PERSONALITY AND ALCOHOL USE: THE ROLES OF IMPULSIVITY, NEGATIVE CONSEQUENCES, AGE AND GENDER

by

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A THESIS SUBMITTED TO THE UNIVERSITY OF BIRMINGHAM FOR THE DEGREE OF DOCTOR OF CLINICAL PSYCHOLOGY

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May 2018

Thesis Overview

Volume I: Research Component

Volume I of the thesis consists of a systematic literature review, empirical research paper, and public dissemination document. The main finding of the systematic review was that sensation seeking is a significant predictor of alcohol use in adolescence, but does not always directly predict problem drinking and related problems. The empirical showed, among a sample of young males who have not attended university, impulsivity and negative consequences are directly related to alcohol use, but that it important to consider mediating and moderating variables that may impact the nature and direction of these relationships. The public dissemination document provides succinct and accessible summaries of both the systematic review and the empirical research paper.

Volume II: Clinical Component

Volume II serves as a compilation of five Clinical Practice Reports (CPRs) conducted throughout the course of the Doctorate programme. CPR I consists of Cognitive-Behavioural and Systemic formulations of a 46-year old female with panic attacks. CPR II presents a service evaluation of missed first appointments for Talking Therapies in an Improving Access to Psychological Therapies (IAPT) service. In CPR III, the effectiveness of a behavioural intervention with a 96-year old female diagnosed with challenging behaviour is tested and described using a single-case design. CPR IV presents a case study of a 15-year old female with anxiety and problematic eating behaviours. CPR V presents an abstract of a case study presentation of a 51-year old female with learning disabilities receiving psychological services for trauma and abuse.

Acknowledgements

Firstly, I would like to thank Dr Hermine Graham for being an amazing research supervisor – your level of organization, calm tone and reassurance has been integral in the completion of my thesis. To my appraisal tutor, Dr Michelle Fisher, thank you for your unwavering support throughout the entire programme, and for doing all in your power to help me achieve this milestone. To Nicole El Marj and Carmel Bennett, thank you both for your guidance and support.

Gratitude is extended to my parents – Linda and Courtney – for your words of encouragement throughout the entire process. Special thanks to my mother for keeping me calm and restoring my self-belief in moments of doubt. To my friends and family, thank you also for keeping me focused, and reminding me to keep my eyes on the prize.

VOLUME I: RESEARCH COMPONENT

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CHAPTER I: SYSTEMATIC LITERATURE REVIEW

THE ROLE OF SENSATION SEEKING IN PROBLEM DRINKING IN ADOLESCENCE: A SYSTEMATIC REVIEW

Abstract

Rationale and Aim of Literature Review

Tackling problem drinking during adolescence can reduce the likelihood that an individual will develop an alcohol addiction/alcohol use disorder in adulthood and/or face negative alcohol-related consequences, including difficulties with the law, physical health, and interpersonal relationships. 'Personality traits' have been explored and considered important in predicting problem drinking among adolescents. One of the most commonly researched personality traits believed to increase the likelihood of problem drinking is 'impulsivity'. Sensation seeking is said to be a facet of the personality trait 'impulsivity. However, much of the research on personality and problem drinking simply highlights correlations between different personality traits and problem drinking. The aim of the current review, therefore, is to create a deeper understanding of one most studied personality traits in alcohol research; 'sensation seeking', and its relation to problem drinking and alcohol related problems in adolescence.

Method

Three databases were used to conduct a systematic search of the literature: PsychINFO (Ovid), MEDLINE (Ovid) and Web of Science (Core Collection). The search yielded 1,254 results, 21 studies met the inclusion criteria and were included in the review. These 21 articles were systematically reviewed, and a quality appraisal of each study was conducted.

Results

'Sensation seeking' was found to predict alcohol use in adolescence. However, only a few studies found direct relationships between sensation seeking and problem drinking and alcohol-related problems. There appears to be other important variables that increase the likelihood that an individual high in sensation seeking will engage in problem drinking behaviour and face

alcohol-related problems. The relationship appears to be mediated most reliably by enhancement motives, and anti-social features, and moderated by social norms. Gender, family and peer history of substance abuse, stressful life events and risk-taking propensity also seem to influence the impact of sensation seeking on problem drinking.

Conclusion

Sensation seeking is a significant predictor of alcohol use in adolescence, but does not always directly predict problem drinking and related problems. However, the role of internal and external influences needs to be considered when trying to predict drinking at a problematic level and alcohol-related problems in adolescence. Future research should explore the specific role of different personality traits on problem drinking. The findings of this review of the literature provide useful pointers for efforts to prevent and treat problem drinking in adolescence.

Introduction

Problem Drinking Definition and Prevalence

There is no clear consensus for a definition of problem drinking. Nevertheless, it is often defined as the "consumption of alcohol that results in difficulty with a person's mental or physical health, social life, and career ("Definition of Problem Drinking", n.d.). This term is not synonymous with alcoholism, but rather is often used to describe the full range of drinking patterns, ranging from moderate to severe. Problem drinking generally describes the drinking patterns of people who are not said to have an alcohol related diagnosis, but experience difficulties related to their drinking behaviour. However, some scholars also use this term as an umbrella term for heavy drinking, binge drinking, alcohol use disorder, alcoholism and alcohol abuse ("Definition of Problem Drinking", n.d.).

In the United Kingdom, the number of individuals reporting that they drink alcohol has decreased in recent times, with a survey conducted in 2016 revealing that 56.9% (approximately 29 million people) drank alcohol in the week before the interview compared to 64.2% reporting the same in 2005 (Windsor-Shellard, 2017). However, this does not mean that problem drinking is no longer a concern. Still, 7.8 million people reported 'bingeing' on their heaviest drinking day (Windsor-Shellard, 2017) and it is suggested that 10.8 million adults drink at levels harmful to their health (Health matters, 2016). Hospital admissions for alcohol-related injuries and illnesses was approximately 339,000 in 2015/2016 -- 3% higher than in 2014/2015 and 22% higher than in 2005/2006 (Statistics on Alcohol, 2017). Furthermore, problem drinking is said to create a financial burden on the economy, with estimates suggesting that £11 billion is spent as a result of alcohol-related crime, £7 billion is lost in productivity due to sickness and unemployment, and

£3.5 million is spent by the NHS annually for provision of services for individuals who are problem drinkers (Health matters, 2016).

Adolescence and Problem Drinking

Researchers have been particularly interested in problem drinking among adolescents because of the possible deleterious and long-term effects and impacts (Maldonado-Devincci, Badanich, & Kirstein, 2010; Squeglia, Jacobus, & Tapert, 2009). The World Health Organization (WHO; WHO, 2014) defines adolescence as "the phase of life stretching between childhood and adulthood" (WHO, 2014). In terms of age, WHO has long categorized adolescence as the period of the lifespan between 10-19 years old (WHO, 2014). However, recent literature suggests that the age range 10-19 years does not adequately encapsulate the adolescent period based on social and biological factors. Proponents for the revised definition of adolescence suggests that the age range should be adjusted to include individuals between 10-24 years old (Sawyer, Azzopardi, Wickremarathne, & Patton, 2018). The rationale for the revised consideration is that more modern research has recognized that aspects of biological growth and societal roles characteristic of adolescents have evolved in the past century, making the previous age range somewhat erroneous (Sawyer, et al., 2018). For instance, research has identified that biological changes associated with puberty extend past the period previously considered the pubescent phase (Sawyer, et al.,). Similarly, individuals are attending university and other types of training at later ages than had been generally done in the past, and milestones such as marriage are generally occurring later in life than was characteristic of the past perceptions of adolescence (Sawyer, et al.,).

A main concern in the research is that the adolescent brain is more susceptible than the adult brain to neurocognitive, brain structure and functioning abnormalities as a result of

substance use (Squeglia, et al., 2009). Alcohol use in adolescence can lead to alterations in dopamine in the nucleus accumbens septi responsible for our responses to rewarding experiences (Maldonado-Devincci, et al., 2010). These alterations due to alcohol use in adolescence have been suggested to contribute to the development of addictions during adolescence and throughout adulthood (Maldonado-Devincci, et al., 2010). Additionally, adolescents who experience difficulties with problematic drinking have been found more likely to have histories of adverse childhood events, such as physical and sexual abuse, and are more likely to be faced with legal difficulties as perpetrators of acts of violence and misconduct (Clark, Lesnick, & Hegedus, 1997). This suggests that the adolescent population is particularly vulnerable and highly impacted by issues surrounding problem drinking, perhaps more so than other age groups.

Sensation Seeking and Problem Drinking

The literature suggests that addictions (including alcohol addiction) are best explained from a biopsychosocial theoretical framework (Moos, 2003). This framework emphasizes that certain risk factors may contribute to the development and maintenance of addictive behaviours, and that these risk factors are often made up of a combination of biological, psychological and social components (Moos, 2003). One such risk factor which is central to the research surrounding alcohol addiction has been the concept of personality (Cloninger, Sigvardsson, & Bohman, 1988; Cook, Young, Taylor, & Bedford, 1998; Newton-Howes, Foulds, Guy, Boden, & Mulder, 2017). Many different personality traits have been investigated to facilitate the identification and treatment of individuals with problem drinking behaviour (Lejuez, et al., 2010; Newton-Howes, et al., 2017). This consideration has been seen throughout the literature for decades, however, recent research emphasizes that personality, as a risk factor for alcohol addiction, is not a stand-alone concept, but rather is influenced by and exists within a

biopsychosocial model of addiction (Moos, 2003). Specifically, personality is thought to be influenced by genetics and brain development, psychological processes, an individual's experiences, and their culture and environment (Bouchard, Lykken, McGue, Segal, & Tellegen, 1990; Segal, 2012; Triandis & Suh, 2002). For instance, twin studies have found that some aspects of personality appear to have a genetic component because twins - even though they are raised apart – still displayed significant similarities in personality (Bouchard, et al., 1990; Segal, 2012). Similarly, genetic studies have found that genes associated with certain personality traits (e.g. genes of relevance for novelty seeking, reward dependence and harm avoidance) are found commonly in persons with alcohol use disorders (Oreland, et al., 2018). Research has also found that certain personality traits appear to be more present in certain countries/regions and cultures over others, suggesting a social and environmental component to personality (Triandis,et al., 2002).

With this understanding, perhaps one of the most commonly researched personality traits believed to increase the likelihood of problem drinking is 'impulsivity' (Lejuez, et al., 2010; Newton-Howes et al., 2017). Initially, impulsivity – generally defined as an inability to control urges, delay gratification and consider negative consequences before responding to stimuli (Eysenck, 1993) - was measured as a single unitary construct, but more recently, researchers have been exploring different constructs thought to be facets of impulsivity (Bo, Billieux, & Landro, 2016; Jones, Chryssanthakis, & Groom, 2014). Of these facets, one of the most confidently referenced in the literature for its relationship with alcohol use is 'sensation seeking' (Lejuez, et al., 2010; Newton-Howes et al., 2017).

Sensation seeking is a personality trait that is commonly defined as "seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical,

social, legal, and financials risks for the sake of such experience" (Zuckerman, 1994). Furthermore, like the general concept of personality, sensation seeking as a personality trait is thought to be both a product of biological predisposition and environmental factors (Zuckerman, 1994), as well as a possible contributor to both the development and maintenance of problem drinking behaviour (Newton-Howes et al., 2017; Noel, et al., 2011). The general consensus appears to be that higher levels of sensation seeking increase the likelihood of alcohol consumption and problem drinking (Hittner, & Swickert, 2006) with some research suggesting that people experiencing alcohol problems have higher levels of sensation seeking than healthy controls, even when sober (Noel, et al., 2011). There also seems to be a correlation between level of sensation seeking and impaired decision-making abilities and manipulation of information stored in their working memory (Noel, et al., 2011). This suggests that sensation seeking may influence alcoholism at a neurocognitive level, with individuals high in sensation seeking potentially being more at risk of developing alcohol problems and alcohol relapse due, in part, to cognitive functioning.

However, although sensation seeking and problem drinking have been explored together for quite some time, few papers have systematically reviewed the results of the literature in order to propose useful conclusions about the specific role of sensation seeking in problem drinking behaviour. Gaining a better understanding of the relationship between sensation seeking and problem drinking in adolescence could potentially aid in the development of more tailored, suitable and effective interventions that may go some way in moderating other related or consequential harms. Specifically, interventions could be tailored based on the personality traits exhibited to resonate better with the specific individual and their unique experiences.

Rationale and Aim of the Current Literature Review

There is currently an abundance of research exploring different personality traits and their relationships with problem drinking (Adan, Forero, & Navarro, 2017). Particularly, most research has explored the impacts of Impulsivity and Sensation Seeking, and the Big Five Personality Model (Extraversion, Neuroticism/Emotional Stability, Conscientiousness, Openness [to new experiences]/Intellect and Agreeableness) on problem drinking (Adan, et al., 2017).

Systematic reviews in the past have focused on rating the impact of each facet of personality/personality trait on problem drinking and have been able to inform personality-targeted interventions (Adan, et al., 2017). However, each facet/type is often rated in comparison to another, which makes it difficult to truly tease apart and understand the impact of each individual facet of personality/personality trait on problem drinking and related problems. Additionally, much of the existing literature is quite broad and often neglects to consider other factors that might moderate (strengthen or weaken) or mediate (further explain) the relationship between these two variables. Furthermore, few systematic reviews integrate the impact of factors such as age and gender beyond the level of description.

As such, this systematic review will zoom in on one particular personality trait – sensation seeking - to better explore its relationship with problem drinking. The aim of this paper, therefore, is to explore the relationship between sensation seeking and alcohol use among adolescents, employing the revised definition that includes individuals between the ages of 10-24 years old. For the purpose of this paper, the author chose to focus on Sensation seeking because it is one of the most frequently studied personality traits in problem drinking research because of its reliable predictive capabilities – that is, high levels of sensation seeking are often predictive of high levels of alcohol and substance use across different samples (Adan, et al., 2017).

The studies explored in this systematic review will focus on the adolescent period because research posits that this is the period of the lifespan when Sensation Seeking is highest (Steinberg, et al., 2008). Additionally, personality-targeted intervention studies have found that it is beneficial to tackle problem drinking during adolescence in order to reduce the prospects of future alcohol-related problems in adulthood (Conrod, Castellanos, &Mackie, 2008; Conrod, Castellanos-Ryan, & Mackie, 2011). In these studies, the intervention is designed in a way that specifically focuses on the personality traits of the individuals (e.g. those high in sensation seeking) to reduce problem drinking.

The systematic review was be primarily exploratory; however, the author sought to more holistically explain the role of sensation seeking characteristics on problem drinking and related problems on its own, and in the context of other personality traits and moderating/mediating variables.

The review therefore aimed to answer the following questions:

1. Does the literature provide evidence for a possible direct relationship between sensation seeking and problem drinking/alcohol-related problems?
2. If the literature suggests a possible relationship between sensation seeking and problem drinking/alcohol-related problems, what factors moderate could (strengthen or weaken) this relationship?
3. What other variables help to explain the relationship between sensation seeking and problem drinking?

Method

Prior to a systematic search of the literature, an initial search was conducted using The Cochrane Database of Systematic Reviews to identify whether a similar review had already been published. This search was conducted using the terms "sensation seek*" AND "problem* drink*" OR "alcohol abus*". However, this search yielded no results. This could be because no systematic reviews have yet explored this concept specifically, because sensation seeking is often mentioned as a facet of impulsivity or in conjunction with other personality traits and has not yet been explored as a stand-alone variable. However, it is also possible that a more thorough search on other similar databases would have yielded some results.

A search using the aforementioned keywords on the Google Scholar search engine identified one meta-analysis (Hittner, et al., 2006). This meta-analysis explored the relationship between sensation seeking and alcohol use among young people and adults based on four components of sensation seeking first proposed by Zuckerman (1994): thrill and adventure seeking, experience seeking, disinhibition and boredom susceptibility. They found a small to moderate, heterogeneous relationship between sensation seeking and alcohol use. They also discovered that of the four components of sensation seeking examined, disinhibition had the strongest correlation to alcohol use. This meta-analysis, while useful, highlights the strength of the relationship, but does not sufficiently explain how sensation seeking impacts alcohol use. Furthermore, the age range makes it difficult to identify the unique impact of sensation seeking on alcohol use among adolescents.

The authors of the meta-analysis recommended that future research include more longitudinal studies, and that studies whose samples include treatment-seeking population are also considered. Thus, longitudinal studies throughout adolescence were included in the current

review. The latter recommendation, however, was not included in the current literature review, because one of the main reasons for exploring the relationship between sensation-seeking and problem drinking during adolescence is to implement preventative strategies to curtail the possible future negative effects. In other words, this systematic review is geared towards being proactive.

Search Strategy

Three databases were selected based on their relevance to the subject area and used to collate articles for the current systematic literature review: PsychINFO (Ovid), MEDLINE (Ovid) and Web of Science (Core Collection). The systematic search was conducted between March 2017 to April 2018. These databases were accessed using subscriptions provided by the University of Birmingham.

Articles were sought that explored the relationship between sensation seeking and problematic drinking among adolescents. The aim was to identify studies that were empirical, written in the English language, and used an adolescent sample. Table 1 outlines the terms used to conduct the systematic search.

Table 1. *Search Terms Used in Systematic Search.*

Database	**Construct**	**Search Terms**
PsycINFO (Ovid) MedlineR (Ovid)	Sensation Seeking	**(Keyword)** exp. Sensation Seeking/ OR sensation seek* .mp
	AND	
PsycINFO (Ovid) MedlineR (Ovid)	Problematic Drinking	**(Keyword)** exp Alcohol Abuse/ or exp Binge Drinking/ or exp Alcoholism/ or problematic drink*.mp.
Web of Science (Core Collection)	Sensation Seeking	**(Topic)** Sensation* seek*
	AND	
Web of Science (Core Collection)	Problematic Drinking	**(Topic)** alcohol abus* OR Binge drink* OR problem* drink* OR alcoholism OR alcohol misuse
	Adolescence	Initially the keyword *adolscen* was included in the search, but this was later removed due to the conflicting definitions of the age of adolescence and discrepancies resulting therein. Instead, abstracts and full-text articles were screened to include only studies with adolescent populations.

Note:
'AND' and 'OR' are Boolean operators used to combine search terms
*- represents truncated terms and allows the inclusion of variations of the ending of the term including plurals, various suffixes, and different spelling

Inclusion and Exclusion Criteria

Articles were included in the systematic review if they were empirical papers, written in English, with an adolescent sample, and if they explored sensation seeking and problem drinking

or related concepts. This included articles where sensation seeking was explored as a moderator/mediator as well as articles in which the relationship between sensation seeking and problem drinking was moderated or mediated by other variables.

As the purpose of this paper was to conduct a systematic review of the existing literature, review articles and meta-analyses were excluded from the analysis; they did, however, serve as comparison for the findings of the current review. Similarly, proceedings papers, notes and letters were also excluded because they are not always primary sources, and seldom peer-reviewed. Adult samples were also excluded because the focus of the current systematic review is the adolescent population. Furthermore, as the goal of the systematic review was exploratory in nature, treatment/intervention studies were excluded as the author sought to better understand the relationship between sensation seeking and problem drinking as opposed to evaluating the effectiveness of measures already existing to curtail the negative effects of the relationship. In a similar manner, drug/pharmaceutical studies were also excluded.

Articles that focused on the neurological, biological or genetic factors that contribute to sensation seeking and/or problem drinking were also excluded because this information, though helpful in understanding sensation seeking and problem drinking as separate concepts, was not considered directly relevant to the research question. The inclusion and exclusion criteria are summarized in Table 2.

Table 2. *Summary of Inclusion and Exclusion Criteria.*

Inclusion Criteria	Exclusion Criteria
Empirical studies	Reviews or meta-analyses, Proceedings papers, Notes, Letters
Written in the English Language	Non-English papers
Adolescent population (10-24)	Adult samples
Studies measuring sensation seeking and various categories of problem drinking (binge drinking, heavy drinking, etc)	Treatment/intervention studies
Studies exploring mediators and moderators of sensation seeking and problem drinking	Not directly exploring the relationship between sensation seeking and problem drinking or a related concept (sensation seeking mentioned only descriptively)
All countries	Pharmaceutical/drug studies
Studies measuring sensation seeking using pre-established scales	Scale development studies
Psychological, educational, sociological (and similar) research	Neuro/Biological/Genetic Research
Non-clinical populations (without known/reported diagnoses of alcohol-use disorder)	Clinical Samples

Systematic Study Selection

Figure 1 serves as a pictorial representation of the literature identification process. The systematic search of the three afore-mentioned databases yielded 1,254 articles. Of those studies initially identified, 43 were removed after limiting to English and human studies, and 112 reviews, proceedings papers, notes and letters were excluded. Then, 1,099 titles and abstracts were screened, and 287 studies were removed because they were duplicated between the databases. This left 812 unique studies to be screened. Thereafter, based on the inclusion and

exclusion criteria mentioned above, 791 articles were removed. This meant that 21 articles remained and formed the basis of the current systematic review.

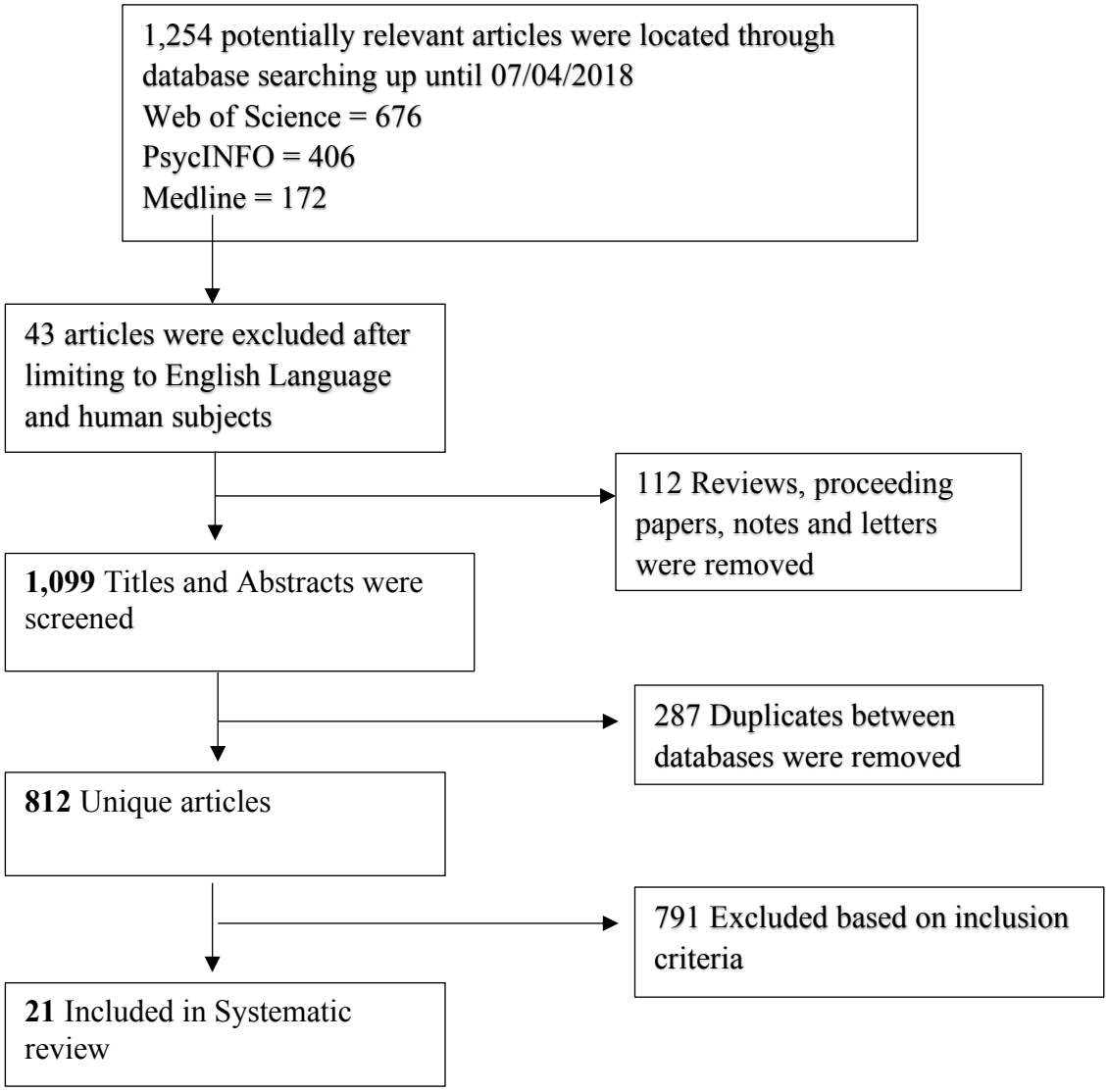

Figure 1. *Systematic Study Selection Process*

Quality Appraisal

The quality of the articles identified was appraised using Kmet, Lee, and Cook's (2004) 14-item quality assessment criteria. Each article was assessed individually and given a numerical

rating, which is then converted to a percentage rating to reflect the quality of the methodology and explanation of the aims, procedure and findings of each study. Scores of 2 are given to mean "yes", scores of 1 stands for "partial" and scores of 0 mean "no" for each item of the criteria. Although the highest score possible using this criterion is 28 (achieved by scoring 2 on each of the 14 items), Lee et al. (2008) assigned a scoring system for Kmet, et al.'s (2004) criteria which instructs that only items that are relevant to the study are assigned scores. Items that were not relevant to the study (e.g. items that were geared towards assessing the quality of intervention studies) were therefore not given rating, instead of receiving a score of zero (n=0). Finally, total scores and percentages based on the number of relevant items were calculated and each article was given a descriptive quality rating as instructed by Lee et al. (2008). Studies with scores above 80% were rated as "strong", studies scoring between 70-80% were considered "good", studies scoring between 50-70% were rated as "adequate", and studies scoring lower than 50% were considered "limited.

Table 3. *Quality Appraisal.*

Quality Appraisal Questions	1. Adan, et al. (2016)	2. Bo, et al. (2016)	3. Charles, et al. (2017)	4. Curcio, & George (2011)	5. Drane, et al. (2017)	6. Doumas, et al. (2017)	7. Galbraith &Conner (2014)	8. Glazer, et al. (2010)	9. Hahn, et al. (2016)	10. Johnson & Cropsey (2000)	11. Kazemi, et al. (2014)	12. Lindgren, et al. (2010)	13. MacPherson et al.	14. Magid, et al. (2007)	15. Mastroleo et al. (2013)	16. Mushquash, et al. (2013)	17. Pocuca, et al. (2018)	18. Read et al. (2003)	19.Shin, et al. (2013)	20. Stewart et al. (2011)	21. Wilkinson et al. (2011)
Question / objective sufficiently described?	2	0	1	2	1	1	2	2	2	1	1	2	2	2	1	2	1	2	1	2	1
Study design evident and appropriate?	2	1	2	1	1	2	1	1	1	1	1	2	2	2	1	1	2	1	1	1	2
Method of subject/comparison group selection or source of information/input variables described and appropriate?	2	0	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2
Subject (and comparison group, if applicable) characteristics sufficiently described?	1	0	1	1	1	2	2	2	2	1	1	1	2	2	2	2	1	2	2	1	2
If interventional and random allocation was possible, was it described?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
If interventional and blinding of investigators was possible, was it reported?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
If interventional and blinding of subjects was possible, was it reported?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? means of assessment reported?	1	1	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1
Sample size appropriate?	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Analytic methods described/justified and appropriate?	1	2	2	2	2	2	1	2	1	2	1	2	2	2	1	2	2	2	1	2	2
Some estimate of variance is reported for the main results?	1	1	1	2	1	2	1	2	1	1	2	0	2	1	2	0	2	1	1	1	1
Controlled for confounding?	1	1	2	2	1	1	1	1	1	1	1	0	1	1	0	2	2	1	1	0	1
Results reported in sufficient detail?	2	1	2	2	2	2	2	2	2	2	1	2	2	2	1	1	2	2	1	1	2
Conclusions supported by the results?	2	1	2	2	1	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1

Results

Overview of Articles Selected

Table 4 provides a summary of the studies included in the review. All of the 21 articles selected for this systematic review were all published between 2000 and 2018. The majority of the studies were conducted in the United States of America (Charles, Mathias, Acheson, & Dougherty, 2017 ; Doumas, Miller, & Esp, 2017; Galbraith, & Conner, 2014; Glazer, Smith, Atkin, & Hamel, 2010; Hahn, Simons, & Hahn, 2016; Johnson, & Cropsey, 2000; Kazemi, Flowers, Shou, Levine, & Van Horn, 2014; Lindgren, Mullins, Neighbors, & Blayney, 2010; Magid, MacLean, & Colder, 2007; McPherson, Magidson, Renolds, Kahler, & Lejuez, 2010; Mastroleo, Scaglione, Mallett, & Turrisi, 2013; Read, Wood, Kahler, Maddock, & Palfai, 2003; Shin, Chung, & Jeon, 2013;Wilkinson, Shete, Spitz, & Swann, 2011). In addition, three (3) were conducted in Australia (Curcio & George, 2011 ; Drane, Modecki & Barber, 2017; Pocuca, et al., 2018), two (2) in Canada (Mushquash, Stewart, Mushquash, Comeau, & McGrath, 2013; Stewart, McGonnell, Wekerle, & Adlar, 2011), one (1) in Norway (Bo, Billieux, &Landro, 2016), and one (1) in Spain (Adan, Navarro, & Forero, 2016). The majority of the articles utilised were rated as "strong" (n=9), while seven (n=7) were rated as "good", four (n=4) as "adequate", and only one (n=1) article fit the category of "limited" based on the quality appraisal criteria used (Kmet, et al., 2004; Lee et al., 2008).

The sample sizes ranged from 79 to 3,287 participants, and participants' ages ranged from 9-25 years old in the studies in which ages were reported. Most studies (n=16) were cross sectional in design, however the review also includes five (n=5) longitudinal studies. Moreover, three (n=3) studies (Adan, et al., 2016; Shin, et al., 2013; Wilkinson, et al., 2011) used interviews in their methodology, whereas the remainder used paper questionnaires and online surveys. The

studies that utilised interviews still followed a structured format, using established questionnaires to guide the interviews. Furthermore, although no studies included participants drawn from a clinical population, one study (Adan, et al., 2016) compared participants who met the criteria for Binge Drinking against those who did not.

The results are presented descriptively and critically, and focus is primarily on the findings of the studies, because the methodology between the studies varied too significantly to compare the studies on a methodological or statistical basis.

Table 4. *Summary of Articles Included in the Review.*

Authors (Year) & Country	**Sample**	**Design**	**Constructs Measured**	**Main Findings**	**Quality Appraisal**
1.Adan, Navarro, & Forero (2016) Spain	N= 140 (60M; 80F) 70 Binge Drinkers; 70 Controls University Students Age: Range= 18-25 M = 21.33 SD = 0.16 Ethnicity: All Caucasian	Cross-sectional	*Personality:* Zuckerman-Kulhman Personality Questionnaire (ZKPQ) - Spanish adaptation) *Circadian Typology:* Composite Scale of Morningness (Spanish adaptation) *Alcohol Use:* Structured Clinical Interview about Binge Drinking and Substance dependence	• Binge Drinking (BD) participants scored significantly higher than healthy controls in Neuroticism Anxiety and Impulsive Sensation seeking • Highest levels of Neuroticism anxiety in BD participants came from women, whereas highest levels of Impulsive sensation seeking came from men • Men are twice as likely than women to report BD and alcoholism, but women are more likely to report medical problems related to alcohol after years of BD	Percentage: 77% Description: Good
2. Bo, Billieux, & Landro (2016) Norway	N=162 (80M;82F) University students Age: Range=18-25 M=NR SD=NR Ethnicity: NR	Cross-sectional	*Alcohol Use:* AUDIT *Impulsivity:* UPPS-P Impulsive Behaviour Scale	• Sensation seeking significantly predicted binge drinking behaviour. • However, when controlling for age, gender and global alcohol consumption, only negative urgency significantly predicted binge drinking.	Percentage: 45% Description: Limited

3. Charles, Mathias, Acheson, & Dougherty (2017) USA	N=167 (78M; 89F) Family History of Substance Use Disorder Age: Range= At least 15 years old at time of visit M=NR SD=NR Ethnicity: Majority Hispanic	Part of larger longitudinal study which started when youth were between 10-12 years old	*Substance Use:* Youth were interviewed about use of different substances at each visit *Sensation Seeking:* Sensation seeking scale for children was used from age 12 onward *Stressful Life Events:* Stressful Life Events Schedule	• High levels of sensation seeking in preadolescence predicted substance use by age 15 among youth with a family history of substance use disorders. • Exposure to stressors during early adolescence also predicted substance use by age 15. • Youth with family histories of substance use disorders who were high in sensation seeking and were exposed to stressors in pre and early adolescence were more likely to drink than their comparative peers at 15.	Percentage: 86% Description: Strong
4. Curcio, George (2011) Australia	N=261 (64M;197F) University students Age: Range=18-25 M=NR SD=NR Ethnicity: NR	Cross-sectional	*Alcohol Use:* AUDIT *Alcohol Problems:* College Alcohol Problems Scale *Personality Traits:* - ZKPQ (sensation seeking) - Urgency Measure *Drinking Motives*	• Age, Sensation seeking, and enhancement motives significantly predicted alcohol use. • Alcohol use and negative urgency significantly predicted alcohol related problems • Sensation seeking had a direct and indirect (via enhancement motives) effect on alcohol use	Percentage= 86% Description: Strong

5. Drane, Modecki, & Barber (2017) Australia	N= 502 (220M; 282F) Adolescents who participated in sports for 3 consecutive years Age: Range= 12-14 M = 12.99 SD = 0.33 Ethnicity = NR	Part of longitudinal study	*Sensation Seeking:* 3 items from NEO Personality Inventory *Binge drinking*: 1 item from adapted Michigan Study of Adolescent Adult Life Transitions *Risky Peers in Sport*: three items adapted from Fredricks and Eccles (2006) *School Level SES*	• Athletes with early high levels of sensation seeking showed quicker increases in binge drinking and risky peer associations over three years • Binge drinking behaviour also seemed to go hand in hand with risky peer associations among sport participants	Percentage: 59% Description: Adequate
6. Doumas, Miller, & Esp (2017) USA	N=346(168M;178F) High School Students Age: Range= 15-18 M=17.16 SD= 0.45 Ethnicity: 82.8% Caucasian	Cross-sectional	*Binge Drinking* *Alcohol-Related Consequences:* Rutgers Alcohol Problem index *Impulsive Sensation Seeking:* Sensation Seeking Subscale of ZKPQ *Protective Behaviours*	• Sensation seeking significantly predicted binge drinking and alcohol-related problems • In high sensation seekers, those using more protective behavioural strategies reported less binge drinking behaviour and had fewer alcohol related consequences than those who used fewer protective behavioural strategies	Percentage: 82% Description: Strong

7. Galbraith, & Conner (2014) USA	N= 376 (Gender n = NR) Undergraduate Psychology Students Age: Range=NR M=NR SD=NR Ethnicity: NR	Cross-Sectional	*Demographics* *Sensation Seeking:* Sensation Seeking Personality Type Scale *Risk Behaviour:* Risky Behaviour Inventory *Religious Orientation Scale* *Spiritual Well-being* Modified spiritual well-being scale *Religiosity:* Religiosity item	• Risk and experience seeking were positively correlated with heavy drinking • Some facets of religiosity predicted marijuana use, but not heavy drinking	Percentage: 77% Description: Good
8. Glazer Smith, Atkin, & Hamel (2010) USA	N=891 (348M; 543F) University Students Age: Range= NR M= 20.4 SD= NR Ethnicity: 80% Caucasian	Cross-Sectional	*Drinking self-report* *Perception of others' drinking* *Sensation Seeking:* Brief sensation seeking scale *Believability of social norms messages*	• Sensation seeking was positively correlated with amount of alcohol consumed • Individuals with higher sensation seeking scores who believed fewer social norms messages consumed more alcohol	Percentage: 86% Description: Strong

9. Hahn, Simons, & Hahn (2016) USA	N=624 (194M; 430F) Undergraduate Students Age: Range=18-25 M=19.77 SD=1.55 Ethnicity: 95% Caucasian	Cross-Sectional	*Demographics* *Personality:* Personality assessment inventory *Impulsivity:* UPPS-P *Alcohol Use:* Daily drinking questionnaire modified *Alcohol-related Consequences:* Young adult alcohol consequences questionnaire	• Sensation seeking, lack of premeditation and positive urgency uniquely predicted antisocial personality features, while negative urgency predicted both antisocial and borderline personality features • Antisocial features mediated the relationships between urgency, lack of premeditation and sensation seeking and both alcohol use and alcohol related problems	Percentage: 77% Description: Good
10. Johnson, & Cropsey (2000) USA	N=256 (84M; 172F) Age: Range =NR MD=20.21(M); 20.07(F) SD= 4.16(M); 3.66(F) Ethnicity: NR	Cross Sectional	*Alcohol Use:* Participants rated their frequency and quantity of alcohol consumed in the past year and past month *Drinking Game Participation:* Participants rated their frequency of playing drinking	• Sensation seeking predicted frequency of playing drinking games, even after controlling for overall quantity and frequency of drinking • Disinhibition (facet of Sensation Seeking) was the main predictor of drinking game play • Men experienced more negative alcohol-related	Percentage: 64% Description: Adequate

	games and typical quantity of alcohol consumed while playing *Negative Consequences:* Participants rated how often they experience 13 possible negative consequences based on 4 categories of consequences: Excessive Consumption, Sexual Behaviour, Irresponsible Behaviour, Social Conflict *Importance of Playing Drinking Games* *Sensation Seeking:* Zuckerman's Sensation Seeking Scale (Form V)	consequences of playing drinking games than females • Heavy-drinking females who played drinking games were higher in sensation seeking than women who did not drink heavily nor play drinking games

11. Kazemi, Flowers, Shou, Levine, &Van Horn (2014) USA	N=260 (97M;163F) Freshman Students Age: Range= 18-20 M=19.7 SD=NR Ethnicity: 68.4% European American 24.2% African American	Cross-Sectional	*Alcohol Use:* Daily Drinking Questionnaire *Alcohol-Related Problems:* Rutgers Alcohol Problems Index *Sensation Seeking :* SURPS *Alcohol Expectancies :* Alcohol Expectancies Questionnaire	• The relationships between impulsivity and sensation seeking on alcohol drinking behaviour and associated consequences were mediated by positive alcohol expectancies. • Participants who were higher in impulsivity and sensation seeking had more positive expectancies and experienced more negative consequences of alcohol.	Percentage: 64% Description: Adequate
12. Lindgren, Mullins, Neighbors, & Blayney (2010) USA	N=79 (79F) College Students Age: Range= NR M=18.66 SD=1.73 Ethnicity: 53% Caucasian 33% Asian American	Part of a Longitudinal Study	*Alcohol Use* *Alcohol-Related Problems:* Rutgers Alcohol Problems index *Sensation Seeking :* Brief sensation seeking scale *Curiosity:* Curiosity and exploration inventory	• Curiosity - High scores in exploration were correlated to fewer alcohol-related problems while high absorption predicted more alcohol-related problems. • Sensation seeking had a positive correlation with alcohol-related problems • Sensation seeking and the two facets of curiosity uniquely predicted alcohol-related problems	Percentage: 73% Description: Good

13. MacPherson, Magidson, Reynolds, Kahler, & Lejuez (2010) USA	N=257 (143M; 114F) Early adolescents Age (at 1st wave): Range= 9-12 M: 11.01 SD: 0.81 Ethnicity: 48.8% non-Hispanic White 35.5% African-American, 3.1% Latino 1.2% Asian-American, 11.4%o f mixed or other ethnicity	Longitudinal (3 year)	*Demographics* *Sensation Seeking:* Brief Sensation Seeking Scale *Risk Task:* Balloon Analogue Risk Task – Youth *Risk-taking Propensity:* Modified version of Youth Risk Behaviour Surveillance System	• Increases in individual levels of sensation seeking and risk-taking propensity over time best predict odds of alcohol use	Percentage: 91% Description: Strong
14. Magid, McLean, & Colder (2007) USA	N=310 (112M; 198F) College drinkers Age: Range=18-24 M=19.4 SD= NR Ethnicity:	Cross-Sectional	*Personality traits:* Schalling's Impulsiveness Monotony Avoidance scale *Drinking Motives:* Drinking Motives Questionnaire *Alcohol Use:*	• Sensation seeking had a direct effect on enhancement and social motives and alcohol use • Impulsivity had a direct effect on coping and social motives and alcohol-related problems • Enhancement mediates the relationship between sensation seeking and alcohol-related problems	Percentage: 91% Description: Strong

	90% Caucasian 4.5% African-American 2.3% Hispanic 1.0% Asian 1.9% Other		Specifically created alcohol use index *Alcohol-related problems:* Rutgers Alcohol Problems Index		
15. Mastroleo, Scaglione, Mallett, & Turrisi (2013) USA	N= 113 (44M; 69F) First year athletes and non-athletes Age: Range=NR M=18.6 SD=0.69 Ethnicity: 85.6% Caucasian 6.3% Hispanic 1.8% Asian 1.8% African 4.5% Other	Cross-sectional	*Drinking Behaviour:* Drinking outcome measures exploring weekend drinking behaviour, heavy drinking episodes and peak drinking behaviour *Mediating Personality traits:* Modified version of Zuckerman's personality scales	• Athletes drank significantly more than non-athletes and the relationship was mediated by risk taking and sensation seeking • Sensation seeking was a significant mediator of athletic status and a number of drinking outcomes	Percentage: 73% Description: Good
16. Mushquash, Stewart, Mushquash, Comeau, & McGrath (2013) Canada	N=317 (149M; 168F) Aboriginal Youth from various communities across Canada	Cross-sectional	*Substance Use Risk:* Substance Use Risk Profile Scale *Drinking Motives:* Drinking Motives Questionnaire-Revised	• males exhibited significantly higher levels of sensation seeking than females • Sensation seeking was positively correlated to enhancement motives for drinking and heavy episodic drinking	Percentage: 82% Description: Strong

	Age: Range=NR M=16.00 SD=1.37 Ethnicity: 100% Aboriginal		*Heavy Episodic Drinking:* Heavy Episodic Drinking item *Alcohol-Related Problems:* -Rutgers Alcohol Problems Index	• Sensation seeking, anxiety sensitivity, impulsivity and hopelessness all predicted alcohol related problems	
17. Pocuca, Hides, Quinn, White, Mewton, Newton, …..& Allsop (2018) Australia	N=3287 (1512M;1775F) Age: Range=NR M=13.51 SD=0.58 Ethnicity=NR 78% Australian-born	Cross-sectional Part of RCT	*Sensation Seeking:* SURPS *Drinker status:* Yes or No questions *Perceived peer drinking:* Likert Scale *Control measures:* Demographics Truancy	• High impulsivity, sensation seeking and hopelessness positively predicted early adolescent drinking, whereas anxiety sensitivity had a negative correlation with early adolescent drinking • Perception of peer drinking increased the likelihood of early adolescent drinking in adolescents higher in sensation seeking	Percentage: 91% Description: Strong
18. Read, Wood, Kahler, Maddock, & Palfai (2003) USA	N=388(172M;216F) University Students Age: Range=NR M=18.6 SD=0.56	Part of Longitudinal Study	*Alcohol outcome expectancies:* Alcohol outcome expectancies scale *Impulsivity-Sensation Seeking:*	• Drinking motives contributed to alcohol use and problems; but did not act consistently mediators between other psychosocial factors and alcohol involvement variables	Percentage: 82% Description: Strong

	Ethnicity: 87% White	-Zuckerman Impulsivity/Sensation Seeking Scale *Negative Affect:* Positive and Negative Affect Schedule *Alcohol Offers* *Perceived peer drinking:* Perceived peer drinking environment measure *Alcohol-related problems:* Young adult alcohol problems screening test *Drinking Motives:* Drinking motives measure *Alcohol Use:* Quantity and frequency of alcohol consumption over 3 months	• Sensation seeking affected alcohol problems indirectly through enhancement motives

19. Shin, Chung, & Jeon (2013) USA	N=257 (122M; 135F) Age: Range=18-25 M=21.9 SD=NR Ethnicity: 65.5% White	Cross-Sectional	*Impulsivity:* UPPS *Hazardous Drinking:* AUDIT *Psychological Distress* Brief symptom inventory *Illicit drug use:* Composite International Diagnostic Interview Substance Use Module (CIDI-SAM) *Parental Substance use:* Children of Alcoholics Screening Test	• Impulsivity was more related to illicit substance use than to hazardous drinking • Parental and peer substance use, and psychological distress were consistently related to hazardous drinking and illicit substance use • Sensation seeking was not significantly correlated with hazardous drinking • Sensation seeking was, however, correlated to past-year illicit substance use and poly-substance use	Percentage: 68% Description: Adequate
20. Stewart, McGonnell, Wekerle, & Adlaf (2011) Canada	N=197 (85M; 112F) Age: Range=15-20 M=16.8 SD=1.1 Ethnicity=NR	Part of longitudinal study	*Sensation seeking:* SURPS *Alcohol and drug use:* Ontario Student Drug Use and Health Survey (OSDUHS)	• Hopelessness, sensation seeking and anxiety were positively correlated with overall drinking levels and alcohol related problems on the OSDUHS • Anxiety sensitivity was unrelated to alcohol	Percentage: 73% Description: Good

				problems and negatively correlated to overall drinking levels • Hopelessness was positively correlated to seeking treatment for alcohol problems, while impulsivity was the opposite • Sensation seeking and hopelessness were positively correlated with earlier onset drinking	
21. Wilkinson, Shete, Spitz, & Swann (2011) USA	N=1053 (522M; 531F) Age: Range=12-17 M=14.4 SD=1.0 Ethnicity: NR	Longitudinal	5 sequential personal interviews (first and final in the home, and other three on the telephone) over 30 month period	• High sensation seeking was associated with adolescent drinking and risk behaviours after controlling for age, gender, SSS, acculturation and family cohesion • Social disinhibition (factor of sensation seeking) moderates the relationship between other risk behaviours (e.g. smoking) and alcohol use	Percentage: 77% Description: Good

Note:
N=Number. M=Male. F=Female. M=Mean. SD=Standard Deviation. NR=Not Reported.

Sensation Seeking and Problem Drinking in Adolescence

Some of the studies reviewed found that sensation seeking predicts problem drinking, whereas others have not been able to yield significant results for this relationship. For instance, Wilkinson, et al. (2011) found - over the course of five sequential personal interviews within a 30-month period - that high sensation seeking was associated with adolescent drinking and risk behaviours after controlling for age, gender, subjective social status, acculturation and family cohesion in a sample of 1,053 young Mexicans living in the United States. Similarly, Doumas, et al. (2017) explored sensation seeking, binge drinking, and alcohol-related consequences in 346 high school seniors and found that sensation seeking significantly predicted binge drinking behaviour. Additionally, Bo, et al. (2016) conducted a study, among 162 students between 18-25 years old in Norway, to assess which facets of impulsivity best predict binge drinking. They found that sensation seeking and negative urgency both significantly predict binge drinking. However, after controlling for age, gender and global alcohol consumption, only negative urgency significantly predicted binge drinking. According to Lynam, Smith, Cyders, Fischer, and Whiteside (2007), negative urgency is "the tendency to act rashly when experiencing intense negative affect". This finding, therefore posits that individuals might be more likely to drink heavily as an escape from negative emotions as opposed to doing so for the purpose of excitement and exposure to new experiences. In contrast, Shin, et al. (2013) in their study, of 257 young people between the ages of 18-25 years old in the USA, found that sensation seeking was not significantly correlated with hazardous drinking. The Merriam-Webster Online Dictionary (n.d.) defines "hazardous" as "involving or exposing one to risk [as loss or harm]". Thus, in essence, their findings suggest that sensation seeking was not correlated to drinking at a level that involves or exposes the drinker to risk. Rather, sensation seeking was correlated to

past-year illicit substance and poly-substance use. Furthermore, parental substance use, peer substance use, and psychological distress were consistently related to hazardous drinking and illicit substance use in their study. Taken together, then, these findings suggest that whereas sensation seeking seems to predict drinking in adolescence, other personality features such as negative urgency and social and psychological factors (i.e. parental and peer substance use and psychological distress) might be more reliably predictive of drinking at a hazardous/problematic level. However, it is important to note that the methodological quality of Bo, et al.'s (2016) study was categorized as "limited" and Shin, et al.'s (2013) study was categorized as "adequate" because of a number of design and methodological flaws, therefore these findings should be taken cautiously.

Sensation seeking also appears to impact age of onset of drinking in adolescence. Stewart, et al. (2011) conducted a study with 197 adolescents between the ages of 15-20 years receiving child welfare services (services designed to investigate and protect victims of child abuse and neglect) to decipher the role of personality in alcohol use behaviour and related problems. The results of their study showed that hopelessness, sensation seeking and anxiety were positively correlated with overall drinking levels and alcohol related problems, and that sensation seeking and hopelessness were positively correlated with earlier onset drinking. This study was rated as "good" based on the assessment of methodological quality, but the researchers did not control for confounding variables such as family history of substance use, socio-economic status and living status. No other studies explored the impact of sensation seeking on age of onset of drinking in this review. However, Charles, et al. (2017) found that higher sensation seeking in preadolescence predicted substance use by age 15 years in adolescents with a family history of substance use disorder (n =167). They also found that, coupled with sensation

seeking, exposure to stressors in preadolescence also predicted substance use when compared to peers low in sensation seeking who were not exposed to stressors. Furthermore, the alcohol intake levels of those high in sensation seeking who had been exposed to stressors were higher than those who used alcohol but were not high in sensation seeking, nor had exposure to stressors. However, the majority of the sample was Hispanic, limiting the generalizability of these findings to non-Hispanic populations.

Interestingly, one study suggests that solely identifying levels of sensation seeking in early adolescence might not best predict continued alcohol use, and rather, that continuing to monitor levels of sensation seeking throughout different stages of adolescence might be more beneficial (MacPherson, et al., 2010). MacPherson, et al. (2010) enrolled 257 early adolescents between the ages of 9-12 years old in a 3-year longitudinal study exploring the changes in sensation seeking and risk-taking propensity and the impact of such changes on alcohol use in adolescence. They found that individual increases in sensation seeking and risk-taking propensity (willingness to take risks) throughout adolescence best predicted the odds that an individual would continue to increasingly use alcohol. This therefore implies that sensation seeking as a facet of personality should be viewed more as a dynamic construct than a static one in order to help predict future problem drinking. This study was methodologically sound and rated as "strong".

Sensation Seeking and Alcohol-Related Problems

Only two studies found a direct relationship between sensation seeking and alcohol-related problems (Doumas, et al., 2017; Lindgren, et al., 2010). The term "alcohol-related problems" is similar to the term problem drinking, but is used to refer to the specific difficulties in an individual's life that have occurred as a result of alcohol use (Lindgren, et al., 2010). In

essence, problem drinking refers to the drinking behaviour that leads to problems, and alcohol-related problems are the problems caused by problem drinking behaviour. In this light, Doumas, et al. (2017) found that sensation seeking was related to both binge drinking and alcohol-related problems. These relationships were weakened, however, in high sensation seekers who used more protective behavioural strategies such as stopping or limiting their intake at a certain time, changing the pace/quantity of their drinking and finding ways to reduce possible harm resulting from drinking (such as using a designated driver; Doumas, et al., 2017). Additionally, Lindgren, et al. (2010) conducted a study among 79 female college students (mean age = 18.66) to explore the relationships between sensation seeking, curiosity, alcohol consumption and alcohol related problems. They found that sensation seeking was positively correlated with alcohol-related problems. Similarly, they found that one facet of curiosity - absorption ("the tendency to become deeply involved and interested in such activities") was also positively correlated with alcohol-related problems in a similar way to sensation seeking, but that the other facet of curiosity – exploration ("the desire to seek out novel information and experiences") was negatively correlated with alcohol-related problems. However, there was no correlation found between sensation seeking and the two facets of curiosity; instead, they all contributed to alcohol-related problems uniquely. These findings suggest that while sensation seeking does predict alcohol-related problems, being absorbed in drinking behaviour might have a similar effect, in spite of sensation seeking. Still, the fact that this study was conducted solely among females, makes it difficult to determine if the facets of curiosity impact males in the same way, or if this finding is only relevant to females. One study, on the other hand, did not identify a direct significant relationship between sensation seeking and alcohol-related problems. Curcio et al. (2011) did not find a significant relationship between sensation seeking and alcohol-related problems, although

sensation seeking was positively correlated with alcohol use. Instead, they found that another personality trait – Negative Urgency – significantly predicted alcohol-related problems. This thereby suggests, that like the relationship between sensation seeking and problem drinking, the findings are inconclusive in determining if sensation seeking is directly correlated with alcohol-related problems, despite being confidently correlated with alcohol use.

Gender, Sensation Seeking and Problem Drinking

The literature highlights some differences in the relationship between sensation seeking and problem drinking among males and females. Mushquash, et al. (2013), for instance, explored the relationship between personality traits (anxiety sensitivity, sensation seeking, impulsivity and hopelessness), motives for drinking (enhancement/social, conformity and coping) and alcohol misuse in a sample of 317 Canadian aboriginal youth with a mean age of 16 years. They found that males were significantly higher in sensation seeking than their female counterparts. Yet, the same study found that sensation seeking and hopelessness predicted heavy episodic drinking, regardless of gender. Adan, et al. (2016) conducted a study to examine the relationship between personality profile and binge drinking among 140 university students between the ages of 18-25 years old in Spain; although the sample was drawn from a non-clinical population, 70 participants met the criteria for binge drinking and the remaining 70 were controls. They also found that men scored higher than females on impulsive sensation seeking, while women were higher on neuroticism anxiety (Adan, et al., 2016). Furthermore, they found that participants who reached the criteria for binge drinking were higher on impulsive sensation seeking and neuroticism anxiety than the controls, and that the participants highest in impulsive sensation seeking within the binge drinking sample were predominantly male and those binge drinkers high in neuroticism anxiety were disproportionately female (Adan, et al., 2016). Additionally,

males were twice more likely to report binge drinking and alcoholism than females. Thus, this suggests that there might be inherent personality trait differences between men and women, and that impulsive sensation seeking seems to predict problem drinking in men, but not women.

In addition to displaying higher levels of sensation seeking, one study suggests that the consequences for alcohol use might also vary depending on gender. Johnson, et al. (2000) conducted a study with 256 adolescents (mean ages = 20.07 female and 20.21 male) to explore the role of sensation seeking on drinking game participation and the associated negative consequences in college students. They found that sensation seeking predicted frequency of playing drinking games, even after controlling for overall quantity and frequency of drinking. They also reported that whereas females higher in sensation seeking were more likely than other females to drink more heavily and play drinking games, males experienced more negative consequences of playing drinking games than females.

Moderators and Mediators of the Relationship Between Sensation Seeking and Problem Drinking

The literature suggests that a variety of variables might mediate or moderate the relationship between sensation seeking and problem drinking. A mediator variable is one that explains the relationship between a predictor variable and dependent variable, whereas a moderator variable influences the strength and/or direction of the relationship between the predictor and dependent variables (Baron, & Kenny, 1986).

Sensation Seeking as Mediator. Mastroleo, et al. (2013) conducted a study amongst 113 first year collegiate athletes and non-athletes to assess if personality could predict differences in drinking behaviour between athletes and non-athletes. They found that athletes drank significantly more than non-athletes and the relationship was mediated by risk taking and

sensation seeking. Moreover, sensation seeking was a significant mediator of athletic status and a number of negative drinking outcomes. This relationship could be explained by considering that athletes may have a higher threshold for thrill and excitement than non-athletes, and may therefore engage in more risky drinking behaviour (Mastroleo, et al., 2013). Drane, et al.'s (2017) study among 502 adolescent athletes, which tracked sensation seeking and binge drinking over the course of three years, yielded similar results. They found that athletes with earlier high levels of sensation seeking displayed quicker increases in binge drinking and risky peer associations over three years. They also considered athletes as more susceptible to risk-taking behaviour than comparative peers.

Enhancement Motives as Mediator. The concept of 'enhancement motives' in alcohol-related literature refers to drinking behaviour motivated by a desire to improve mood (Curcio, et al., 2011). The literature suggests that the relationship between sensation seeking and problem drinking might be explained by enhancement motives, such that an individual high in sensation seeking uses alcohol because they have the desire to be in a more positive mood (Curcio, et al.,2011; Magid, et al., 2007; Mushquash, et al., 2013; Read, et al., 2003).

In addition to alcohol use, two studies found that enhancement motives mediate the relationship between sensation seeking and alcohol problems. Magid, et al. (2007) found this in a sample of 310 college students, and Read, et al., (2003) found this in a sample of 388 university students. Both studies were rated as methodologically "strong" giving us some confidence in their findings. Magid, et al. (2007) and Mushquash, et al. (2013) also found that being higher in sensation seeking also directly predicted enhancement motives, thereby further providing further confirmatory evidence that enhancement motives play a role in problem drinking and related problems among high sensation seekers.

Positive Alcohol Expectancies as Mediator. Kazemi, et al. (2014) posit that the relationships between impulsivity and sensation seeking on alcohol drinking behaviour and associated consequences is mediated by positive alcohol expectancies. That is, in their study conducted among 260 freshmen between the ages of 18-20 years old, they identified that participants higher in sensation seeking who had more positive alcohol expectancies, actually reported more negative consequences of alcohol use. Their explanation for this is that individuals high in sensation seeking attend more to positive social cues and are therefore less likely to learn from previous negative consequences. This study, however, was rated "adequate" in quality, and therefore the results should be interpreted with caution.

Anti-social Features as Mediator. Hahn, et al. (2016) explored the relationships between five factors of impulsivity (Negative urgency, [lack of] premeditation, [lack of] perseverance, sensation seeking, and positive urgency), borderline and antisocial features, and alcohol-related problems in a sample of 624 college students between the ages of 18-25 years old. Antisocial features in this study refer to features similar to those displayed in individuals with antisocial personality disorder, which is characterized by disregard and violation of the rights of others (Hahn, et al., 2016). Borderline features, likewise, are similar to those apparent in an individual with borderline personality disorder, which include instability in interpersonal relationships, affect, and self-image (Hahn, et al., 2016). Hahn, et al. (2016) found that sensation seeking, lack of premeditation and positive urgency uniquely predicted antisocial features, but not borderline features. On the other hand, negative urgency was correlated with both. However, antisocial features significantly mediated the relationship between sensation seeking and alcohol consumption and alcohol problems.

Social Norms as Moderator. Two studies explored the impacts of peers and social norms on problem drinking among adolescents high in sensation seeking (Glazer, et al., 2010; Pocuca, et al., 2018). Pocuca, et al. (2018) conducted a study among 3,287 adolescents in Australia on the impact of personality and perception of peer drinking on early adolescent drinking. They found that perception of peer drinking increased the likelihood of early adolescent drinking in adolescents higher in sensation seeking (Pocuca, et al., 2018). That is, adolescents high in sensation seeking who thought that their peers were using alcohol were more likely to drink alcohol themselves at an earlier age. Another study explored the moderating effects of perception of peer alcohol consumption and belief of social norms messages advertisements on alcohol consumption among sensation seekers (Glazer, et al., 2010). In this study conducted among 891 university students, it was found that high sensation seekers who believed that their peers consumed higher levels of alcohol, consumed more alcohol. In a similar way, high sensation seekers who did not believe many of the social norms advertisements which are intended to highlight misconceptions about the levels of alcohol consumed by peers, also drank more heavily. This postulates that consumption of alcohol by adolescents tends to be influenced by misconceptions of heavy drinking by their peers (Glazer, et al., 2010; Pocuca, et al., 2018).

Religiosity as Moderator. Galbraith et al. (2014) sought to explore if religiosity moderated the relationship between sensation seeking and substance use among 376 undergraduate psychology students. However, they found that some facets of religiosity predicted marijuana use, but not heavy drinking. This might suggest a difference between drinking and marijuana use when it comes to the moderating influence of religiosity.

Discussion

The aim of the current systematic review was to tease apart the relationship between sensation seeking and problem drinking. Specifically, it was geared towards exploring: Firstly, the direct relationship between sensation seeking and problem drinking/alcohol-related problems; secondly, the factors that might strengthen or weaken the relationship between sensation seeking and problem drinking; and third, other variables which help to explain the relationship between sensation seeking and problem drinking.

Impact of Sensation Seeking on Problem Drinking and-Alcohol Related Problems

From the literature reviewed, it is suggested that sensation seeking is correlated with drinking behaviour, though not always at a level that is problematic. The research highlights that this relationship is neither straight-forward nor generalizable to all individuals high in sensation seeking. Notably, there appears to be other important variables that increase the likelihood that an individual high in sensation seeking will engage in problem drinking behaviour and face alcohol-related problems. The relationship between sensation seeking and problem drinking appears to be mediated most reliably by enhancement motives, and anti-social features, and moderated by social norms. Furthermore, gender, family and peer history of substance abuse, stressful life events and risk-taking propensity also seem to influence the impact of sensation seeking on problem drinking.

Variables that Explain or Strengthen the Relationship

The Feel-Good Factor. The literature suggests a theme in terms of reasons that adolescents high in sensation seeking drink at problematic levels. Studies found that both enhancement motives and positive expectancies appear to be important factors in the relationship between sensation seeking and problem drinking (Curcio, et al., 2011; Magid, et al., 2007;

Mushquash, et al., 2013; Read, et al., 2003; Kazemi, et al., 2014). Still, while the studies on enhancement motives were all "strong" methodologically, the study about positive expectancies was only rated as "adequate". Therefore, we can more confidently conclude that that adolescents high in sensation seeking are more likely to use alcohol at a problematic level if they are motivated by an expectation of feeling good as a result of consumption. This makes sense in that individuals high in sensation seeking would appear to have a predisposition to using alcohol, but only those with a certain goal of 'feeling good' would continue drinking past recommended levels in hopes that they will achieve a desired positive outcome. Perhaps, then, consumption levels increase when that outcome is not achieved after a "safe" level of intake because the individual perceives that more alcohol might be required to achieve the desired benefit. As is characteristic of the sensation seeking personality trait, individuals high in sensation seeking would be less inclined to think about past and possible future negative consequences than someone with a more internal locus of control (Eysenck, 1993).

Antisocial Features. Only one study in the review looked at the role of antisocial features as a mediator in the relationship between sensation seeking and problem drinking (Hahn, et al., 2016). However, antisocial features were found to mediate the relationship between sensation seeking and alcohol consumption and alcohol-related problems. Individuals with antisocial features, according to Hahn, et al. (2016) are those that generally violate rules of society and the rights of others. In the context of problem drinking this would mean that because an individual is high in sensation seeking they would be more inclined to drink beyond reasonable levels as they might be expected to have little regard for the consequences of their drinking behaviour on others.

Social Norms. The impact of social norms on the relationship between sensation seeking and problem drinking is interesting. From the literature, it seems as though individuals high in

sensation seeking tend to adhere to their perceptions of drinking level norms among their peers (Glazer, et al., 2010; Pocuca, et al., 2018). Generally, adolescents perceive that their peers are drinking greater levels of alcohol than they actually are (Glazer, et al., 2010; Pocuca, et al., 2018). However, campaigns that aim to debunk misconceptions about social norms are sometimes not believed because the perception of drinking levels held by the individuals is somewhat fixed (Glazer, et al., 2010). Both studies which explored the role of social norms were strong in methodology, analysis and presentation, thus we can conclude with some degree of confidence that social norms are an important variable in the relationship between sensation seeking and problem drinking.

The Role of Gender. The results of this systematic review suggest that sensation seeking may influence individuals differently based on gender. Specifically, sensation seeking as a personality trait appears to be more common amongst males than females (Adan, et al., 2016; Mushquash, et al., 2013). This finding can be trusted with some degree of confidence because Adan, et al. (2016) and Mushquash (2013)'s studies were methodologically sound and were classified as "good" and "strong", respectively based on Kmet, et al.'s (2004)'s quality assessment criteria. Interestingly, the research exploring the aetiology of sensation seeking has suggested that individuals might be biologically predisposed to being higher in sensation seeking. Although the biological basis of sensation seeking is quite complex and beyond the aims and scope of the current systematic review, Daitzman and Zuckerman (1980) highlighted the involvement of gonadal hormones in sensation seeking which would help to explain gender differences. However, it is also possible that socialization may play a role in sensation seeking amongst males as well, because traditionally, males have been more often encouraged than their female counterparts to be more 'adventurous' while females have often been socialized to live more 'cautious' lives (Arnett, 1994).

Other Important Factors. The current review sheds light upon the influence of risk-taking propensity in the relationship between sensation seeking and problem drinking. MacPherson, et al. (2010) explained that alcohol-related problems are more likely if sensation seeking is paired with risk taking propensity. Furthermore, this study highlighted the dynamic nature of both sensation seeking and risk-taking propensity. That is, increases in these variables over time may best predict future problem drinking behaviour (MacPherson, et al., 2010). Daitzman et al. (1980) posit that sensation seeking generally decreases with age, therefore it is understandable how increases in this personality trait with age could potentially increase the likelihood of problem drinking behaviour over time.

The research also highlighted the impacts of parental substance use and psychological distress which all appear to influence the relationship between sensation seeking and problem drinking among adolescence (Bo, et al., 2016). However, the research was not methodologically strong enough for conclusions to be drawn confidently.

Limitations and Suggestions for Future Research

The current systematic review provides a more in-depth understanding of the role of sensation seeking in problem drinking among adolescence. However, it is very important to be mindful that it is not without limitations. Considering the limitations of the current review can help to provide direction for future research.

Perhaps one of the most noteworthy limitations of the current review is the overall quality of the studies included. Although some of the articles in the study were strong methodologically, quite a few of the articles were methodologically weak. Furthermore, even amongst the studies that were rated as methodologically strong, the cross-sectional nature of them limited the researcher's ability to draw meaningful conclusions from the data. Cross-sectional studies do not

allow for causal inferences to be made, as the main purpose of these types of studies is to describe data patterns, rather than explaining them which would be required to enhance understanding. Moreover, cross-sectional data is collected over a relatively short time span, so it is also possible that the results could differ if the same data were to be collected at different time (Levin, 2006). It would perhaps have been helpful to include more longitudinal studies to enable a comparison of data at a variety of time-points to facilitate more accurate conclusions.

In addition to the majority of the studies being cross-sectional, these studies also measured multiple factors which makes it even more difficult to draw conclusions because the efforts made by the researchers to explore the relationship between sensation seeking and problem drinking lacks depth. Therefore, in order to better understand the relationship between sensation seeking and problem drinking, qualitative data would have been extremely useful. Qualitative data would have added richness to the data and allowed for more explanation and clarification, as opposed to solely description. Conclusions drawn from qualitative data would potentially be more reflective of the true relationship because this type of data affords the opportunity to answer questions left unanswered by the current data in the studies selected. Future research, therefore, should utilise more longitudinal and randomised controlled studies, as well as qualitative studies for a more comprehensive and meaningful review to be conducted.

The variety of measures used to assess sensation seeking can also be considered a limitation of the current review. Although there is generally a consensus on the meaning of sensation seeking, the difference in reliability and validity of each scale in measuring the construct of sensation seeking could be problematic when trying to compare the findings of each study. A future meta-analysis would be beneficial so that the findings of the literature can be weighed statistically so as to better account for differences that might arise from the measures used. Furthermore, it is

important to recognize that all of the measures used in the studies included required subjective self-rating. This is a limitation generally in research, but especially so among the populations in the studies in this review because many of the participants would not be above the legal drinking age and might therefore have been less likely to answer honestly on measures of alcohol use due to fears of legal repercussions if they were identified. This would be particularly the case in studies that involved interviews, but could have also been the case in studies where participants used online or paper and pencil surveys.

Culture can also be considered a limitation in the context of the United Kingdom because none of these studies were conducted among a British population. This begs the question of the generalizability of the findings of the current review, especially because – as aforementioned – sensation seeking has both biological and environmental influences. Thus, future research should explore the role of sensation seeking on problem drinking among adolescents within the United Kingdom.

The extended range for the age of adolescence, although more inclusive and perhaps more accurately representative, also means that some of the participants in these studies were at very different stages in their lives and cognitive, psychological and social development which may have influenced their alcohol consumption and sensation seeking levels. For instance, older participants might have been more inclined to report their alcohol consumption once they passed the legal drinking age, as opposed to individuals in early adolescence whom might fear the repercussions of disclosing alcohol consumption, or who might not have yet been exposed to alcohol. Similarly, the university culture of alcohol use might create differences in drinking behaviour among adolescents at this stage versus those in high school.

It would be helpful if future reviews explore the specific role of different personality traits on problem drinking. For instance, negative urgency should be explored separately since it appears to contribute to problem drinking among different populations. Also, neuroticism should also be explored more closely due to its proposed role in problem drinking among females.

Clinical Implications

Developing our understanding of the role of sensation seeking in problem drinking can have both preventative and treatment benefits. In order to help prevent/mitigate against future issues with alcohol use, trained professionals within educational institutions could develop and implement alcohol use prevention programmes tailored to individuals with specific personality traits. With the knowledge about what it means to be high in sensation seeking and the factors that, when coupled with high sensation seeking, increase the likelihood for problem drinking, these programmes could be designed in a tailored way. For example, an alcohol prevention programme for adolescents high in sensation seeking could include activities that: highlight the reality of social norms and perceptions of peer behaviour; consider the role of parental history of substance use and psychological distress; and increase awareness of the negative consequences of alcohol use so that the perceived enhancement benefit can be more grounded in reality. Likewise, treatment programmes could be developed in a way that is specific to different personality traits. In fact, research has already shown that intervention programmes that target specific personality traits can have lasting effects on the reduction of alcohol use among adolescents (Conrod, Castellanos, & Mackie, 2008; Conrod, Castellanos-Ryan, et al., 2011). Importantly, as the literature highlights possible gender differences in the impact of sensation seeking on problem drinking, professionals would benefit from consideration of the influence of these differences in a treatment setting.

Conclusions

Overall, the literature suggests that sensation seeking may be an important personality trait to consider in relation to problem drinking in adolescence. However, whereas sensation seeking more often than not confidently predicts alcohol use in adolescence, in most cases, sensation seeking on its own will not be reliably predictive of problem drinking and alcohol-related problems. Rather, other factors such as gender, negative urgency, enhancement motives, perception of social norms, parental and peer substance use, stressful life events, anti-social features and risk-taking propensity should be considered in addition to sensation seeking to predict drinking at a problematic level. Although it is important to considering that other biopsychosocial factors contribute to an individual's problem drinking behaviour, the findings of this review of the literature may provide useful pointers for efforts to prevent and treat problem drinking in adolescence to help curtail the likelihood of the development of alcohol use disorders and other related difficulties in adulthood.

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VOLUME I

CHAPTER II: EMPIRICAL PAPER

THE IMPACT OF IMPULSIVITY AND KNOWLEDGE OF NEGATIVE CONSEQUENCES OF ALCOHOL CONSUMPTION ON ALCOHOL USE

Abstract

Background

The current literature suggests that impulsivity is correlated with alcohol use. Recent studies have also found that different subcategories of impulsivity (Sensation seeking, Urgency, Premeditation [lack of], and Perseverance [lack of]) vary in their relationships with alcohol use. However, it is still unclear exactly how each of these subcategories differentially interact with alcohol use, and the effects that each subcategory has on alcohol-related negative consequences. Furthermore, gender seems to be an important consideration as men have been found to be disproportionately higher than females in both impulsivity and negative consequences of alcohol use.

Aim

The primary aim of this study was to further explore the relationships between subcategories of impulsivity and alcohol use, and to explore whether this relationship is moderated by negative consequences of alcohol consumption in a male sample. It was hypothesized that all subcategories of impulsivity would be positively correlated with alcohol use, but that the effects of urgency and sensation seeking would be most profound, such that individuals with high levels of urgency and sensation seeking would exhibit highest levels of alcohol use. Additionally, it was hypothesized that individuals high in impulsivity who had more negative consequences of alcohol consumption in the last year would report lower levels of alcohol use than those who experienced fewer negative consequences.

Method

Sixty-six (N=66) participants (Mean age = 20.68, SD = 2.19) were recruited using social media websites, poster advertisements throughout Birmingham and through a local college in

Birmingham. Participants were included if they were 18-25 year-old males who had never been to university. Participants completed an online survey consisting of four questionnaires: a Brief Demographics Questionnaire, the Alcohol Use Disorders Identification Test to assess drinking pattern/behaviour, The Young Adult Alcohol Consequences Questionnaire assessing number of negative alcohol-related consequences experienced by the participant, and the UPPS Impulsive Behaviour Sale (Whiteside, & Lynman, 2001) which tests for levels of impulsivity across four subcategories (Urgency, Premeditation [lack of], Perseverance [lack of], and Sensation Seeking). The data were analysed using bivariate correlations and bootstrap moderation analysis.

Results

Total impulsivity and the separate subcategories of impulsivity were all positively correlated to alcohol use, but negatively correlated to negative consequences. However, negative consequences of alcohol consumption did not moderate the relationship between impulsivity and alcohol use.

Conclusion

Young adult males high in impulsivity are likely to consume more alcohol, however, being high in impulsivity may decrease an individual's insight into the negative consequences associated with alcohol use. Future research should explore other mediators and moderators of the relationship between impulsivity and alcohol use to better inform clinical practice.

Introduction

Impulsivity and alcohol use

Personality has long been studied as a risk factor in alcohol use and addiction research (Lejuez, et al., 2010). However, whereas this was once mainly researched in isolation and mainly focused on a biological perspective, more recently, research on alcohol use has moved from independent theories to acknowledge a more biopsychosocial model (Moos, 2003). This model suggests that various biological, psychological and social factors combine to varying degrees to lead to the development and maintenance of alcohol use at problematic levels and alcohol addictions (Moos, 2003). Thus, in this context, personality is thought to be a risk factor - influenced by genetics and brain development, psychological processing, culture and environment - which may interact with other biopsychosocial risk factors to contribute to alcohol use and addictions.

With this in mind, throughout the literature on alcohol use, impulsivity continues to be mentioned as one of the main personality traits thought to be predictive of drinking behaviour (Coskunpinar, Dir, & Cyders, 2013; Stautz, & Cooper, 2013), such that individuals higher in impulsivity tend to use more alcohol than those lower in impulsivity (Ashenhurst, Harden, Corbin, & Fromme, 2015; Coskunpinar, et al., 2013; Fu, Ko, Wu, Cherng, & Cheng, 2007; Jones, Chryssanthakis, & Groom, 2014; Stautz, et al., 2013; Wellman et al., 2014). According to Bari and Robbins (2013, p.53), impulsivity is a personality trait which is generally defined as "the inability to withhold or stop a response or a thought in the face of negative consequences; preference for a small immediate reward versus a larger but delayed one; acting without forethought or before all necessary information is available; novelty/sensation-seeking and an increased propensity to engage in risky behaviours".

However, more recent studies have found that "impulsivity" as an umbrella term does not adequately describe the relationship between this trait and alcohol consumption. Rather, it is thought that different subcategories of impulsivity are more predictive of alcohol use than others (Bo, Billieux, & Landro, 2016; Jones, et al., 2014). Generally, studies that have looked at the subcategories of impulsivity have used three or all of the subscales of the UPPS Impulsive Behaviour Scale (Whiteside, & Lynman., 2001; Urgency, Premeditation [lack of], Perseverance [lack of], and Sensation Seeking). These studies have found that the subcategories of impulsivity may influence alcohol use in varying ways in different populations. For instance, one study revealed that urgency (drinking to quickly alleviate distress), lack of premeditation and sensation seeking had varying relationships with alcohol consumption and problem behaviour (Jones, et al., 2014). Specifically, urgency was directly predictive of negative consequences and indirectly related to coping motives for drinking. Additionally, Jones, et al. (2014) found that participants high in sensation seeking were also highly likely to experience greater negative consequences, but this was influenced by the quantity of alcohol consumed, with more alcohol increasing the likelihood of negative consequences. Another study found that urgency appeared to be generally most predictive of binge drinking behaviour (Bo, et al., 2016). Bo, et al. (2016) also found that when looking at male participants alone, sensation seeking was most predictive of drinking behaviours. This suggests that different subcategories of impulsivity might also have differential effects on drinking behaviour dependent on gender.

The Role of Gender

Researchers recruited 609 English and French speaking participants in secondary school (grade 7) in Montreal, Canada to investigate the predictors of sustained binge drinking during

young adulthood (Wellman, et al, 2014). Survey data were collected every three months during five years in secondary school (20 times between 1999-2005), then twice later (2007-2008 and 2011-2012). The results showed that participants who were categorized as sustained binge drinkers at the later data collection times were more likely to be young, male, have less education and started drinking at an earlier age. This suggests that both gender and education levels could be potential predictors of binge drinking behaviour throughout the lifespan with males with less education being more susceptible than females and even their more highly educated male counterparts. Research also suggests that the relationship between alcohol and impulsivity among males is more complicated than that among females. Fu, et al. (2007) sought to investigate gender differences in risk for alcohol use in a one-year longitudinal study among 1122 Chinese college students. They found that there was only a direct relationship between impulsivity and alcohol use in females. In males, however, impulsivity only affected alcohol use when they reported higher levels of positive outcome expectancies of alcohol use. Therefore, impulsivity on its own may not accurately predict drinking behaviour among men; rather, male drinking behaviour appears to be motivated by a thought process that involves positive expected outcomes and consequences of their alcohol use.

Interestingly, gender differences seem to also exist in the experience of alcohol-related problems/negative consequences of alcohol consumption. Generally, research suggests that male participants seem to have lower negative outcome expectancy and higher positive outcome expectancy scores than females (Fu, et al, 2007; Park, & Grant, 2005), but may actually experience more negative outcomes/ consequences and alcohol related problems than females (Fu, et al, 2007; Park & Grant, 2005). This suggests that men may have a more positive

mentality about alcohol use, although actual experiences with alcohol are more problematic and negative than they expect.

Alcohol Use and Related Problems in the United Kingdom

Although alcohol use among adults in the United Kingdom has generally decreased over the last decade from approximately 64.2% in 2005 to 56.9% in 2016 (Office for National Statistics, 2017a), there is still public concern regarding alcohol related problems. For instance, alcohol consumption is still closely linked with violence throughout the United Kingdom, with over half (53%) of the victims of violent acts reporting that the perpetrators appeared to be under the influence of alcohol at the time of the crime (Office for National Statistics, 2017b). Likewise, alcohol is linked to thousands of driving incidents and fatalities (Royal Society for the Prevention of Accidents, 2017). As it relates to mental health, binge drinking has been linked to depression and anxiety disorders in adolescents (Martinez-Hernaez, 2015). In the United Kingdom, approximately 44% of patients receiving community mental health services reported problematic drinking or drug use in the previous year (Public Health England, 2016). Also, 45% of patients who committed suicide between 2002 and 2011 were found to have a history of hazardous drinking (Public Health England, 2016).

Consistent with the literature, age and gender appear to be important factors when exploring alcohol use and related problems in the context of the United Kingdom. For instance, in the United Kingdom, men have been found more likely than their female counterparts to consume alcohol, and males aged 16-24 years old have been found to be the heaviest drinkers out of all age groups (Office for National Statistics, 2018). Furthermore, 65% of all alcohol-related death in 2015 were among males (Office for National Statistics, 2017b). This suggests that, in the United Kingdom, alcohol use among young adult males is of particular clinical

interest and may benefit from being further explored through research. Although there is currently quite a large body of literature about alcohol use in young adults, few studies are specific to males, and most are conducted among university students. Considering that approximately half of the population in the United Kingdom does not attend university, the findings of the current body of research may not be generalizable to the majority of the population (Office for National Statistics, 2017c).

Current Study

In essence, the current literature provides us with findings that suggest that impulsivity, negative consequences of alcohol consumption, and alcohol use are correlated, and that these relationships might be different for males and females, but the way in which these variables interact with each other is still inconclusive, and the findings of most studies are mainly limited to student populations. Thus, the aim of this study was to contribute to the body of literature on alcohol use and the factors that lead to its continued consumption in spite of negative consequences among young males between age18-25 years old who had not been to university. This is based on the assumption that people who consume high levels of alcohol would experience negative consequences as a result of their drinking behaviour.

Male participants who had not yet been to university were selected, because most of the research on the subject matter has been primarily conducted among university students, and the researcher was interested in exploring potential differences among participants of the same age who were not in the university environment, as these environments may have special drinking cultures. Additionally, the decision to only include male participants was made because research has shown gender differences in alcohol use and negative alcohol-related problems between men

and women. Specifically, men have been found to experience more alcohol-related problems than women, including higher levels of alcohol related deaths.

Importantly, this study is among the few to be conducted in the United Kingdom (UK), as most of the research available for reference has drawn from samples in the United States, Canada and China. Drawing from samples in the U.K. allows for a better understanding of the specifics of the phenomenon in this geographical region, because drinking behaviour is influenced differently by culture, and legal limitations (Jones, et al., 2014). Although the study will not be limited to the United Kingdom (due to the nature of recruitment via social media and an online survey platform), making the differentiation apparent on the demographics questionnaire will still facilitate the exploration of the phenomenon specifically among U.K. participants. Therefore, in addition to filling the gap on research conducted in the U.K., the current study aims the explore the relationships further, while focusing on a population whose gender, age and educational level may provide differential results than the populations cited in the existing literature.

Three main hypotheses were tested in the current study. The first two were guided by the existing literature, whereas third hypothesis was exploratory in nature. The researcher hypothesized that:

1. Impulsivity would predict alcohol use.
    a. Higher scores on all subcategories of impulsivity (Sensation seeking, Urgency, Premeditation [lack of], and Perseverance [lack of]) would be correlated to higher levels of alcohol use;
    b. Participants high in urgency and sensation seeking would report highest levels of alcohol use.

2. Negative consequences would be positively correlated with impulsivity and alcohol use.
    a. Participants who drink greater amounts of alcohol would experience more negative consequences of alcohol consumption;
    b. Participants higher in impulsivity would experience more negative consequences of alcohol consumption.
3. Negative Consequences of alcohol consumption would act as a moderator in the relationship between impulsivity and alcohol use; such that the hypothesized positive correlation between impulsivity and alcohol use would be influenced by the number of negative consequences of alcohol use reported.
    a. Participants individuals high in impulsivity whom would normally consume a lot of alcohol would use less alcohol if they reported more negative consequences of alcohol consumption.

Methodology

Ethics

Ethical approval was sought and received from the Ethics Committee at the University of Birmingham (see appendix A for evidence of approval).

Study Design

The study employed a cross-sectional design.

Method

The study was uploaded to LimeSurvey – an online survey tool accessible to students at the University of Birmingham. The survey link was abbreviated using the website 'Bitly' in order to facilitate sharing. When participants clicked on the link to complete the study, the first page provided a brief explanation of the study, researcher details, estimated duration of the survey, explanation of confidentiality and information about any potential discomfort that they may experience while completing the survey (see appendix B). They were then asked whether or not they were willing to consent to participate in the study. Participants who did not wish to provide consent were redirected to a page thanking them for their time, while participants who agreed to provide consent were sent to the actual survey questionnaires.

The entire survey lasted between 20-30 minutes. Once participants had completed all of the questions, the final page of the survey provided them with contact information for services that they would be able to seek support from, if necessary. These services included online and physical alcohol support services in the United Kingdom, and suggestions for Alcoholics Anonymous services outside of the United Kingdom. Participants were also given the opportunity to provide their e-mail addresses to be entered into a raffle for one of three Amazon gift vouchers worth £50 each.

Measures

Brief Demographics Questionnaire. A brief demographics questionnaire was created by the researcher which inquired about age, ethnicity, employment status, marital status and country of origin.

Alcohol Use. Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, J& Grant,1993). The AUDIT is a 10-item measure developed by the World Health Organization (WHO) to assess drinking pattern/behaviour in order to identify patterns of hazardous drinking. Scores on the AUDIT can range from 0-40 as each item can be given a score of 0-4. The scoring instructions of the AUDIT advise that scores of 0-7 indicate low risk of hazardous drinking, 8-15 indicate increasing risk, 16-19 indicate high risk of hazardous drinking and scores above 20 indicate possible alcohol dependence. The AUDIT has been found to have good reliability and validity across a variety of populations (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009).

Negative Consequences of Alcohol Consumption. The Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006) was used to assess number of negative alcohol-related consequences experienced by the participants in the last year. The YAACQ consists of 48 items which are scored dichotomously. These items range from low level problems (e.g. hangovers) to more serious consequences (e.g. dependence). The YAACQ has been found to demonstrate strong concurrent and predictive validity, internal consistency, and test-retest reliability (Read, Merrill, Kahler, & Strong, 2007).

Impulsivity. The UPPS Impulsive Behaviour Scale (Whiteside, et al., 2001) is a 45-item measure that tests for levels of impulsivity across four subcategories (Urgency, Premeditation [lack of], Perseverance [lack of], and Sensation Seeking). Higher scores on this measure indicate

higher levels of impulsivity. The UPPS has been reported to have high internal consistencies in young adult populations, and good convergent and discriminant validity (Smith et al., 2007).

Recruitment

Participants were recruited both online and in person by the researcher. The researcher initially began recruiting participants through the social media website Facebook, by creating a Facebook account specifically for the study. Through this account, the study was advertised weekly on a number of Public Facebook pages (n = 15) and in a variety of Facebook groups (n=9) identified to be frequented by young men. The groups and pages were selected by entering keywords into the Facebook search box such as “men”, “young”, “young men”, “alcohol”, “boys”, “cars”, “sports”, “work”, “fathers”, etc (see appendix C).

A Facebook page is a public profile that can be “liked” and “followed” by anyone, whereas with Facebook groups, individuals must request to join the group, and are considered members. Some Facebook groups accept the request automatically, whilst others require approval from a group administrator in order for the request to be accepted. The requests to join groups were generally approved, however, there were some instances where the request was denied. Specifically, six (n=6; 40%) of the fifteen Facebook groups initially sent requests, declined. Although no explanation was given for this decline, the researcher hypothesised that it could be because the groups were exclusive to men. The advertisement also encouraged individuals to share the study with potential participants. This strategy is called snowballing (Goodman, 1961). Due to a slow response rate, participants were also recruited through flyer and poster advertisements throughout Birmingham outside of restaurants and bars (e.g. Nando’s and Revolution) and by use of a stall set up on two occasions at a vocational college in Birmingham.

Sample

A total of 82 participants completed the survey, however, 16 participants were then excluded from the final analysis. Five (n=5) participants were excluded for being female, six (n=6) participants had missing data, two (n=2) reported their age as older than 25 years, and three (n=3) participants were excluded for being younger than 18 years old. The final sample, therefore, consisted of sixty-six (N=66) males between 18-25 years old who had not attended university.

Data Analysis

The data were inspected for Skewness and Kurtosis, and the inspection found that the data for the YAACQ and the AUDIT were skewed, and therefore violated the assumptions of normality (appendix D). Therefore, non-parametric data analyses were conducted.

Spearman's correlational analyses were used to examine the relations between scores on the AUDIT, UPPS Impulsive Behaviour Scale, and the YAACQ. The UPPS scores were analysed holistically and by subscale (see table 7).

Furthermore, boot strap moderation analysis was used to decipher whether negative consequences of alcohol consumption moderated the relationship between impulsivity and alcohol use. In other words, this analysis tested whether an individual who scored high in impulsivity used large amounts of alcohol even if they reported more negative consequences of alcohol consumption. Boot strap estimates have several advantages, including the fact that the bootstrap parameter estimates are robust to smaller sample sizes, such that models with only moderate effect sizes can be reliably detected using samples of only 70 participants (Fritz & MacKinnon, 2007)

Results

Demographics

Full demographic characteristics for the sample are presented in table 5. In total, 66 individuals participated in the current study. Participants were all male and between the ages of 18-25 years (M = 20.68, SD = 2.19). The majority of participants were from the United Kingdom (57.6%) or Anguilla (31.8%) and over half of the sample identified as Black/African/Caribbean (51.5%), while 33.3% identified as White/European/Caucasian. Most participants (60.6%) lived with their parents/guardians/relatives, were single (87.9%), and were employed (65.2%).

Table 5. *Demographic Characteristics of the Sample.*

		All Participants (N = 66)
Age (M, SD)		20.68 (2.19)
Ethnicity (N, %)	Black/African/Caribbean	34 (51.5%)
	White/European/Caucasian	22 (33.3%)
	Asian	4 (6.1%)
	Mixed (Any combination of the above)	6 (9.1%)
Country of Origin (N, %)	United Kingdom	38 (57.6%)
	Anguilla	21 (31.8%)
	Jamaica	2 (3%)
	Antigua and Barbuda	1 (1.5%)
	Iran	1 (1.5%)
	Kenya	1 (1.5%)
	South Africa	1 (1.5%)
	Uganda	1 (1.5%)
Living Situation (N, %)	Parents/guardians/ relatives	40 (60.6%)
	Alone	11 (16.7%)
	Husband/Wife/Domestic Partner/Significant Other	7 (10.6%)
	Shared accommodation (other)	7 (10.6%)
	Child/Children	1 (1.5%)
Marital Status (N, %)	Single	58 (87.9%)
	Married	1 (1.5%)
	Separated	1 (1.5%)
	Divorced	1 (1.5%)
	Other (In a relationship/engaged)	5 (7.5%)
Employment Status(N, %)	Employed	43 (65.2%)
	Unemployed	16 (24.2%)
	In training/apprenticeship	5 (7.6%)
	Other	2 (3%)

Clinical Characteristics

Table 6 outlines the means and standard deviations for the measures used in the study, as well as the percentages of the sample that fell into the different categories of the AUDIT. The participants' mean score for the AUDIT was 9, which falls into the category of 'increasing risk for hazardous drinking'. However, almost half (41.5%) of the sample scored below the cut-off for concerns about hazardous drinking. The mean score on the YAACQ (M=33.02, SD=14.71)

was well above the half-way point of the 45-item measure, suggesting that most participants in the study experienced quite a number of negative consequences of alcohol consumption, although the YAACQ does not provide specific cut-off points or categories for classification. Furthermore, of the four subcategories of the UPPS, participants were classified as highest in 'sensation seeking' and 'urgency' (M=34.55, and M=31.11, respectively).

Table 6. *Descriptive Statistics*

		All Participants (N=66)
Audit Score (M, SD)		9 (9.14)
Audit Categories (N, %)	Lower Risk	34 (41.5%)
	Increasing Risk	18 (27.2%)
	Higher Risk	4 (6%)
	Possible Dependence	10 (15%)
YAAQ -Negative Consequences (M, SD)		33.02 (14.71)
UPPS Total (M, SD)		105.91 (27.02)
UPPS Categories (M, SD)	Urgency	31.11 (9.98)
	Sensation Seeking	34.55 (8.23)
	(lack of) Premeditation	20.02 (7.23)
	(lack of) Perseverance	20.23 (6.07)

Correlational Analyses

Spearman's correlational analyses were used to test hypotheses 1 and 2 (see table 7).

Hypothesis 1: Impulsivity would predict alcohol use

A Spearman correlational coefficient was conducted to assess the relationships between impulsivity and alcohol use. Total impulsivity was found to be a strong predictor of alcohol use $r_s\,(66) = 0.68$, $p < 0.001$. Similarly, all the subcategories of impulsivity were also positively correlated with alcohol use, therefore providing support for hypothesis 1a. Also, as predicted, urgency was the strongest predictor of alcohol use ($r_s\,[66] = 0.72$, $p < 0.001$). However, hypothesis 1b was only partially supported as (lack of) premeditation was found to be a stronger

predictor than sensation seeking, $r_s(66) = 0.57$, $p < 0.001$) although the strength of the correlation only differed slightly. Sensation seeking yielded a correlation of $r_s(66) = 0.49$, $p < 0.001$, while (lack of) perseverance yielded a correlation of $r_s(66] = 0.48$, $p < 0.001$), both of which are considered moderate in strength.

Hypothesis 2. Negative consequences would be positively correlated with alcohol use and impulsivity

A Spearman correlational analysis was conducted to decipher if negative consequences of alcohol consumption was correlated to alcohol use. The analysis revealed a very strong negative correlation between negative consequences and alcohol use, such that participants who reported more negative consequences of alcohol use, reported lower risk for hazardous drinking, $r_s(66) = -0.83$, $p < 0.001$, therefore rejecting hypothesis 2a.

A Spearman correlational analysis was conducted to assess the relationship between negative consequences of alcohol consumption and impulsivity. A strong negative correlation was found between total impulsivity and negative consequences of alcohol consumption, $r_s(66) = -0.76$, $p < 0.001$. Negative correlations were also indicated for urgency ($r_s[66] = -0.74$, $p < 0.001$), sensation seeking ($r_s[66] = -0.59$, $p < 0.001$), (lack of) premeditation ($r_s[66] = -0.65$, $p < 0.001$), and (lack of) perseverance ($r_s[66] = -0.62$, $p < 0.001$). Therefore, hypothesis 2b was also rejected.

Table 7. *Bootstrap Bivariate Correlations*

		Age	YAACQ Total	Audit Total	UPPS Total	PREMEDITATION	_URGENCY	SENSATION SEEKING	_PERSEVERANCE
Age	Correlation Coefficient	1.000	.163	-.091	-.218	-.065	-.147	-.301*	-.115
	Sig. (2-tailed)	.	.191	.467	.079	.602	.240	.014	.359
YAACQ Total	Correlation Coefficient	.163	1.000	-.833**	-.757**	-.648**	-.740**	-.578**	-.615**
	Sig. (2-tailed)	.191	.	.000	.000	.000	.000	.000	.000
Audit Total	Correlation Coefficient	-.091	-.833**	1.000	.677**	.572**	.720**	.493**	.484**
	Sig. (2-tailed)	.467	.000	.	.000	.000	.000	.000	.000
UPPS Total	Correlation Coefficient	-.218	-.757**	.677**	1.000	.823**	.889**	.823**	.837**
	Sig. (2-tailed)	.079	.000	.000	.	.000	.000	.000	.000
PREMEDITATION	Correlation Coefficient	-.065	-.648**	.572**	.823**	1.000	.659**	.524**	.789**
	Sig. (2-tailed)	.602	.000	.000	.000	.	.000	.000	.000
_URGENCY	Correlation Coefficient	-.147	-.740**	.720**	.889**	.659**	1.000	.638**	.638**
	Sig. (2-tailed)	.240	.000	.000	.000	.000	.	.000	.000
SENSATION SEEKING	Correlation Coefficient	-.301*	-.578**	.493**	.823**	.524**	.638**	1.000	.594**
	Sig. (2-tailed)	.014	.000	.000	.000	.000	.000	.	.000
_PERSEVERANCE	Correlation Coefficient	-.115	-.615**	.484**	.837**	.789**	.638**	.594**	1.000
	Sig. (2-tailed)	.359	.000	.000	.000	.000	.000	.000	.

*Note: Sig. = significance. Significant correlations are marked with asterisks (*). Stronger correlations are marked '**' and weaker correlations are marked '*' A negative correlation means that as one variable increases, the other decreases and is marked with minus sign (-). A positive correlation means that as one variable increases, the other also increases, and is identified by the absence of a minus sign.*

Hypothesis 3: Negative Consequences of alcohol consumption would be a moderator in the relationship between impulsivity and alcohol use; such that the positive correlation between impulsivity and alcohol use would be influenced by the number of negative consequences of alcohol use reported.

The multivariate relationship between impulsivity (UPPS), negative consequences of alcohol consumption (YAACQ) and alcohol use (AUDIT) was assessed using model 1 (moderation analysis; Figure 2) of the PROCESS application for calculating moderation and mediation models in SPSS (Hayes & Matthes, 2009; Preacher & Hayes, 2004, 2008). In the model, total impulsivity was the independent variable (IV), alcohol use was the dependent variable (DV) and negative consequences for alcohol consumption was explored as the moderating variable (MV).

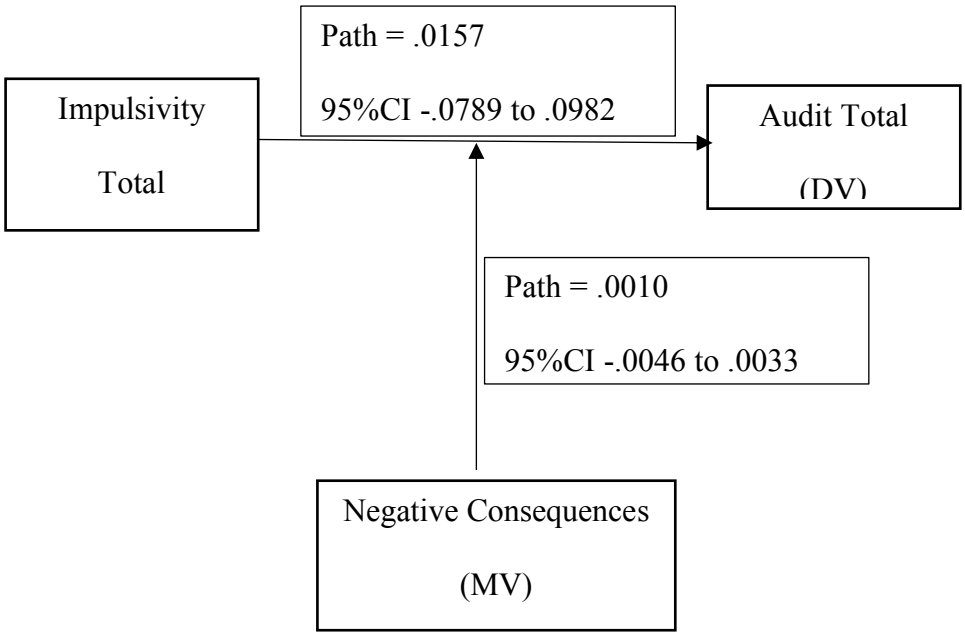

Figure 2. *Moderation analysis path.*

As can be seen in Figure 2, there was no significant main effect for the impulsivity to alcohol use pathway, $b = 0.016$, 95%CI (-0.08, 0.10). Similarly, the moderating effects of negative consequences was also not statistically significant, $b = 0.001$, 95%CI (-0.004, 0.003). Therefore, hypothesis 3 was not supported. Negative consequences of alcohol consumption did not significantly moderate the relationship between impulsivity and alcohol use.

Other Findings

The data also revealed a weak negative correlation between the sensation seeking subcategory of the UPPS and age, suggesting that sensation seeking levels decrease with age $r_s(66) = -0.30$, $p = 0.01$. No significant effects were found for country of origin, marital status or employment status among any of the main variables.

Discussion

Main Findings

The current study sought to explore the links between impulsivity, knowledge of negative consequences of alcohol consumption, and alcohol use among 66 male participants between 18-25 years old who were not enrolled in university. Participants in the study were mainly from the United Kingdom and Anguilla. They were primarily single and living with family. The majority of participants in this study indicated little risk for hazardous drinking, with only few scoring above the cut-off for possible alcohol dependence. However, none of the participants were not drawn from a clinical sample, thereby making it unclear if any had a pre-existing diagnosis of alcohol use disorder or have been previously treated for problems concerning alcohol use.

The findings demonstrated that young males who have not been to university tend to drink greater amounts of alcohol if they are higher in impulsivity as was hypothesized. On the contrary, the findings posit that young males who drink greater levels of alcohol report fewer negative consequences of alcohol consumption. Similarly, the results suggest that young males who are higher in impulsivity experience fewer negative consequences of alcohol use, contrary to what was hypothesized.

It was also hypothesized that individuals high in impulsivity would be more likely to use greater amounts of alcohol if they experienced fewer negative consequences of alcohol consumption. However, negative consequences of alcohol consumption did not weaken the relationship between impulsivity and alcohol use, as was hypothesized.

Impulsivity and Alcohol Use

Consistent with past research, impulsivity in the current study has been linked to alcohol use. This confirms that young adult males who do not attend university share similarities with

their university-going counterparts in this regard. Most research also suggests that among males, urgency and sensation seeking are the two subcategories most predictive of alcohol use, with one study suggesting that among males, sensation seeking is most predictive (Bo, et al., 2016). This study, however, found that urgency was most predictive in the current sample. It is possible, therefore, that level of education influences which subcategory of impulsivity has the greatest impact. Perhaps young adult males obtaining a university degree are more likely to consume greater amounts of alcohol due to the impulse to experience novel and exciting sensations as is characteristic of sensation seeking (Zuckerman, 1994), while their counterparts who do not attend university may consume more alcohol as a way to quickly escape negative affect as is characteristic of urgency (Lynam, Smith, Cyders, Fischer, & Whiteside, 2007). This could suggest that university might equip an individual with different ways to cope in negative situations but may also have a culture that encourages using alcohol as a means of feeling intense, new and exciting sensations and experiences.

Impulsivity, Alcohol Use and Negative Consequences of Alcohol Consumption

Interestingly, participants who were higher in impulsivity and who reporter greater amounts of alcohol use, also reported fewer negative consequences of alcohol consumption. These findings were inconsistent with existing literature, and the data were revised carefully to ensure that the pattern identified correctly reflected what was reported by participants and no error had been made. This does not necessarily mean that individuals high in impulsivity and/or who used more alcohol actually experienced fewer negative consequences of alcohol consumption, but rather may shed light upon the thought process involved in young adult male drinking behaviour, and potential flaws in the scale used to report negative consequences of alcohol consumption.

Previous research has found that males tend to have more positive expectancies for alcohol use than females, even though they may actually experience more negative consequences (Fu, et al, 2007; Park et al., 2005). A similar study found that individuals who were higher in impulsivity who had more positive expectancies of alcohol use, experienced more negative consequences (Kazemi, et al., 2014). However, this study was conducted primarily amongst female participants. Thus, it is possible that males high in impulsivity and those who use more alcohol may also only mentally process the positive effects that they expect to gain from their consumption and are therefore sometimes unaware of the associated negative consequences.

Research has also suggested that impulsivity functions as an antipode (direct opposite) to components of executive functioning (Bickel, et al., 2012). This means that individuals high in impulsivity may have difficulties doing what they know is right and grounding future actions based on past experiences. It is therefore important to consider that the idea of reporting negative consequences using a self-report measure would require a level of insight into the relationship between negative consequences experienced and alcohol use that might not be present in individual's high in impulsivity.

Therefore, using a self-report measure of negative consequences in this study might have impacted the results of the study with individuals high in impulsivity and those who consumed more alcohol potentially underreporting negative consequences of alcohol consumption. Although the YAACQ is described as a measure of negative consequences of alcohol use by the developers, it can be argued that it more accurately measures perception rather than reality. In other words, considering the wording of the items in the YAACQ, it can be hypothesized that this scale is more a measure of one's awareness/knowledge of negative consequences related to alcohol use, as opposed to actual negative consequences experienced. For instance, many of the

statements in the YAACQ end with "…because of my drinking". It is possible that although the males in this study identified with some of the negative events listed, they did not consider them to be a result of their alcohol use. An example of this would be the item that states, "I have been less physically active because of my drinking". It is possible that an individual could identify a decline in physical activity, but not be able to make the link between this decline and their drinking behaviour.

Clinical Implications

The current study has important implications for clinical work, especially being the first study of its kind to explore impulsivity, negative consequences and alcohol use in a completely male, non-university sample. Most importantly, understanding that males high impulsivity might not have insight into the negative consequences resulting from alcohol use can be an important consideration in treatment. Professionals might benefit from finding creative and effective ways to increase the individual's awareness of negative consequences of alcohol consumption. This may be done, for example, through behavioural experiments, or input from people in their wider system such as friends and family.

Similarly, the negative correlation between alcohol use and negative consequences identified in this study suggests that, aside from impulsivity, young males' psychological processing of their experiences with alcohol might be obstructed in some way. It is possible that, as previous research suggests, males have positive alcohol expectancies that may hinder their insight into the negative consequences associated with their drinking behaviour (Fu, et al., 2007). Knowledge of this can encourage professionals to use psychoeducation and perhaps more objective, evidence-based cognitive restructuring techniques to help patients identify the links between their alcohol use and associated negative consequences.

Still, it would be important in clinical practice to remember that impulsivity should not be used as a stand-alone concept in trying to predict an individual's susceptibility to problematic drinking and alcohol-related problems. Rather, impulsivity should be considered within a wider biopsychosocial context (Moos, 2003). Thinking about other biological, psychological and social risk factors for alcohol use would potentially help professionals to provide more comprehensive and effective interventions than being guided solely on an individual's level of impulsivity. For instance, thinking about an individual's upbringing, culture, relationships and support systems can be potentially useful in conjunction with impulsivity to formulate their likelihood to engage in alcohol use at problematic levels (Moos, 2003).

Strengths and Limitations

This study was unique because, unlike the research discussed previously, the sample included non-university participants. This is especially important because almost half of the population between 18-25 in the U.K. do not attend university, thereby making previous research hardly generalizable (Office for National Statistics, 2017c). Also, using male participants alone should be beneficial considering the disproportionate amount of negative consequences that the literature suggests are experienced by men who consume alcohol, and may help to clarify the mixed findings that suggest that males with lower levels of education are more likely to be sustained binge drinkers than their female, educated counterparts (Sloan, Grossman, &Platt, 2011; Wellman, 2014).

Still, the current study was not without limitations. Firstly, the sample size was small, thereby reducing the generalizability of the findings to the wider population. Furthermore, using a cross-sectional design is a limitation because it does not allow for cause and effect conclusions

to be made, and the findings of the study cannot be considered truly representative because it only offers a snapshot of the occurrence, specific to the time that the study is conducted.

Also, collecting data from the target population (young males outside of the university setting) proved more difficult than was originally anticipated. As such, the researcher and her advisor were tasked with thinking of creative ways to reach the population, which included more face-to-face public outreach in the community and in colleges. Not only was this more time consuming, but the element of persuasion involved in face-to-face soliciting could have introduced a new element of bias into the sample. Additionally, using snowballing as a method of data collection could also be considered a limitation, because with this technique, it is difficult to estimate how representative the sample is of the general population. The impact of snowballing in the current study could be identified by the high number of participants from Anguilla which is the primary researcher's country of origin.

The terminology used to select Facebook groups and pages on which to post the study can also be viewed as a limitation. The researcher used terminology stereotypically associated with males, which could have led to bias in the types of males that would have seen the study advertisement. In actuality, not all males subscribe to sports, cars, and fitness page, or even pages dedicated solely to males. Little to no provision was made for males whose hobbies and interests are common amongst both genders. For instance, it could have been beneficial to think about pages that focus on different professions, such as cooking, accounting, business management, lifestyle and fashion, and the like.

The YAACQ used to measure negative consequences of alcohol consumption can also be considered a limitation. In the context of the current study, males high in impulsivity may struggle to think of negative consequences of alcohol use and may not have made associations

between past negative events that occurred and their drinking behaviour. This has important implication for the interpretation of the results of this study, because it would be difficult to conclude whether the consequences reported by the participants were actual or perceived negative consequences of alcohol consumption. Thus, the surprising result that an individual higher in impulsivity had fewer negative consequences of alcohol consumption could potentially be inherently flawed based on the literature about impulsivity and the design of the scale.

Suggestions for Future Research

As the current study did not find a significant moderation effect of negative consequences of alcohol, future research should explore other variables that influence the strength of the relationship between impulsivity and alcohol use. This can help to inform both prevention and treatment efforts for alcohol use disorder among adolescent and adult males. Perhaps future research can explore the moderating impact of positive expectancies of alcohol use to decipher if males high in impulsivity are more likely to consume greater amounts of alcohol if they expect positive outcomes from consumption. Similarly, it would be interesting to explore if mental health difficulties such as anxiety or depression can further explain (mediate) the relationship, such that individuals high in impulsivity consume more alcohol as a way of coping with anxiety/depression.

It might be helpful if future research also seeks other ways to measure negative consequences of alchol consumption to be able to get a more accurate picture of the relationship between impulsivity and negative consequences of alcohol use. Perhaps qualitative data could be collected from the individual's system to be compared to any self-report data collected.

Furthermore, as aforementioned, the current study is unique because it used a non-university sample. The decision to do this was based on the assumption that the university

culture and level of education can influence drinking behaviour differently among males. However, the current study does not confirm that the difference between these two populations is significant enough to warrant differential treatment. Thus, future research can replicate the current study with both a university and non-university sample to facilitate comparison.

Conclusion

Impulsivity as an umbrella term, as well as the subcategories of impulsivity were all correlated with alcohol use in a sample of 18-25-year-old males who have not attended university. However, both impulsivity and alcohol use were negatively correlated with negative consequences of alcohol use, suggesting that individual in this sample who were either high in impulsivity or consumed high levels of alcohol reported fewer negative consequences. It is proposed that this finding might have to do with an individual's insight or awareness of negative consequences as a result of their alcohol consumption and might not necessarily be a true reflection of actual experienced negative consequences. Furthermore, bootstrap moderation analysis revealed that negative consequences of alcohol consumption was not a significant moderator of the relationship between impulsivity and alcohol use. These findings can help inform clinical practice, and future research can explore other factors that moderate or mediate the relationship between impulsivity and alcohol use among this population and create a comparison with same-aged university going males.

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VOLUME I

CHAPTER III: PUBLIC DISSEMINATION DOCUMENT

Systematic Literature Review:

The Role of Sensation Seeking in Problem Drinking in Adolescence: A Systematic Review

Background

One definition of problem drinking is "consumption of alcohol that results in difficulty with a person's mental or physical health, social life, and career". In adolescence, problem drinking is of particular concern because it can have long-term impacts on brain development, mood, and behaviour.

'Personality traits' have been explored and considered important in predicting problem drinking among adolescence. One of the most commonly researched personality trait believed to increase the likelihood of problem drinking is 'sensation seeking' which often refers to an individual's willingness to take risk and/or seek new and exciting experiences. However, most of the research on personality and problem drinking simply compares the impacts of different personality traits on problem drinking, but this makes it difficult to truly tease apart and understand the impact of each individual personality trait.

Aim

The aim of the systematic literature review was to explore the specific relationship between sensation seeking and problem drinking among adolescents.

Method

Three databases were used to conduct a systematic search of the literature. From this search, 1,254 articles were retrieved. Of these articles, some were excluded because they did not meet the criteria necessary to be included in the review. After exclusion of articles that did not

meet the criteria, 21 studies were included in the review. These 21 articles were systematically reviewed, and the quality of each article was assessed to determine the reliability of the findings.

Results

'Sensation seeking' was found to be a predict alcohol use in adolescence. However, only a few studies found direct relationships between sensation seeking and problem drinking. This means that there might be other important factors to consider that increase the likelihood that an individual high in sensation seeking may drink at a harmful level and potentially experience problems related to their alcohol use. Some factors that the literature suggests are important in explaining these relationships are enhancement motives (drinking behaviour motivated by a desire to improve mood), and antisocial features (features similar to those displayed in individuals with antisocial personality disorder, characterized by disregard and violation of the rights of others). Similarly, the literature also suggests that individuals high in sensation seeking may be more likely to drink at harmful levels if they think that heavy drinking is a norm among others their age. Furthermore, gender, family history of substance abuse, stressful life events and willingness to take risks also seem to increase the impact of sensation seeking on problem drinking.

Conclusion

Adolescents who higher in sensation seeking might be more likely to use alcohol than adolescents who are low in the sensation seeking personality trait. However, being high in sensation seeking does not always directly predict that an individual will drink at harmful levels and experience alcohol-related problems. In order to more accurately predict problem drinking and alcohol-related problems in adolescence, the role of internal and external influences needs to

also be considered. The findings of the review of the literature may provide useful pointers for efforts to prevent and treat problem drinking in adolescence.

Empirical Research Paper:

The Impact of Impulsivity and Knowledge of Negative Consequences of Alcohol Consumption on Alcohol Use

Background

One definition of impulsivity is "the inability to withhold or stop a response or a thought in the face of negative consequences". Generally, research has shown that individuals high in impulsivity tend to use greater amounts of alcohol than those lower in impulsivity. Recent studies have also found that different subcategories of impulsivity (Urgency [drinking to quickly alleviate distress], [lack of] Premeditation, [lack of] Perseverance, and Sensation Seeking [seeking new, exciting experiences; willingness to take risk]) vary in their relationships with alcohol use. However, it is still unclear exactly how each of these subcategories influence alcohol use differently, and the impact that each subcategory has on alcohol-related negative consequences. Furthermore, gender seems to be an important consideration, as men have been found to score higher than females in both impulsivity and negative consequences of alcohol use.

Aim

The primary aim of this study was to further explore the relationships between the subcategories of impulsivity and alcohol use, and to explore whether this relationship is impacted by negative consequences of alcohol consumption in a young, male sample.

Method

Sixty-six (N=66) participants (Mean age = 20.68, SD = 2.19) were recruited using social media websites, poster advertisements throughout Birmingham and through a local college in Birmingham. Participants were included if they were 18-25 year-old males who had never been to university. Participants completed an online survey consisting of four questionnaires: a Brief

Demographics Questionnaire, the Alcohol Use Disorders Identification Test (AUDIT; ; Saunders, et al., 1993) to assess drinking pattern/behaviour, The Young Adult Alcohol Consequences Questionnaire(YAACQ; Read, Kahler, Strong, & Colder, 2006) assessing number of negative alcohol-related consequences experienced by the participant, and the UPPS Impulsive Behaviour Sale (Whiteside et al., 2001) which tests for levels of impulsivity across four subcategories (Urgency, [lack of] Premeditation, [lack of] Perseverance, and Sensation Seeking).

Results

Total impulsivity and the separate subcategories of impulsivity were all positively correlated to alcohol use, suggesting that if an individual scored high in impulsivity, they would be more likely to use greater amounts of alcohol. However, in this study, impulsivity was negatively correlated to negative consequences of alcohol consumption, suggesting that individuals high in impulsivity were less likely to report negative consequences of alcohol consumption than those who scored lower in impulsivity.

Furthermore, it was predicted that the relationship between impulsivity and alcohol use would be impacted by negative consequences of alcohol consumption, such that an individual high in impulsivity that experienced fewer negative consequences of alcohol consumption would use more alcohol. However, this prediction was not supported by the statistical analysis, suggesting that negative consequences did not significantly influence the relationship between impulsivity and alcohol use.

Conclusion

Young adult males high in impulsivity are likely to consume more alcohol. However, surprisingly, this study suggests that individuals who are more impulsive reporter fewer negative

consequences of alcohol consumption. Although this finding is different from other studies, one possible explanation could be that being high in impulsivity may reduce an individual's awareness of the negative consequences associated with their alcohol use. Still, this suggestion would need to be explored more in future studies. Future research should also explore other factors that might better explain or influence the relationships between impulsivity, alcohol use and negative consequences of alcohol consumption to better inform clinical practice.

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APPENDICES

Appendix A

Ethical Approval

Appendix B

Participant Information

Appendix C

Facebook Posting Log

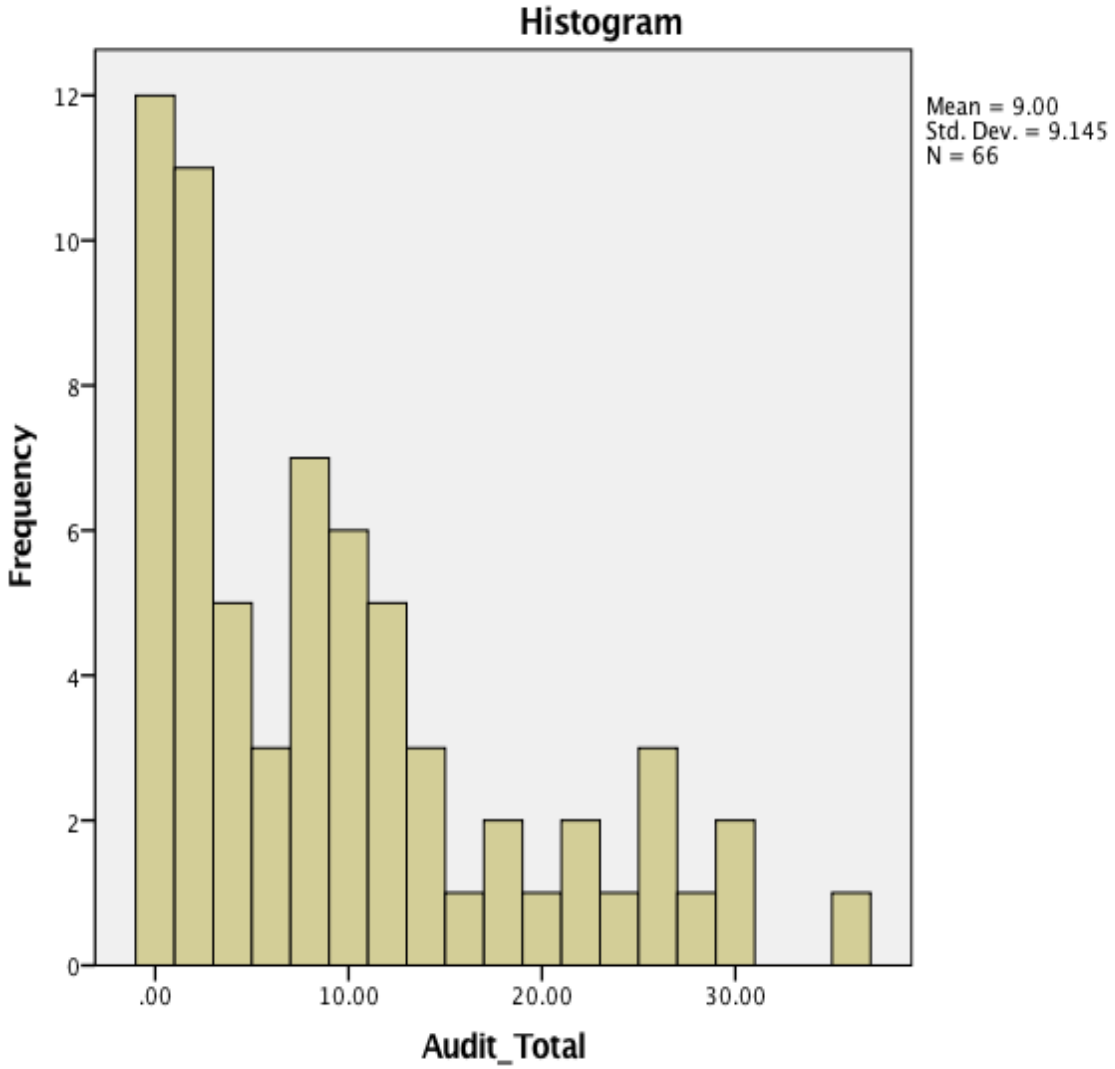
Group/Page	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Amateur Football Friendlies in Birmingham			**1**		**1**						**1**	
BBC Young Musicians	**2**	**2**										
British Amateur Rugby League Association BARLA			**1**		**1**						**1**	
Car Lovers				**1**								
Drinks Mixer		**1**				**1**						
Drunk Texts	**1**					**1**						
European Cyclists' Federation		**2**									**1**	
Football South Coast 5-A-Side			**2**								**1**	
Gym Addicts				1			**1**					**1**
Gym Junkies				**1**			**1**					**1**

Gym & Tonic 2017							**1**					**1**
Hard Work		**1**										
Hype the Gym							**1**					**1**
Ibiza Workers 2017		**1**						**1**				
Job Seekers UK (For EU Members	**1**							**1**				
Rugby Football League			**1**	**1**		**1**						
Sport Cars				**1**								
Work Hard Everywhere		**1**							**1**			
Work Hard, Play Hard		**1**							**1**			
Young Black Fathers		**2**	**2**						**1**			
Young Fathers		**2**	**2**						**1**			

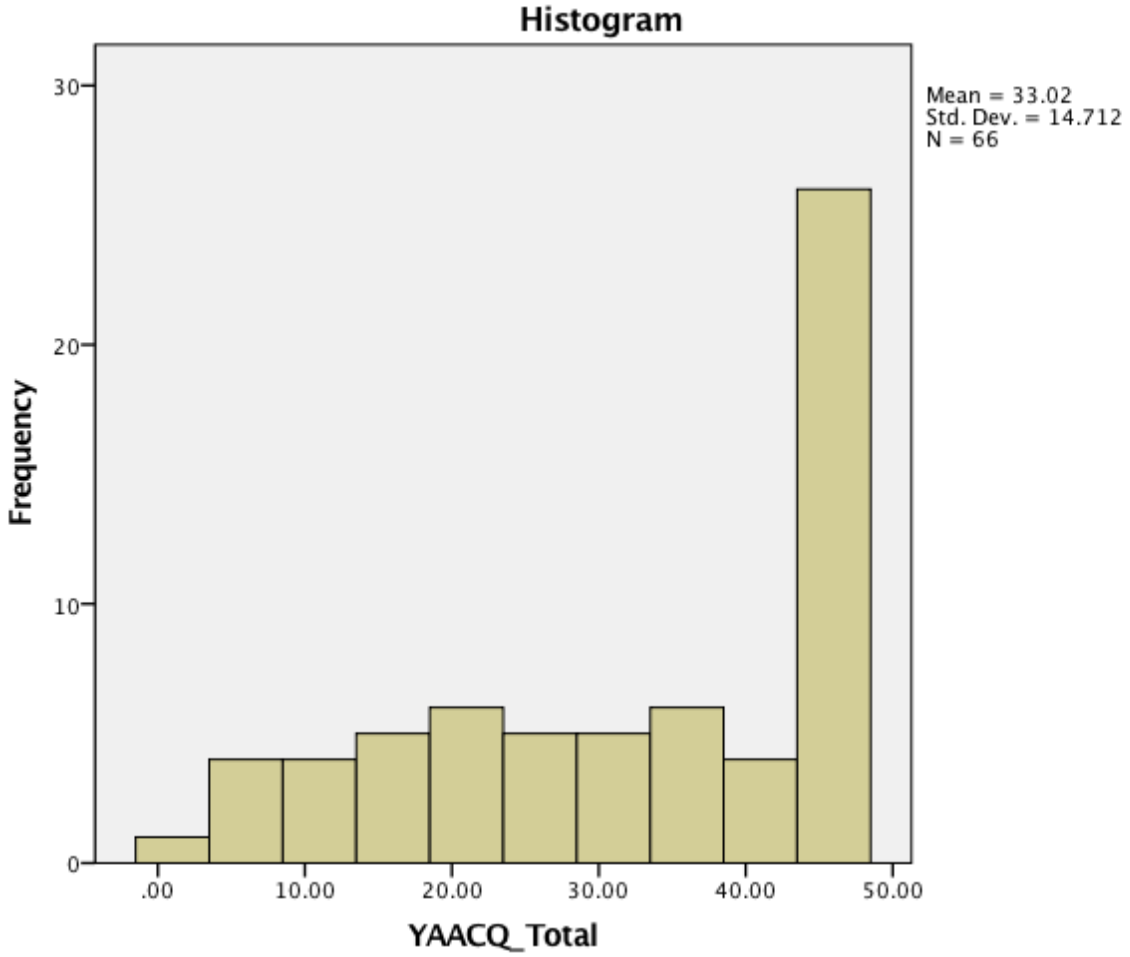
Standing United												
Young Hustlers New Generation – YHNG	**1**	**1**	**1**						**1**			
Young Men	1	1							1			
Young Men of Awareness	1								1			

Appendix D

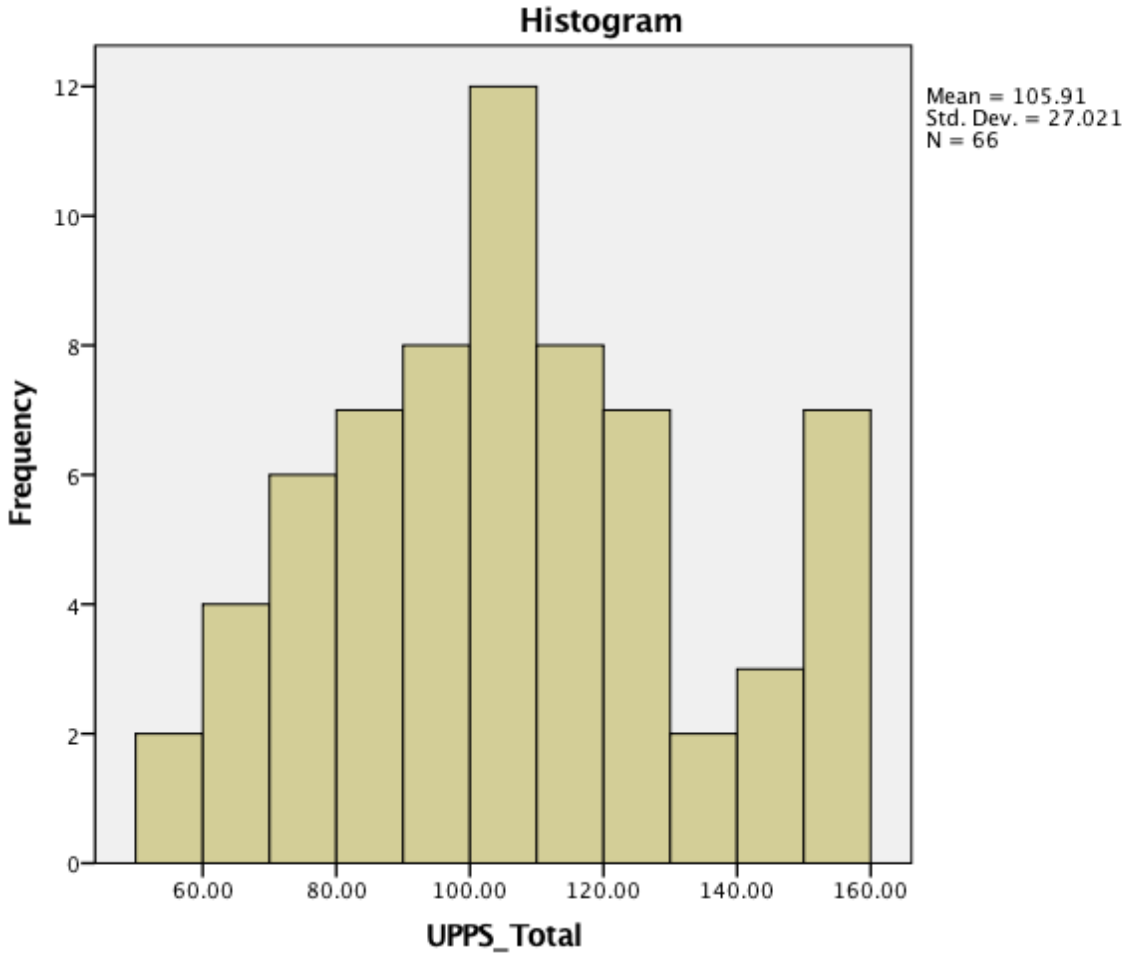
SPSS Histograms



AUDIT Histogram



YAACQ (Negative Consequences) Histogram



UPPS Total (Total Impulsivity) Histogram