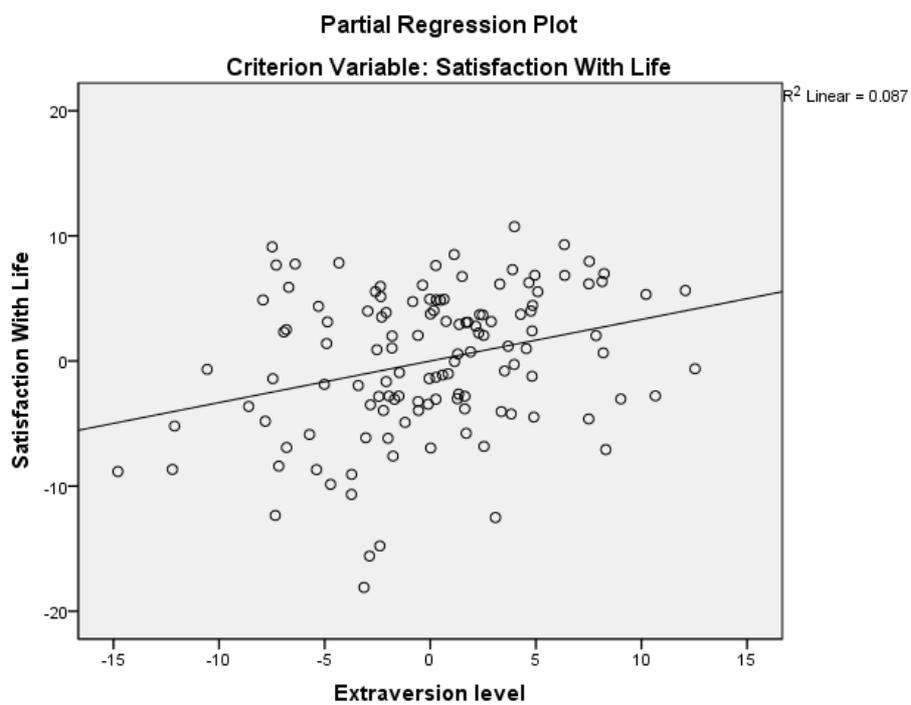
	Mean	SD	NS	Age	Gender	Extraversion level	Alcohol to Cope
NS ^a	16.74	3.77					
Age	33.16	8.99	-0.03				
Gender	0.50	0.50	-0.16	-0.11			
Extraversion level	22.90	5.44	-0.17	0.05	0.28		
Alcohol to Cope	5.34	1.87	-0.06	-0.22	0.10	0.13	
Alcohol Consumption ^b	62.03	50.65	-0.14	-0.19	0.31	0.18	0.45

^a Criterion variable - Nocturnal Sleep^b Total Standard Units December 2012

Appendix K

Multiple Regression Histogram and Relevant Plots – Satisfaction with Life





Multiple Regression Histogram and Relevant Plots – EDS

