Prevalence, Determinants and Consequences of Risky Alcohol Consumption of Australian University Students

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Statement of Originality

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Acknowledgement of Collaboration

I hereby certify that the work embodied in this thesis has been done in collaboration with other researchers. I have included as part of this thesis a statement clearly outlining the extent of collaboration, with whom and under what auspices.

I contributed to the development of the research question, the database search, the statistical analysis, the interpretation of results and editing of the manuscript. Professor John Germov, Tara Renae McGee, Toni Schofield, Jo Lindsay, Julie Hepworth and Rose Leontini contributed to the formulation of the methodology and data collection. Professor Billie Bonevski and Dr Ross Wilkinson contributed to the development of the research question, the interpretation of results, and editing of the manuscript.

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Structured Abstract

Scope

The high prevalence of risky alcohol use among university students is well documented, typically yielding prevalence rates of 40% to 80%. Among university students aged between 18 to 25 years risky alcohol use is clinically problematic as it increases the likelihood of alcohol dependence and abuse occurring. Research reports males pose a greater risk as they are typically found to consume alcohol at riskier levels than their female counterparts. Although research is emerging suggesting the gender gap may be diminishing, there is currently no consensus across the literature. Alcohol-related adverse consequences that follow risky alcohol use have been reported as academic difficulties, interpersonal problems, sexual, verbal and physical assault at both the first-hand and second-hand level. Lines of enquiry in determining alcohol-use motives of university students' risky alcohol consumption have identified personal motivations and social motivations as the reasons for excessive use; although there is no consensus concerning which is the most salient.

Purpose

The purpose of this study was to measure the prevalence, determinants, consequences and gender differentials of risky alcohol consumption among Australian university students. In addition to measuring prevalence of risky alcohol consumption, we also investigated alcohol dependence among students. We investigated consequences in terms of first-hand and second-hand effects and examined whether students risky alcohol consumption was better predicted by personal or social motives.

Methodology

This research analysed data from the cross-sectional Alcohol and University Life Survey which consists of questions from several key measures that enable collection of

data pertaining to alcohol consumption patterns, alcohol-related harm, and harm minimisation practices. Participants were 3725 Australian university students from five public universities across Australia. Females accounted for roughly 74% (n = 2466) of the population sample and males 26% (n = 853). Mean age was 22 years (SD = 6.8). The three main measures of interest for this research were students' answers pertaining to the Alcohol Use Disorders Identification Test (AUDIT), the College Alcohol Survey and the Three-Dimensional Measure of Drinking Motives.

Results

Results revealed 39% of students drink at risky levels and 41% showed incipience of alcohol dependence within a 12 month period; with 4.6% showing daily alcohol dependence. Male students had a mean AUDIT score of 9.4 (SD = 6.32, 95% CI = 8.98-9.87) indicative of risky alcohol use. Female students had a mean AUDIT score of 7.3 (SD = 5.73, 95% CI = 7.15-7.62) indicating the absence of, or low, alcohol problems. Males were 1.8 times more likely to engage in risky alcohol consumption compared to females, and an increase of each year in age is associated with a decrease in the odds of consuming alcohol at risky levels by a factor of .975. We identified males were between two to four times as likely to experience first-hand and second-hand adverse alcohol-related consequences. However, females were 1.7 times more likely to experience sexual assault. Moreover, males were twice as likely to consume alcohol at risky levels for personal reasons and up to four times as likely for social reasons in contrast to females.

Conclusions and Implications

The risky alcohol consumption among university students is an issue for health and social concern. The results of this study reinforce the importance for the development of an intervention program for university students in order to reduce harm associated with

risky alcohol consumption. Our results could be used as a starting point for the development of such an intervention. Brief interventions should be tailored according to gender and developed to address ways of coping with psychological distress and or social pressures. Additionally, policy makers could use the results of this study to re-evaluate the alcohol environment on campuses by addressing special promotions regarding pricing, as well as time and quantity of alcohol availability, for example.

Literature Review

Alcohol consumption is a normal part of many societies and cultures. While many individuals consume alcohol in moderation, research indicates that alcohol is a drug of concern to the community as there are a proportion of individuals' that consume alcohol at a high-risk level. Risky alcohol use is a risk factor for morbidity and premature mortality (World Health Organisation [WHO], 2015). The Australian Institute of Health and Welfare (2014) estimate an annual mortality rate from risky alcohol use is 5,554 people and the burden of disease attributable to risky alcohol use is estimated at 2.7%. Furthermore, alcohol related problems costs Australian society approximately $15 billion annually (Laslett et al., 2010; Manning, Smith, & Mazerolle, 2013). Broken down, it is estimated that $2,958 billion represents costs to the criminal justice system (e.g. violence, sexual assault and property damage), $1,686 billion comprises costs to the health care system (e.g. injury and illness), $6,046 billion involve costs to Australian productivity (e.g. absenteeism from work) and $3,662 billion are costs associated with traffic accidents (Manning et al., 2013). The second-hand adverse consequences others are subjected to due to a person's risky alcohol use are estimated to be an additional $6,807 billion (Laslett et al., 2010).

Risky alcohol use can affect brain functionality and potentially cause lifelong cognitive problems, alcohol dependency and irreversible health conditions (Harper, 2007). Risky alcohol consumption is problematic due to considerable quantities of alcohol being consumed in a short period of time, resulting in the body's blood alcohol content to rise dramatically (Townsend & Duka, 2005). Ultimately, decision-making abilities, reaction time and other motor functioning skills decrease, thus increasing the probability of negative consequences occurring (Krystal et al., 2006).

Of particular interest for this review are university students. There is a

substantial body of international research revealing university students between 18 to 25 years consume alcohol at risky levels (Dawson, Grant, Stinson, & Chou, 2004; Gill, 2002; Hallett et al., 2012; Karam, Kypri, & Salamoun, 2007; Robertson & Forbes, 2011; Wicki, Kuntsche, & Gmel, 2010). Although on a national scale, this area of research is in its infancy in comparison (Reavley, Jorm, McCann, & Lubman, 2011). Furthermore, alcohol-related adverse consequences among this sub-population have been reported across the literature as not only having a first-hand effect on the individual, but a second-hand effect on others too (Karam et al., 2007; Mundt, Zakletskaia, & Fleming, 2009). Moreover, research on the determinants of drinking behaviour has revealed there is no definitive single factor that can determine whether a university student will misuse alcohol, but instead multiple developmental, psychological, biological, individual, social and environmental factors that interact to influence this outcome; most of which are beyond the scope of this review.

Therefore, this literature review will firstly describe how risky alcohol consumption is defined and then discuss how risky alcohol consumption is commonly measured. Following will be an investigation of the prevalence, first-hand and second-hand consequences, and the determinants that are associated with university students' risky alcohol use. Understanding the reasons for risky alcohol use offers valuable information that not only adds to the knowledge base, but more importantly can be implemented in order to guide appropriate prevention programs that target the audience in question. In doing so, this will not only prevent the short-term adverse effects, but notably, potentially prevent the long-term adverse outcomes mentioned previously.

Definition of Risky Alcohol Consumption

Risky alcohol consumption, also referred to as binge drinking and hazardous drinking, is determined by the volume of alcohol consumed and the pattern of drinking

outside of a set of guidelines (Baer, 2002). In Australia, the guidelines for safe alcohol consumption were developed by the National Health and Medical Research Council (NHMRC, 2009). The guidelines categorise alcohol consumption into two risk types. Long-term risk; the risk level associated with regular daily patterns of drinking. The guideline advises both genders should not drink more than two standard drinks a day in order to reduce the lifetime risk of harm from alcohol-related disease or injury. In addition is short-term risk; the risk of harm in the short term that is associated with certain levels of drinking on a single day. The guideline suggests both genders should not drink more than four standard drinks on a single occasion in order to avoid risky alcohol consumption and alcohol-related adverse consequences (Australian Institute of Health and Welfare, 2014; NHMRC, 2009). International guidelines typically vary from Australian guidelines by an additional drink for males. For instance internationally, risky alcohol consumption would be defined as five or more consecutive standard drinks on a single occasion for men and four consecutive standard drinks standard drinks on a single occasion for women (Baer, 2002).

Alcohol Use Disorders Identification Test

The most commonly used measure of alcohol consumption is the Alcohol Use Disorders Identification Test (AUDIT) developed by the WHO. A score of eight or more is considered to indicate risky and harmful patterns of alcohol consumption, a score of 20 or more generally indicates an alcohol use disorder such as alcohol dependence (Germov & McGee, 2014). Therefore, any alcohol consumption beyond the safe guideline limits corresponds to sequelae that not only impacts an individual but also creates a second-hand effect on society (Australian Institute of Health and Welfare, 2014).

Prevalence of Risky Alcohol Consumption among University Students

A large body of research has accumulated concerning risky alcohol use among university students. University students represent a unique population as it has been reported they often drink 50 to 60 percent more (Kypri, Cronin, & Wright, 2005) than their non-university peers of the same age group (Dawson et al., 2004; Slutske et al., 2004). Although early single sample studies (Berkowitz & Perkins, 1986; Engs & Hanson, 1988) were undertaken that revealed risky alcohol consumption among university students, it was not until Wechsler, Davenport, Dowdall, Moeykens and Castillo (1994) published their research that the seriousness regarding the prevalence of risky alcohol use among university students gained mass recognition as the number one public health problem affecting university students.

Wechsler et al. (1994) conducted the first large-scale study that examined the drinking behaviour of university students across 39 states of America. The research utilised a survey titled the College Alcohol Study (CAS) which has high internal consistency (Chronbachs Alpha = 0.84) to measure alcohol consumption. The CAS was implemented across approximately 140 institutions of higher education yielding 17,592 responses; 58% were female and 42% were male. Results from the CAS established 44% of students reported risky alcohol consumption (defined as five or more drinks in one sitting for men and four for women). Risky alcohol consumption is further reported to be related to age and gender thereby exacerbating the problem.

Predominately, those within the age group of 18 to 24 years yield a higher rate of risky alcohol consumption in contrast to other age groups (Beenstock, Adams, & White, 2011; Dawson et al., 2004; Kypri et al., 2005). An additional frequent finding across the literature concerning university students alcohol consumption, both nationally and internationally, is the gender gap, where males drink more and at riskier levels than females (Beenstock et al., 2011; Clements, 1999; Nourse, Adamshick, &

Stoltzfus, 2017; O'Malley & Johnston, 2002). Whereas others assert that the gender gap is diminishing and females are starting to drink as much as their male counterparts (Hoeppner, Paskausky, Jackson, & Barnett, 2013; Keeling, 2002; Young, Morales, Mccabe, Boyd, & D'Arcy, 2005). At this time though, across the literature, there is no consensus regarding whether the gender gap is diminishing or not as the majority of research shows males are still at higher risk (Gunby, Carline, Bellis, & Beynon, 2012; Hallett et al., 2012; Heather et al., 2011).

A follow up study in 2000 revealed there was no reduction in university students' risky alcohol use and if anything the nature of risky alcohol consumption among students had increased (Wechsler, Eun-Lee, Kuo, & Lee, 2000). Moreover, Knight et al. (2002) assessed university students for alcohol abuse and alcohol dependence under the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV, American Psychiatric Association, 2000) and estimated that 31% of the 8 million higher education students aged between 18 to 24 years in the United States met the criteria for alcohol abuse, with another six percent meeting the criteria for alcohol dependence in the last 12 months (Knight et al., 2002). A subsequent epidemiological study on alcohol and related conditions revealed roughly 20% of university students surveyed ($n = 2188$) met the DSM-IV criteria for an alcohol use disorder within the past year, and this was more prevalent among students aged 19 to 25 (Blanco et al., 2008). Similar results using a smaller sample size were reported by Clements (1999) who discovered 13.1% of the 306 university students sampled met the criteria for alcohol abuse and 11.4% for alcohol dependence within the last 12 months. Such results highlight the importance of this epidemic among American students. However, what is more problematic is that this phenomenon is not confined to the United States alone.

In a study of over 2500 university students in New Zealand, 37% reported one or more risky alcohol episodes in a one week period and 68% drank to hazardous levels according to scores on the AUDIT (Kypri et al., 2009). Among studies in Europe using the AUDIT scale, Beenstock et al. (2011) reported 82% of students from a university in Northern England scored eight or more thus indicating risky alcohol consumption. Heather et al. (2011) reported 60.6 % of the sample across seven universities in the United Kingdom showed risky alcohol consumption. Additionally, results from a university in North West of England found 71.2 % of students reported risky alcohol consumption (Gunby et al., 2012). All of the aforementioned studies reported males were more likely to engage in risky alcohol consumption in contrast to their female counterparts. Most of the alcohol use research among university students has been conducted internationally. Thus by comparison Australian research would be considered in its infancy. Nonetheless, the existing research into alcohol consumption pertaining to Australian university students appears to show a similar and alarming pattern.

For instance, Ridout, Campbell, and Ellis (2012) reported approximately 60% of their participant pool ($n =163$), from Sydney University, showed risky alcohol use according to the AUDIT; a parallel finding from a cohort at an Australian metropolitan university study (Reavley et al., 2011). Results from 7,237 of 13,000 students in a WA university revealed 34% of students meet the criteria for hazardous drinking, with half of the males (aged 20 to 25 years) showing a significant increased odds of being alcohol dependent (AUDIT score 20+) in contrast to a third of young women. Further results of this study revealed that Australian students drank far more than their international counterparts, with the authors concluding that hazardous alcohol use by undergraduates was of concern, but that there was insufficient Australian data thus far and there is a need for more research to be conducted in other Australian universities (Hallett et al.,

2012).

These studies measured alcohol consumption via self-report surveys (the AUDIT and CAS). Even though these surveys have been assessed as having high reliability and validity, one should be mindful of surveys being subject to sources of error. As such there is the probability that students are over or under estimating their responses. However with that said, there are many comparable studies across different countries that report similar results pertaining to risky alcohol consumption; most yielding an average risky alcohol rate between 40% to 80%. Nonetheless, the collective results of these few studies as well as others across the literature are generally in line with each other suggesting that university students aged 18 to 24 years, particularly males, have relatively high levels of risky alcohol consumption. Of further concern to the high prevalence of risky alcohol consumption is the issue that those whom consume alcohol at risky levels, as well as those who do not, experience adverse consequences as a result.

Consequences of Risky Alcohol Consumption

Other than the long-term effects that excessive alcohol consumption can be responsible for, such as cardiovascular diseases, gastrointestinal diseases and cirrhosis of the liver, there are a range of immediate negative consequences that may directly follow excessive drinking in a single session (Perkins, 2002). Risky alcohol consumption among university students has been associated with considerable harm, both to those who consume alcohol; first-hand effects, and to those who do not consume alcohol; second-hand effects (Mallett, Bachrach, & Turrisi, 2008). The picture of extensive harm to students is consistently reported across the literature.

First-Hand Effects of Risky Alcohol Consumption

Hallett et al. (2012) revealed among Australian university students, those who

drank at a risky level more than twice a week were most vulnerable to assault, aggression, interpersonal difficulties and property damage. Moreover, those who drank at a risky level more than twice a week were three times as likely to get into serious interpersonal conflicts and more than twice as likely to be sexually assaulted compared to moderate drinkers (Hallett et al., 2012). Further research demonstrated that university students who drink excessively are more likely to experience short term physical health problems like hangovers, vomiting and blackouts. For instance, from 942 Australian university students that consume alcohol at risky levels (AUDIT $\geq$ 8) 74.8% experience a hangover, 44.8% experience blackouts in which they have forgotten where they were or what they did while drinking, 30.5% have vomited and 44.8% have had an emotional outburst (Hallett et al., 2013). Furthermore, university students who consume excessive alcohol are vulnerable to additional acute harms such as drink driving accidents, substance abuse and misuse, alcohol-related injuries, violence, and alcohol dependence; all yielding similar and yet concerning percentage rates (Hallett et al., 2013; Karam et al., 2007; Mallett et al., 2008; Mundt et al., 2009; National Health & Medical Research Council, 2009). Moreover, while both genders experience adverse consequences, reviews of the literature typically report that males are at most risk (Hallett et al., 2013; Perkins, 2002).

Another adverse consequence that has been linked with risky alcohol consumption is academic impairment (Gill, 2002; Martinez, Sher, & Wood, 2008; Thombs et al., 2009). For instance, in a preceding four week period, Hallett et al. (2013) found 14.9% of students (n = 942) had been late for class, 25.6% failed to attend class, 25.7% had diminished concentration whilst in class and 10.4% could not complete assessment tasks on time; all due to engaging in risky alcohol consumption. Wechsler et al. (1998) found both males and females who drank at risky consumption

levels once or twice during a 2-week period were more than three times as likely to report getting behind in their academic studies. Furthermore, those who drank at risky levels on at least three occasions a fortnight were more than eight times more likely to report academic impairment. Additionally, Pascarella et al. (2007) assessed the CAS data from Wechsler et al.'s (1998) study and concluded that risky alcohol consumption affects academic achievement both directly, through its effect on cognitive ability and indirectly. Powell and Williams (2004) asserted that each additional drink consumed by students would thereby increase the likelihood of missing a class by 9% and falling behind in academic studies by 5%.

The general consensus across the literature regarding risky alcohol consumption is that this puts the individual and others in danger of becoming hurt. However, with regards to the association between risky alcohol consumption and poor academic performance there are those who argue that although quite plausible, it cannot be determined with certainty that students' risky alcohol consumption is solely responsible for their academic impairment (Thombs et al., 2009; Wood, Sher, Erickson, & DeBord, 1997; Wood, Sher, & McGowan, 2000). Specifically, Thombs et al. (2009) assessed students' risky alcohol consumption and their academic performance. They found that although there was a modest relationship between the two, most of this association was accounted for after they controlled for demographic factors and prior student academic characteristics. Conversely, Hallett et al. (2013) argue that the more frequently students engage in risky alcohol consumption, the more frequently this impacts on their ability to attend class, concentrate and complete academic tasks. Nonetheless, researchers should proceed with caution when assessing associations between risky alcohol consumption and students' academic problems, as demonstrated above there may be confounding

variables that need to be controlled for before making such an assumption on the data (Thombs et al., 2009; Wood et al., 2000).

Second-Hand Effects of Risky Alcohol Consumption

In addition to first-hand effects of students' risky alcohol consumption, the literature also reports second-hand affects experienced by non-drinking peers. It has been reported that students who do not drink have had adverse consequences from being kept awake or having interrupted sleep, having to babysit another student, be it their friend or room-mate and have experienced injury and assaults both physical and sexual (Heather et al., 2011; Hingson, Zha & Weitzman, 2009). Wechsler, Dowdall, Maenner, Gledhill-Hoyt, and Lee (1998) found percentage rates from their earlier studies investigating second-hand effects have increased among students since previous years. Specifically, of 14,521 students 60.6% reported a consistent interruption in sleep and study, 50.2% reported having to look after a drunk student in order to keep them safe and 28.6% have been insulted or humiliated. Over a four week period, Hallett et al. (2012) revealed 27.2% of sober students ($n = 7237$) had to babysit inebriated students, 20.9% experienced interrupted sleep and study, 12.9% were insulted or humiliated, 12.5% had a serious argument and 10.9% were victim to unwanted sexual advances from students whom engaged in risky alcohol consumption. Further results revealed, although both genders had been victim to some form of physical assault and unwanted sexual advance, males are more likely to experience physical assault whereas women were more likely to experience unwanted sexual advances.

The aforementioned second-hand effects are well documented across the literature; with results mirroring one another (Hallet et al., 2012; Heather et al., 2011; Hingson et al., 2009; Perkins, 2002). Therefore, it is not only the risky drinker that is being affected adversely by their decisions; bystanders' unfortunately suffer the

consequences too. Given these negative consequences as well as the major health issues as a result of risky alcohol use, it is important to understand why risky levels of alcohol use are so prevalent amongst university students.

Determinants of Risky Alcohol Consumption

Research on the determinants of alcohol consumption among university students investigates motivation in terms of cognitive factors in the prediction of problematic alcohol use and the associated consequences that follow. Cooper, Russell, Skinner, and Windle (1992) put forward that an individual's motivation to consume alcohol is associated with unique behavioural characteristics and related outcomes, thus they developed a psychometrically sound measure of drinking motives that predict alcohol consumption; mood enhancement (or self-enhancement), tension reduction (or coping motives), and social motives. These motives for risky alcohol consumption have emerged in numerous studies involving university students and are described as the primary psychological effects that occur when one consumes alcohol; although which motivational aspect prevails may vary according to the type of binge drinker (Baer, 2002; Cooper et al., 1992; Kuntsche, Rehm, & Gmel, 2004). Specifically, coping motives correspond to anticipated negative reinforcement by avoiding or alleviating psychological distress, thus reinforcing consumption and in turn increasing the probability of problematic alcohol use. Self-enhancement motives on the other hand represent anticipated positive reinforcement by means of enhancing positive mood or well-being (Cooper et al., 1992). Both of these personal forms of motivation for alcohol consumption have been related to risky alcohol use among young adult university students.

 Coping Motives.

Geisner, Larimer, and Neighbors (2004) significantly predicted that university

students whom drink alcohol as a coping mechanism have higher alcohol frequency, consumption and alcohol related consequences. Furthermore, this effect was found more so among female university students compared to their male counterparts. Therefore suggesting that women who consume alcohol in order to avoid or minimise their negative affective state tend to have more depressive moods and this may be an explanation for the problematic drinking found amongst female university students (Geisner et al., 2004; Hussong, 2007; Stewart & Devine, 2000). Additional research by Stewart, Zvolensky, and Eifert (2001) revealed coping motives explained risky alcohol consumption and frequency among woman afflicted with high anxiety putting them in a clinically significant range for alcohol abuse. Stewart et al. concluded that these women appear to be motivated to consume high alcohol quantities more frequently as a means of avoiding their negative internal states of mind; a finding mirrored by Hussong (2007) whom suggest female university students who consume alcohol to reduce emotional pain is related to increased alcohol use intensity. Subsequent studies by Reavley, Jorm, McCann, and Lubman (2011) assessed levels of psychological distress and depression at an Australian metropolitan university and found an association between high levels of psychological distress and risky alcohol consumption. Lewis and O'Neill (2000) report risky alcohol consumption is associated with low self-esteem and high social anxiety. Although these relationships are relatively consistent in the research literature, mixed results have also been reported.

Nourse et al. (2017) found no relationship between levels of anxiety or depression and risky alcohol consumption among university students. However, their sample size was relatively small ($n = 201$) and therefore may not accurately reflect the relationship, if any, between coping motivations and risky alcohol consumption. Moreover, despite the fact that research has identified women drink more to alleviate

distress and social stressors compared to men, differing results have emerged among other studies, revealing males appear more likely than females to report drinking to alleviate psychological distress and social stressors (Nolen-Hoeksema & Harrell, 2002; Park & Levenson, 2002). Whatever the case may be, it seems evident that one's perceived perception of their inability to cope with psychological distress appears to be related to an increase in risky alcohol consumption among young adult university students.

Self-Enhancement Motives.

In addition to coping motives another reason cited for university students to consume alcohol at risky levels is that of self-enhancement. Cooper (1994) identified a relationship between drinking to enhance positive effect and risky alcohol consumption, however, alcohol-related problems were only indirectly associated and this was dependent on frequency of consumption. Sensation seeking and enjoyment reasons are both cited across the literature as falling within the category of enhancement motives. McCabe (2002) reports, students who drink for sensation seeking purposes such as 'it is exciting' or 'because it is fun', and enjoyment purposes such as 'I like the feeling' will generally yield a higher level of problematic drinking and increased drinking frequency compared to those who do not drink for sensation seeking or enjoyment purposes; a parallel finding by Boekeloo, Novik, and Bush (2011).

Social Motivation as a determinant of Risky Alcohol Consumption

Social motivation (or social camaraderie and conformity motive) is drinking to fit in with others and in order to enjoy the company within a drinking context or event (Haden & Edmundson, 1991). Research shows students tend to seek out social situations that facilitate drinking at risky levels (Clapp et al., 2003). For instance, Clapp and Shillington (2001) surveyed university students and found that individuals' at any

given drinking event surrounded by numerous intoxicated people was predictive of risky alcohol consumption. Haden and Edmundson posit the results of their regression model found the rate of alcohol consumed by students was better predicted by social motivation in contrast to personal motivations measured such as, self-enhancement or coping motivation. Cooper (1994) asserts that while social motives may be positively related to frequency of use and quantity of alcohol consumption, there is no association between social motives and risky alcohol consumption or alcohol-related problems. Wechsler, Lee, Kuo, and Lee (2002) reported 40% of university students participated in risky alcohol use on at least one occasion in a two week period and that the students' alcohol consumption was influenced by their peers in social settings. Further reports have shown that students who were exposed to others who drank were more likely to partake in risky alcohol use themselves in contrast to peers without similar exposures (Amonini & Donovan, 2006; Clapp & McDonnell, 2000; Weitzman, Toben, Nelson, & Wechsler, 2003). Moreover, some studies have reported that this effect mainly occurs amongst females (Griffin, Botvin, Epstein, Doyle, & Diaz, 2000; Labrie, Hummer & Pedersen, 2007), whereas others have reported the effect to be more correlated amongst males (Barber, Bolitho, & Bertrand, 1998; Beck et al., 2008; O'Malley & Johnston, 2002).

Further support that perceived social normative drinking behaviour of others can predict personal alcohol use, and in turn result in individuals participating in risky alcohol consumption themselves comes from a study conducted by Lo (1995) involving first-year students at a southern university in America. Specifically, it was found that perceived social peer norms were stronger predictors of level of intoxication more so than any other background factors measured, and social normative drinking was greatest in males. However, after an extensive literature review, Baer (2002) concluded that

social motives are not significantly associated to risky alcohol consumption or alcohol-related consequences, but rather are often associated with light, infrequent and non-problematic alcohol use. A similar conclusion was reached by Ham and Hope (2003) whom assert that although motives such as coping and self-enhancement have an association with risky alcohol consumption, social motives are the only motives that are not related to problematic or risky alcohol use.

The inability to find a direct link between socially motivated risky alcohol consumption seems counterintuitive given the strong social role alcohol plays within universities. One explanation for such discrepancies is that those that drink for social motivation tend to drink more frequently but consume less on each occasion (Baer, 2002). Therefore, there would be no relationship between social motivation and risky alcohol use. Conversely, researchers who did find an association between social motivation and risky alcohol use may have been due to confounding variables as risky alcohol users are not a homogeneous group and differ in terms of the combination of associated problems; perhaps an underlying state-trait interaction. Whatever the case may be, it is evident that these personal and social reasons for consuming alcohol be it risky or otherwise appear to be determining factors related to university students' alcohol consumption.

Summary

In summary, risky alcohol consumption is a major public health issue of concern both at the national and international level. University students aged between 18 to 25 years old represent a unique population as they consume alcohol at risky levels 50% to 60% more so than their peers in the general population. The high prevalence of risky alcohol use among university students is identified using alcohol measures and is well documented, typically yielding prevalence rates of 40% to 80%. Moreover, risky

alcohol use is clinically problematic as it increases the likelihood of alcohol dependence and abuse occurring during this period. Alcohol-related adverse consequences that follow risky use include academic difficulties, interpersonal problems, sexual, verbal and physical assault at both the first-hand and second-hand level. Lines of enquiry in determining alcohol-use motives of university students' risky alcohol consumption have identified personal motivations and social motivations as the reasons for excessive use. Personal motivation is said to alleviate psychological distress and enhance coping ability, while social motivation is drinking to fit in with peers or conform to social norms. Inconsistent results have emerged concerning the most salient reasons for student alcohol consumption and the consequential effects on drinking outcomes. While some researchers have found personal motivation to be the major contributing factor to university students' risky alcohol consumption, others assert social motivation is the reason in question. Further inconsistencies are found when gender is investigated. The majority of research reports males as being most at risk with regards to risky alcohol consumption, although there is a small amount of emerging evidence showing females are starting to exceed their male counterparts; suggesting the gender gap may be diminishing. Research into Australian university students drinking behaviours, with a particular focus on males needs to be conducted to identify the relative priority of factors associated with risky alcohol consumption. Understanding reasons for alcohol misuse will offer valuable information that can be used to assist university policy makers in effectively designing programs that directly target factors that are likely to have the greatest impact on risky alcohol consumption, thereby reducing risky alcohol practices and reducing alcohol-related harm to students, as well as secondary harm to the local population and the community.

Aim

The aim of this study is to measure the prevalence of risky alcohol consumption among Australian university students. We further aim to examine the personal motives and social motives related to risky alcohol consumption, as well as the adverse first-hand and second-hand consequences that ensue. Finally, we will investigate whether there are any differential effects concerning gender in relation to risky alcohol consumption and the associated predictors. We hypothesis that:

1. There will be a high prevalence of risky alcohol consumption (8+ on the AUDIT) among Australian university students and males will yield more risky alcohol consumption compared to females.

2. There will be a significant positive association between personal motives, social motives, adverse first-hand consequences and adverse second-hand consequences and the occurrence of risky alcohol consumption.

3. There will be a gender difference between personal motives, social motives, adverse first-hand consequences and adverse second-hand consequences with males yielding higher levels of risky alcohol consumption for each predictor.

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Manuscript

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Prevalence, Determinants and Consequences of Risky Alcohol Consumption of

Australian University Students

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Abstract

Research demonstrates 40-80% of university students consume alcohol at risky levels; with most showing alcohol dependence. The high prevalence of risky alcohol consumption among university students is accompanied by adverse consequences, including academic difficulties, interpersonal problems as well as sexual and physical assault. The aim of this study was to investigate gender differentials and measure the prevalence, determinants and adverse consequences among Australian university students who consume alcohol at risky levels. This research was a secondary data analysis of the cross-sectional Alcohol and University Life Survey of alcohol consumption patterns, alcohol-related harm, and harm minimisation practices experienced across five Australian universities ($n = 3725$). Results showed 39% of students drink at risky levels and 41% show in incipience of alcohol dependence within a 12 month period; with 4.6% showing daily dependence. We identified males consume alcohol at riskier levels than females and were between two to four times as likely to experience first-hand and second-hand adverse consequences. However, females were 1.7 times more likely to experience sexual assault. Males were twice as likely to consume alcohol at risky levels for personal reasons and up to four times as likely for social reasons. We propose this research could serve as a basis for the development of an alcohol intervention for use within for the university setting. Additionally, policy makers could use the results of this study to re-evaluate the alcohol environment on campuses.

Keywords: *University Students, Risky Alcohol Consumption, Determinants, Consequences*

Introduction

While many individuals consume alcohol in moderation, research indicates that alcohol is a drug of concern to the community as there are a proportion of individuals' that consume alcohol at a high-risk level. Risky alcohol use can affect brain functionality and potentially cause lifelong cognitive problems, alcohol dependency and irreversible health conditions (Harper, 2007). Risky alcohol consumption is problematic due to considerable quantities of alcohol being consumed in a short period of time, resulting in the body's blood alcohol content to rise dramatically (Townsend & Duka, 2005). Ultimately, decision-making abilities, reaction time and other motor functioning skills decrease, thus increasing the probability of negative consequences occurring (Krystal et al., 2006).

There is a substantial body of research revealing university students between 18 to 25 years consume alcohol at risky levels, and males pose a greater risk than females (Dawson, Grant, Stinson, & Chou, 2004; Gill, 2002; Hallet et al., 2012; Karam, Kypri, & Salamoun, 2007; Robertson & Forbes, 2011; Wicki, Kuntsche, & Gmel, 2010). Furthermore, alcohol-related adverse consequences among this sub-population have been reported as not only having a first-hand effect on the individual, but a second-hand effect on others too (Karam et al., 2007; Mundt, Zakletskaia, & Fleming, 2009). Research into the determinants of drinking behaviour has revealed there is no definitive single factor that can determine whether a university student will misuse alcohol, but instead multiple developmental, psychological, biological, individual, social and environmental factors that interact to influence this outcome; most of which are beyond the scope of this paper.

The aim of this study was to investigate the prevalence, determinants, consequences and gender differentials of risky alcohol consumption among Australian

university students. Understanding the reasons for risky alcohol use offers valuable information that not only adds to the knowledge base, but more importantly can be implemented in order to guide appropriate prevention programs that target the audience in question. Doing so, will not only prevent the short-term adverse consequences of risky alcohol consumption, but notably, potentially prevent the long-term adverse effects.

Prevalence of Risky Alcohol Consumption among University Students

A large body of research has accumulated concerning risky alcohol use among university students. University students represent a unique population as it has been reported they often drink 50% to 60% more (Kypri, Cronin, & Wright, 2005) than their non-university peers of the same age group (Dawson et al., 2004; Slutske et al., 2004). Wechsler, Davenport, Dowdall, Moeykens, and Castillo (1994) conducted a large-scale study that examined the drinking behaviour of university students across 39 states of America and established 44% of students reported risky alcohol consumption. In a study of university students in New Zealand, 37% reported one or more risky alcohol episodes in a one week period and 68% drank at risky levels (Kypri et al., 2009). Among studies in Europe, Beenstock, Adams, and White (2011) reported 82% of students' consumed alcohol at risky levels, while Gunby, Carline, Bellis, and Beynon (2012) reported a prevalence rate of 71.2% and Heather et al. (2011) found 60.6% of university students consumed alcohol at risky levels.

Research from Australian studies show similar prevalence patterns. Ridout, Campbell, and Ellis (2012) reported approximately 60% of their participant pool from Sydney University showed risky alcohol use; a parallel finding from a cohort at an Australian metropolitan university (Reavley, Jorm, McCann, & Lubman, 2011). Moreover, results from a WA university revealed 34% of students meet the criteria for

risky and hazardous drinking (Hallett et al., 2012). Other than the high prevalence, risky alcohol consumption is further reported to be related to age and gender thereby exacerbating the problem. All of the aforementioned studies reported males were more likely to engage in risky alcohol consumption in contrast to their female counterparts. Predominately, those within the age group of 18 to 24 years yield a higher rate of risky alcohol consumption in contrast to other age groups (Beenstock et al., 2011; Dawson et al., 2004; Kypri et al., 2005).

Another frequent finding across the literature concerning university students' alcohol consumption is the gender gap; where males are found to drink at riskier levels than females (Beenstock et al., 2011; Clements, 1999; Nourse, Adamshick, & Stoltzfus, 2017; O'Malley & Johnston, 2002). On the other hand, some researchers assert that the gender gap is diminishing and females are starting to drink as much as their male counterparts (Hoeppner, Paskausky, Jackson, & Barnett, 2013; Keeling, 2002; Young, Morales, Mccabe, Boyd, & D'Arcy, 2005). At this time though, there is no consensus regarding whether the gender gap is diminishing or not as the majority of research shows males are still at higher risk (Gunby et al., 2012; Hallett et al., 2012; Heather et al., 2011).

An additional concern is the emergence of alcohol dependence among university students. Knight et al. (2002) assessed university students for alcohol abuse and alcohol dependence under the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV, American Psychiatric Association, 2000) and estimated that 31% of the 8 million higher education students aged between 18 to 24 years met the criteria for alcohol abuse, with another six percent meeting the criteria for alcohol dependence in the last 12 months (Knight et al., 2002). A subsequent epidemiological study on alcohol and related conditions revealed roughly 20% of

university students surveyed ($n = 2188$) met the DSM-IV criteria for an alcohol use

disorder within the past year, and this was more prevalent among students aged 19 to 25

(Blanco et al., 2008). Similar results using a smaller sample size were reported by

Clements (1999) who discovered 13.1% of the 306 university students sampled met the

criteria for alcohol abuse and 11.4% for alcohol dependence within the last 12 months.

Moreover, Ridout et al. (2012) revealed half of the males in their sample ($n =163$) aged

20 to 25 years showed a significant increased odds of being alcohol dependent in

contrast to a third of the young women.

Consequences of Risky Alcohol Consumption: First-Hand Effects

Risky alcohol consumption among university students has been associated with

considerable harm, both to those who consume alcohol; first-hand effects, and to those

who do not consume alcohol; second-hand effects (Mallett, Bachrach, & Turrisi, 2008).

Hallett et al. (2012) revealed Australian university students that drank at a risky level

more than twice a week were most vulnerable to assault, aggression, and property

damage. Additionally, they were also three times as likely to get into serious

interpersonal conflicts and more than twice as likely to be sexually assaulted compared

to moderate drinkers (Hallett et al., 2012). Further research demonstrated that university

students who drink excessively are more likely to experience short term physical health

problems like hangovers, vomiting and blackouts. For instance, from 942 Australian

university students that consume alcohol at risky levels 74.8% experience a hangover,

44.8% experience blackouts in which they have forgotten where they were or what they

did while drinking, 30.5% have vomited and 44.8% have had an emotional outburst

(Hallett et al., 2013). Another consequence that has been linked with risky alcohol

consumption is academic impairment (Gill, 2002; Martinez, Sher, & Wood, 2008;

Thombs et al., 2009). For instance, in a preceding four week period, Hallett et al.

(2013) found 14.9% of students (*n* = 942) had been late for class, 25.6% failed to attend class, 25.7% had diminished concentration whilst in class and 10.4% could not complete assessment tasks on time; all due to engaging in risky alcohol consumption. Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee (1998) found students who drank at risky levels once or twice during a 2-week period were more than three times as likely to report getting behind in their academic studies. Furthermore, those who drank at risky levels on at least three occasions a fortnight were more than eight times more likely to report academic impairment. In addition to the aforementioned consequences, university students who consume excessive alcohol are vulnerable to additional acute harms such as drink driving accidents, substance abuse and misuse, alcohol-related injuries, violence, and alcohol dependence; all yielding similar and yet concerning percentage rates (Hallett et al., 2013; Karam et al., 2007; Mallett et al., 2008; Mundt et al., 2009; National Health & Medical Research Council, 2009). Moreover, while both genders experience adverse consequences, reviews of the literature typically report that males are at most risk (Hallett et al., 2013; Perkins, 2002).

Consequences of Risky Alcohol Consumption: Second-Hand Effects

In addition to first-hand effects of students' risky alcohol consumption, the literature also reports second-hand affects experienced by non-drinking peers. It has been reported that students who do not drink have had adverse consequences from being kept awake or having interrupted sleep, having to babysit another student, be it their friend or room-mate and have experienced injury and assaults both physical and sexual (Heather et al., 2011; Hingson, Heeren, Winter, & Wechsler, 2009). Wechsler et al. (1998) found 60.6% of students reported a consistent interruption in sleep and study, 50.2% reported having to look after a drunk student in order to keep them safe and 28.6% have been insulted or humiliated. Over a four week period, Hallett et al. (2012)

revealed 27.2% of sober students had to babysit inebriated students, 20.9% experienced

interrupted sleep and study, 12.9% were insulted or humiliated, 12.5% had a serious

argument and 10.9% were victim to unwanted sexual advances from students whom

engaged in risky alcohol consumption. Further results revealed, although both genders

had been victim to some form of physical assault and unwanted sexual advance, males

are more likely to experience physical assault whereas women were more likely to

experience unwanted sexual advances.

Determinants of Risky Alcohol Consumption: Personal Motivation

Research on the determinants of alcohol consumption among university students

investigates motivation in terms of cognitive factors in the prediction of problematic

alcohol use and the associated consequences that follow. Cooper, Russell, Skinner, and

Windle (1992) put forward that an individual's motivation to consume alcohol is

associated with unique behavioural characteristics and related outcomes. Three motives

were developed from their research, self-enhancement, coping motives and social

motives. Specifically, coping motives correspond to anticipated negative reinforcement

by avoiding or alleviating psychological distress, thus reinforcing consumption and in

turn increasing the probability of problematic alcohol use. Self-enhancement motives on

the other hand represent anticipated positive reinforcement by means of enhancing

positive mood or well-being and Social motivation is drinking to fit in with others and

to enjoy the company within a drinking context or event (Cooper et al., 1992).

Geisner, Larimer, and Neighbors (2004) significantly predicted that university

students whom drink alcohol as a coping mechanism have higher alcohol frequency,

consumption and alcohol related consequences. Furthermore, this effect was found

more so among female university students compared to their male counterparts.

Therefore suggesting women who consume alcohol in order to avoid or minimise their

negative affective state tend to have more depressive moods and this may be an explanation for the problematic drinking found amongst female university students (Geisner et al., 2004; Hussong, 2007; Stewart & Devine, 2000). Additional research by Stewart, Zvolensky, and Eifert (2001) revealed coping motives explained risky alcohol consumption and frequency among woman afflicted with high anxiety putting them in a clinically significant range for alcohol abuse. Subsequent studies by Reavley et al. (2011) assessed levels of psychological distress and depression at an Australian metropolitan university and found an association between high levels of psychological distress and risky alcohol consumption. Furthermore, Lewis and O'Neill (2000) report risky alcohol consumption is associated with low self-esteem and high social anxiety.

Although these relationships are relatively consistent in the research literature, mixed results have also been reported. For instance, Nourse et al. (2017) found no relationship between levels of distress, anxiety or depression and risky alcohol consumption among university students. Moreover, despite the fact that research has identified women drink more to alleviate distress and social stressors compared to men, differing results have emerged among other studies, revealing males appear more likely than females to report drinking to alleviate psychological distress and social stressors (Nolen-Hoeksema & Harrell, 2002; Park & Levenson, 2002).

In addition to coping motives, another reason cited for university students to consume alcohol at risky levels is that of self-enhancement. Cooper (1994) identified a relationship between drinking to enhance positive effect and risky alcohol consumption. McCabe (2002) reports, students who drink for self-enhancement purposes such as it is exciting, because it is fun and I like the feeling, will generally yield a higher level of problematic drinking and increased drinking frequency compared to those who do not drink for such purposes; a parallel finding by Boekeloo, Novik, and Bush (2011).

Determinants of Risky Alcohol Consumption: Social Motivation

Differing research across the literature shows students tend to seek out social situations that facilitate drinking at risky levels (Clapp et al., 2003). For instance, Clapp and Shillington (2001) surveyed university students and found that individuals' at any given drinking event surrounded by numerous intoxicated people was predictive of risky alcohol use. From their results, Haden and Edmundson (1991) put forward the rate of alcohol consumed by university students was better predicted by social motivation in contrast to the personal motivations they measured such as, self-enhancement or coping. Conversely, Cooper (1994) asserts that while social motives may be positively related to frequency of use and quantity of alcohol consumption, there is no association between social motives and risky alcohol consumption or alcohol-related problems. Several researchers assert that university students' alcohol consumption is influenced by their peers and that perceived social peer norms were stronger predictors of level of intoxication more so than any other factors measured (Amonini & Donovan, 2006; Clapp & McDonnell, 2000; Lo, 1995; Wechsler, Eun-Lee, Kuo, & Lee, 2000; Weitzman, Toben, Nelson, & Wechsler, 2003). Moreover, some studies have reported that this effect mainly occurs amongst females (Griffin, Botvin, Epstein, Doyle, & Diaz, 2000; Labrie, Hummer, & Pedersen, 2007), whereas others have reported the effect to be more correlated amongst males (Barber, Bolitho, & Bertrand, 1998; Beck et al., 2008; O'Malley & Johnston, 2002). However, after an extensive literature review, Baer (2002) concluded that social motives are not significantly associated to risky alcohol consumption or alcohol-related consequences, but rather are often associated with light, infrequent and non-problematic alcohol use. A similar conclusion was reached by Ham and Hope (2003) whom assert that although motives such as coping and self-

enhancement have an association with risky alcohol consumption, social motives are the only motives that are not related to problematic or risky alcohol use.

In summary, risky alcohol consumption among university students is an issue of concern among university students aged between 18 to 25 years. Moreover, risky alcohol use is clinically problematic as it increases the likelihood of alcohol dependence and abuse occurring during this period. The high prevalence of risky alcohol use among university students is well documented, typically yielding prevalence rates of 40% to 80%. Alcohol-related adverse consequences that follow risky use include academic difficulties, interpersonal problems, sexual, verbal and physical assault at both the first-hand and second-hand level. Lines of enquiry in determining alcohol-use motives of university students' risky alcohol consumption have identified personal motivations and social motivations as the reasons for excessive use. However, inconsistent results have emerged concerning the most salient reasons for student alcohol consumption and the consequential effects on drinking outcomes. Further inconsistencies are found when gender is investigated. The majority of research reports males as being at most risk with regards to risky alcohol consumption, although there is a small amount of emerging evidence showing females are starting to exceed their male counterparts; suggesting the gender gap may be diminishing.

Research into Australian university students drinking behaviours, with a particular focus on males needs to be conducted to identify the relative priority of factors associated with risky alcohol consumption. Understanding reasons for alcohol misuse will offer valuable information that can be used to assist university policy makers in effectively designing programs that directly target factors that are likely to have the greatest impact on reducing risky alcohol practices and reducing alcohol-related harm. Therefore, the current study aims to measure the prevalence,

consequences, determinants and gender differentials of risky alcohol consumption among Australian university students. We hypothesis that:

1. There will be a high prevalence of risky alcohol consumption among Australian university students and males will yield more risky alcohol consumption compared to females.

2. There will be a significant positive association between personal motives, social motives, adverse first-hand consequences and adverse second-hand consequences and the occurrence of risky alcohol consumption.

3. There will be a gender difference between personal motives, social motives, adverse first-hand consequences and adverse second-hand consequences with males yielding higher levels of risky alcohol consumption for each predictor.

Methods

Study Design

This research is a secondary data analysis of The Alcohol and University Life Survey (AULS), 2014 conducted with the permission of Professor John Germov, The University of Newcastle NSW Australia. The AULS was part of a wider study funded by a grant from the Australian Research Council (ARC) Linkage Projects program - Alcohol Use and Harm Minimisation among Australian University Students. The AULS was a cross-sectional survey of alcohol consumption patterns, alcohol-related harm, and harm minimisation practices experienced by a broad range of Australian university students conducted between April and October, 2011 (Germov & McGee, 2014).

Participants

Participants were 3725 Australian university students from five public universities across Australia; University of Newcastle ($n = 730$), University of Sydney ($n = 365$), University of Queensland ($n = 269$), Griffith University ($n = 758$) and

Monash University ($n = 888$). These universities were intentionally selected as they provide differing populations of both metropolitan and regional campuses, have an adequate number of students (between 30K and 60K) and encompass a comprehensive range of research intensity and disciplines such as arts, sciences, commerce and the professions (Germov & McGee, 2014). Of those who responded, females accounted for roughly 74% ($n = 2466$) of the population sample and males 26% ($n = 853$). Mean age was 22 years ($SD = 6.8$). Ninety two percent of the participants were domestic students. Full time or part time university students from one of the universities selected and over the age of 18 years were eligible to participate. Students were asked to provide information on their drinking patterns and behaviours. The survey was strictly anonymous.

Measures

AULS

The AULS was used to gain information on the prevalence, reasons and consequences of students' alcohol consumption. The AULS consists of questions from several key measures that enable collection of data pertaining to students drinking patterns and behaviours (see Appendix A). The items in the AULS have good internal consistency, Chronbach's Alpha = 0.85 (Germov & McGee, 2014). The three main measures in the AULS data of interest for this research were students' answers pertaining to the Alcohol Use Disorders Identification Test (AUDIT), College Alcohol Survey (CAS) and the Three-Dimensional Measure of Drinking Motives.

AUDIT

To assess alcohol consumption of university students we used their responses to the AUDIT in the AULS. The AUDIT was developed by the World Health Organisation and is designed to identify hazardous and harmful patterns of alcohol consumption.

Each of the ten items in the AUDIT has a five-point rating scale the respondent chooses from. All the response scores are added to attain the AUDIT score. The highest possible score on the AUDIT is 40. Any score over eight relates to a risky consumption level. The AUDIT has high internal consistency and high test-retest reliability; Cronbach's Alpha = 0.849 (Germov & McGee, 2014).

CAS

To assess the alcohol related adverse first-hand and second-hand consequences students experienced we used students responses to the CAS in the AULS. The CAS was developed by Henry Wechsler, from the Harvard School of Public Health. The CAS asks a series of questions about students' alcohol use and associated problems, as well as other high risk behaviours among students, such as tobacco and illicit drug use, unsafe sex, violence, social situations/reasons related to alcohol use, and other behavioural and health problems. Students respond to each question using a 5-point likert scale ranging from almost always to never and each response has a score ranging from 0 to 4. The CAS has good internal consistency; Chronbachs Alpha = 0.84 (Germov & McGee, 2014).

Three-Dimensional Measure of Drinking Motives

To assess the social and personal motives related to risky alcohol consumption we used students' answers to the three-dimensional measure of drinking motives in the AULS. The drinking motives questionnaire was developed in 1992 by Cooper et al. and is made up of a series of questions relating to individuals drinking motives. The questionnaire measures three distinct motives underlying people's alcohol consumption behaviour; Social Motives (for example, to affiliate with others), Enhancement Motives (for example, to increase positive internal states), and Coping Motives (for example, to decrease negative internal states (Cooper et al., 1992).

Procedure

Invitations containing a URL link to an online questionnaire were sent out to student email accounts to all eligible students at each university. The questionnaire was developed using Qualtrics online survey tools (Qualtrics Labs Inc, Provo, UT, 2011, as cited in Germov & McGee, 2014). Ethics approval to participate in the AULS was obtained from each university participating in the study at the time the data was collected, as well as being approved by the University of Newcastle's Human Research Ethics Committee, Approval No. H-2010-1319 (Germov & McGee, 2014). Ethics approval was also gained to use the secondary data for this current research (H-2017-0201; Appendix B). Information about the study was provided on the first page of the study, and informed consent was obtained by participants choosing to enter the survey and submit (see Appendix A). A participation incentive was offered to students who decided to enter a draw for a $50 department/grocery store voucher. Students were asked to answer a series of questions relating to their alcohol consumption and experiences. The questionnaire took approximately 20 minutes to complete (Germov & McGee, 2014).

Statistical Analyses

All secondary data was analysed using the Statistical Package for the Social Science-20 (SPSS-20). Descriptive statistics were conducted to measure the mean gender, age and average AUDIT scores of university students. Spearman rank correlations at the two-tailed level were performed to test for association between both social and personal motives and the occurrence of risky alcohol consumption, and between risky alcohol consumption and adverse first-hand and second-hand consequences. Binary logistic regression, simple main effects and interaction effects, were used to analyse how well the explanatory factors (gender, motives and

consequences) predict risky alcohol consumption. AUDIT scores were dichotomised into 'no harm' (AUDIT score $\leq$ 7) and 'risky alcohol consumption' (AUDIT score $\geq$ 8) in order to fit the regression model.

Results

Descriptive Analyses of AUDIT Scores

Descriptive statistics for alcohol prevalence revealed 96.9% ($n = 3633$) of students have consumed alcohol, 6.1% ($n = 201$) consume alcohol daily, 21.1% ($n = 697$) consume alcohol two to three times a week and 31.6% ($n = 1043$) consume alcohol monthly. In the sample ($n = 3302$) of students who consume alcohol, the overall mean AUDIT score was 7.9 ($SD = 6.0$, 95% CI = 7.69 – 8.10). Male students had a mean AUDIT score of 9.4 ($SD = 6.32$, 95% CI = 8.98-9.87) and female students had a mean AUDIT score of 7.3 ($SD = 5.73$, 95% CI = 7.15-7.62). There was an increase in AUDIT scores ($M = 8.1$) for students aged 21-25 ($SD = 6.22$, 95% CI = 7.75-8.49) and for students aged 26-30 ($M = 8.5$, $SD = 6.32$, 95% CI = 7.69-9.32). AUDIT scores declined with increasing age group thereafter (see Table 1). Of all universities measured, students of the University of Sydney had the highest AUDIT score ($M = 8.7$, $SD = 6.16$, 95% CI = 8.08-9.35) Table 1 summarises AUDIT scores for each university measured, year of study, age groups and gender.

The AUDIT responses were collapsed into four risk categories (Figure 1), 49.6% ($n = 1849$) students had no alcohol problems, 29.1% ($n = 1084$) had medium level of alcohol problems, 4.9% ($n = 184$) had high level of alcohol problems and 5% ($n = 185$) had very high levels of alcohol problems. AUDIT scores were dichotomised into 'no harm' (AUDIT score $\leq$ 7) and 'hazardous and harmful alcohol use' (AUDIT score $\geq$ 8). Of 3302 respondents, 39% ($n = 1453$) consumed alcohol at hazardous and harmful levels, 41% ($n = 1526$) implies incipience of alcohol dependence over a 12 month

period and 4.6% ($n = 172$) of those students showed daily alcohol dependence (20 + on AUDIT).

Table 1:

University Students' Mean AUDIT Scores by Gender, Age and University.

Demographic Variables		% Students (N)	Mean AUDIT (SD)
Gender	Male	26% (853)	9.4 (6.3)
	Female	74% (2466)	7.3 (5.7)
Age	18-20	43.1% (1607)	7.8 (5.6)
	21-25	31.1% (1158)	8.1 (6.2)
	26-30	6.7% (250)	8.5 (6.3)
	31-40	4.4% (164)	7.4 (6.3)
	41-50	2.7% (101)	5.8 (5.9)
	51-60	0.7% (26)	4.1 (4.0)
University	Sydney	93.8% (365)	8.7 (6.1)
	Monash	92.4% (888)	7.5 (5.5)
	Newcastle	93.7% (730)	7.9 (6.0)
	Queensland	83% (269)	7.4 (5.9)
	Griffith	92.6% (758)	8.0 (6.1)
Year of Study	1st Year	88.7% (945)	7.8 (5.6)
	2nd Year	92.3% (705)	7.8 (5.6)
	3rd Year	94.1% (626)	7.8 (6.1)
	4th Year	93.3% (374)	7.3 (5.7)
	5th Year	95.2% (198)	8.9 (7.1)
	6th Year	94.3% (100)	9.8 (7.0)
	7th Year	100% (29)	7.2 (7.1)
	8th Year	85.2% (23)	6.0 (4.6)
Student	Domestic	92.7% (2805)	8.0 (5.9)
	International	7.3% (231)	6.6 (5.3)
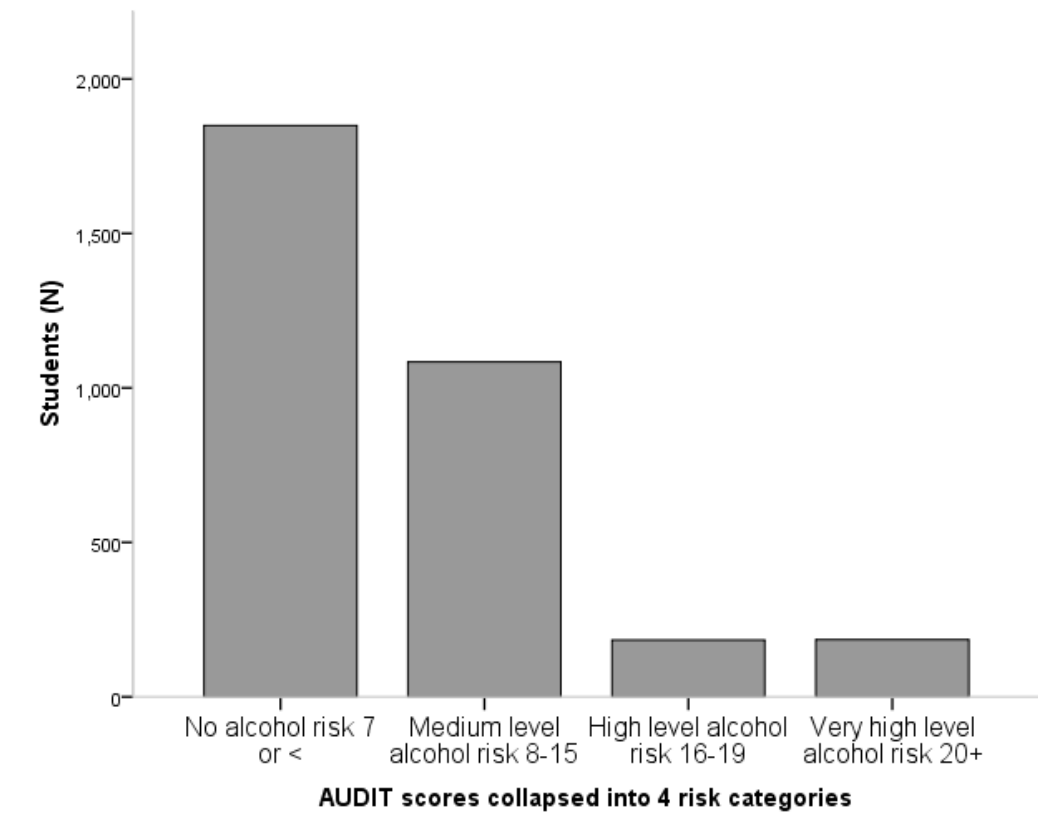
Figure 1: University students' AUDIT scores collapsed into four risk categories.

Spearman rank correlations were performed to test for association between both social and personal motives and the occurrence of risky alcohol consumption, and between risky alcohol consumption and adverse first-hand and second-hand consequences.

Correlations between Social Motives and Risky Alcohol Consumption

Significant positive associations were found between risky alcohol consumption and all social motives to drink. Ninety seven percent of students report drinking 'to celebrate' ($r_s = .220$, $N = 3169$, $p < .0005$), 84.3% consumed alcohol at risky levels because 'it is customary on special occasions' ($r_s = .187$, $N = 3166$, $p < .0005$), 91.4% drink 'to be sociable' ($r_s = .332$, $N = 3169$, $p < .0005$), 84.2% drink to 'make social

gatherings more fun' ($r_s = .431$, $N = 3168$, $p < .005$) and 77.2% drink because 'it is what their friends do' ($r_s = .374$, $N = 3168$, $p < .0005$).

Correlations between Personal Motives and Risky Alcohol Consumption

Significant positive correlations were found between risky alcohol consumption and all personal motives. Sixty percent of students consume alcohol 'to forget their worries'($r_s = .367$, $N = 3167$, $p < .0005$), 65.7% 'to feel self-confident' ($r_s = .38$, $N = 3167$, $p < .0005$), 72.5% drink because 'it is exciting' ($r_s = .424$, $N = 3167$, $p < .0005$), 42.3% 'to get high' ($r_s = .339$, $N = 3163$, $p < .0005$), 74.2% drink 'to feel good' ($r_s = .434$, $N = 3165$, $p < .0005$), 83.8% drink because 'it is fun' ($r_s = .484$, $N = 3168$, $p < .0005$), 45.2% consume alcohol 'to help if depressed or nervous' ($r_s = .310$, $N = 3167$, $p < .0005$), 52.8% drink 'to cheer up a bad mood' ($r_s = .372$, $N = 3165$, $p < .0005$), 75.3% drink 'to relax' ($r_s = .298$, $N = 3164$, $p < .0005$), and 73.8% consume alcohol because they 'like the feeling' ($r_s = .425$, $N = 3166$, $p < .0005$).

Correlations between First-Hand Consequences and Risky Alcohol Consumption

Significant positive correlations were found between the occurrence of risky alcohol consumption and all adverse first-hand consequences. Sixty percent of students whom consume alcohol at risky levels have 'experienced a hangover' ($r_s = .617$, $N = 3154$, $p < .0005$), 22% have 'missed class' ($r_s = .404$, $N = 3152$, $p < .0005$), 2.6% admitted to 'getting behind in academic work' ($r_s = .438$, $N = 3153$, $p < .0005$), 36.3% 'did something they later regretted' ($r_s = .518$, $N = 3153$, $p < .0005$), 30% 'forgot where they were or what they were doing' ($r_s = .545$, $N = 3153$, $p < .0005$), 20.5% experienced 'arguing with friends' ($r_s = .330$, $N = 3153$, $p < .0005$), 18.2% 'have had unplanned sex' ($r_s = .359$, $N = 3153$, $p < .0005$), 10.1% 'have had unprotected sex' ($r_s = .265$, $N = 3153$, $p < .0005$), 8.8% have 'damaged property' ($r_s = .243$, $N = 3153$, $p < .0005$), 2.5% had 'issues with campus security or police' ($r_s = .120$, $N = 3153$, $p < .0005$), 13.4% have

'been hurt or injured' ($r_s = .356$, $N = 3153$, $p < .0005$) and 1.1% have 'needed medical treatment' ($r_s = .058$, $N = 3153$, $p = .001$).

Correlations between Second-Hand Consequences and Risky Alcohol Consumption

Significant positive correlations were found between the occurrence of risky alcohol consumption and all adverse second-hand consequences. Thirty one percent of students had experienced 'being insulted or humiliated' ($r_s = .168$, $N = 3158$, $p < .0005$), 20.6% 'had a serious argument' ($r_s = .217$, $N = 3157$, $p < .0005$), 11.8% had 'been pushed, hit or assaulted' ($r_s = .149$, $N = 3158$, $p < .0005$), 10.6% have 'had property damaged' ($r_s = .132$, $N = 3156$, $p < .0005$), 53.1% 'had to babysit or take care of another student' ($r_s = .205$, $N = 3157$, $p < .0005$), 17.7% have 'found vomit in halls, bathroom or residence' ($r_s = .137$, $N = 3157$, $p < .0005$), 39.2% have 'had study or sleep interrupted' ($r_s = .154$, $N = 3157$, $p < .0005$), 24.5% have 'experienced an unwanted sexual advance' ($r_s = .178$, $N = 3157$, $p < .0005$) and 2.8% have 'been a victim of sexual assault' ($r_s = .086$, $N = 3157$, $p < .0005$).

Binary Logistic Regression

A simple main effects binary logistic regression was performed for the five alcohol-related social motives, 10 alcohol-related personal motives, 14 alcohol-related first-hand adverse consequences, the 9 alcohol-related second-hand adverse consequences, as well as age and gender; with risky alcohol consumption dichotomised as the criterion variable. Of the 3050 cases analysed males were 1.8 times more likely to engage in risky alcohol consumption compared to females and an increase of one year in age is associated with a decrease in the odds of consuming alcohol at risky levels by a factor of .975, with a 58.9% accuracy level (see Table 2).

Table 2:

University Students' (N = 3050) odds of Risky Alcohol Consumption due to Gender and Age

Gender and Age for Risky Alcohol Consumption	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender	.592	.084	49.371	1	.000	1.807	1.532	2.131
Age	-.025	.006	19.604	1	.000	.975	.964	.986

Binary Logistic Regression: Social Motives

For the social motives a total of 3166 cases were analysed and the full model significantly predicted risky alcohol consumption (Omnibus $\chi^2(5) = 499.97$, $p < .0005$). The model explained 19.6% (Nagelkerke R^2) of the variance in risky alcohol consumption, with 63.8% of predictions being accurate. Students were 6.4 times more likely to consume alcohol at risky levels when they drink because it makes gatherings more fun, 2.7 times more likely to engage in risky alcohol consumption because it is what their friends do and 1.3 times more likely to consume alcohol at risky levels when they drink because it is customary on special occasions. Drinking to celebrate or to be sociable were not significant predictors of risky alcohol consumption (see Table 3).

Binary Logistic Regression: Personal Motives

For the personal motives a total of 3155 cases were analysed and the full model significantly predicted risky alcohol consumption (Omnibus $\chi^2(10) = 807.71$, $p < .0005$). The model explained 30.2% (Nagelkerke R^2) of the variance in risky alcohol consumption, with 69.9% of accurate predicted outcomes. Students were 1.4 to 1.5 times more likely to engage in risky alcohol consumption for reasons of drinking to forget worries, to feel self-confident, to get high and because it is exciting. Students

were 1.6 times more likely to drink at risky levels because they like the feeling and to cheer up a bad mood, and, 3.6 times more likely to drink at risky levels because it is fun. Drinking to relax, to feel good and to relieve depression or nervousness were not significant predictors of risky alcohol consumption (see Table 4).

Table 3:

University Students' (N = 3166) odds of Risky Alcohol Consumption due to Social Motives

Social Motives for Risky Alcohol Consumption	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI Lower	Upper
To celebrate	.647	.500	1.673	1	.196	1.910	.716	5.095
To be sociable	.172	.223	.595	1	.440	1.188	.767	1.838
It is customary	.309	.131	5.569	1	.018	1.362	1.054	1.760
Makes gatherings more fun	1.863	.192	94.416	1	.000	6.442	4.424	9.381
It's what my friends do	1.017	.122	69.073	1	.000	2.766	2.176	3.516

Table 4:

University Students' (N = 3155) odds of Risky Alcohol Consumption due to Personal Motives

Personal Motives for Risky Alcohol Consumption	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI Lower	95% CI Upper
To forget worries	.401	.108	13.884	1	.000	1.494	1.209	1.845
To feel self-confident	.390	.109	12.861	1	.000	1.478	1.194	1.829
It is exciting	.469	.130	13.007	1	.000	1.598	1.239	2.061
To get high	.386	.092	17.504	1	.000	1.471	1.228	1.763
To feel good	.210	.142	2.185	1	.139	1.234	.934	1.630
It is fun	1.288	.218	35.022	1	.000	3.624	2.366	5.551
Helps depression or nerves	.021	.108	.040	1	.842	1.022	.828	1.261
To cheer up bad mood	.474	.111	18.258	1	.000	1.606	1.292	1.995
To relax	.027	.123	.049	1	.826	1.028	.807	1.308
I like the feeling	.509	.141	13.095	1	.000	1.663	1.263	2.191

Binary Logistic Regression: First-Hand Consequences

For the first-hand adverse consequences a total of 3111 cases were analysed and the full model significantly predicted risky alcohol consumption (Omnibus $\chi^2(14)$ = 1763.43, $p < .0005$). The model explained 57.9% (Nagelkerke R^2) of the variance in risky alcohol consumption and accurately predicted 81.7% of outcomes. Students who engaged in risky alcohol consumption were 1.6 times more likely to damage property, 1.8 times more likely to miss lectures and 1.9 times more likely to do something they later regretted. Students were twice as likely to get behind in academic work, have unplanned sex, get hurt or injured and verbally abuse someone. They were 3.9 times more likely to experience a hangover and 4.1 times more likely to forget where they were or what they were doing. Although significant, students were less likely to have issues with campus security or police (Exp(B) = .269, p =.001) and less likely to require

medical treatment due to their risky alcohol consumption (Exp(B) = .126, $p < 0005$).

Arguing with friends, engaging in unprotected sex and physically abusing someone

were not significant predictors related to risky alcohol consumption (see Table 5).

Binary Logistic Regression: Second-Hand Consequences

For the second-hand adverse consequences a total of 3055 cases were analysed

and the full model significantly predicted risky alcohol consumption (Omnibus $\chi^2(9)$ =

25989, $p < .0005$). The model explained 10.8% (Nagelkerke R^2) of the variance in risky

alcohol consumption and accurately predicted 63.1% of outcomes. Due to others risky

alcohol consumption, students were 1.9 times more likely to experience a serious

argument, 1.2 times more likely to be pushed, hit, or abused and 1.4 times more likely

to have to babysit an intoxicated student and experience unwanted sexual advances. All

other second-hand predictors were not significant consequences in the model (see Table

6).

Table 5:

*University Students' (N = 3111) odds of Experiencing First-Hand Consequences due to
Risky Alcohol Consumption*

First-Hand Consequences	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Have a hangover	1.38	.117	139.23	1	.000	3.97	3.16	4.99
Miss a class	.637	.141	20.44	1	.000	1.89	1.43	2.49
Get behind in academic work	.741	.122	36.65	1	.000	2.09	1.65	2.66
Do something regretted	.674	.116	33.74	1	.000	1.96	1.56	2.46
Forget where or what doing	1.42	.126	128.44	1	.000	4.16	3.25	5.32
Argue with friends	.201	.141	2.01	1	.156	1.22	.926	1.61
Have unplanned sex	.727	.170	18.34	1	.000	2.06	1.48	2.88
Have unprotected sex	.342	.219	2.44	1	.118	1.40	.917	2.16
Damage property	.491	.222	4.88	1	.027	1.63	1.05	2.52
Trouble with campus security/police	-1.31	.389	11.33	1	.001	.269	.126	.578
Get hurt or injured	1.06	.201	28.18	1	.000	2.91	1.96	4.32
Needed medical treatment	-2.07	.506	16.69	1	.000	.126	.047	.341
Verbally abuse someone	1.05	.166	40.91	1	.000	2.88	2.08	3.98
Physically abuse someone	-.406	.361	1.26	1	.260	.666	.329	1.35

Table 6:

University Students' (N = 3055) odds of Experiencing Second-Hand Consequences due to Students' Risky Alcohol Consumption

Second-Hand Consequences	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Got insulted or humiliated	.052	.096	.291	1	.590	1.05	.873	1.27
Got into serious argument	.651	.105	38.48	1	.000	1.91	1.56	2.35
Was pushed, hit, abused	.261	.131	3.98	1	.046	1.29	1.00	1.67
Had property damaged	.252	.136	3.43	1	.064	1.28	.986	1.68
Had to babysit student	.387	.087	19.67	1	.000	1.47	1.24	1.74
Found vomit	.203	.109	3.48	1	.062	1.22	.990	1.51
Had sleep/study interrupted	.133	.090	2.17	1	.140	1.14	.957	1.36
Received unwanted sexual advances	.373	.096	15.17	1	.000	1.45	1.20	1.75
Became a victim of sexual assault	.281	.244	1.32	1	.249	1.32	.821	2.13

Binary logistic regression models were re-run in order to assess interactions between gender and alcohol-related social motives, alcohol-related personal motives, first-hand and second-hand adverse consequences and the occurrence of risky alcohol consumption.

Interactions between Gender and Motives

There was a significant interaction between the alcohol-related social motives and gender. Compared to females, males were 2.3 times more likely to engage in risky alcohol consumption when they drink because it is what their friends do, they were 4

times more likely to engage in risky alcohol consumption when they drink because it

makes gatherings more fun and they are .449 times less likely to engage in risky alcohol

consumption when they are drinking to celebrate. All other social motives were not

significant predictors of risky alcohol consumption among genders. Significant gender

effects were found for the alcohol-related personal motives, revealing males are 1.7 and

1.9 times more likely to engage in risky alcohol consumption when they drink because

they like the feeling and to forget their worries and are .455 times less likely to engage

in risky alcohol consumption when they drink to relax. All other personal motives were

not significant predictors of risky alcohol consumption among genders (see Table 7).

Table 7:

Interactions between Gender (n = 396), Social Motives and Risky Alcohol Consumption.

							95% CI EXP(B)	
Social Motives of Males	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
To celebrate	**-.802**	.341	5.53	1	**.019**	**.449**	.230	.875
To be sociable	**-**.451	.369	1.49	1	.222	.637	.309	1.31
It is customary	-.048	.248	.038	1	.846	.953	.586	1.55
It's what my friends do	.843	.247	11.64	1	**.001**	**2.32**	1.43	3.77
To make gatherings more fun	1.40	.331	17.96	1	**.000**	**4.06**	2.12	7.77

Table 8:

Interactions between Gender (n = 358), Personal Motives and Risky Alcohol Consumption.

Personal Motives of Males							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	(Exp)B	Lower	Upper
To forget worries	.653	.222	8.62	1	**.003**	**1.92**	1.24	2.97
To feel self-confident	.001	.206	.000	1	.996	1.00	.668	1.50
It is exciting	.363	.239	2.31	1	.128	1.43	.901	2.29
To get high	.329	.190	2.99	1	.083	1.39	.957	2.01
To feel good	.388	.269	2.08	1	.149	1.47	.870	2.49
It is fun	-.191	.263	.526	1	.468	.827	.494	1.38
To help depression or nerves	-.188	.230	.668	1	.414	.829	.528	1.30
To cheer up a bad mood	.325	.226	2.06	1	.151	1.38	.888	2.15
To relax	**-.788**	.247	10.16	1	**.001**	**.455**	.280	.738
Because I like the feeling	.573	.280	4.20	1	**.040**	**1.77**	1.02	3.06

Interactions between Gender and Consequences

First-hand alcohol-related adverse consequences revealed males are 1.7 times more likely to miss a class, 2.7 to 2.8 times more likely to have unplanned sex, get hurt or injured and forget where they are or what they are doing and they are 3.8 times more likely to verbally abuse someone due to their risky alcohol consumption. The second-hand adverse consequences revealed males are 1.4 to 2.8 times more likely to get into a serious argument, be pushed, hit or abused, receive unwanted sexual advances, had property damage and had to baby-sit an intoxicated student due to others risky alcohol consumption compared to females; with the exception of females being the victim of sexual assault (Exp(B) = 1.7). All results are presented in Table 9 and Table 10.

Table 9:

Male Students' (n = 374) odds of Experiencing First-Hand Consequences due to Risky Alcohol Consumption Compared to Female Students.

First-Hand Consequences by Males	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Had a hangover	.167	.171	.962	1	.327	1.18	.846	1.65
Missed a class	.543	.274	3.93	1	**.047**	**1.72**	1.00	2.94
Got behind in academic work	.251	.255	.966	1	.326	1.28	.780	2.11
Did something regretted	.399	.224	3.18	1	.074	1.49	.961	2.31
Forgot where or what was doing	1.03	.248	17.42	1	**.000**	**2.81**	1.73	4.58
Argued with friends	.262	.288	.831	1	.362	1.30	.739	2.28
Had unplanned sex	.998	.315	10.06	1	**.002**	**2.71**	1.46	5.02
Had unprotected sex	**-**.069	.397	.030	1	.862	.933	.429	2.03
Damaged property	**-**.117	.323	.132	1	.716	.889	.472	1.67
Trouble with campus security/police	**-**.682	.573	1.41	1	.234	.506	.164	1.55
Got hurt or injured	1.01	.424	5.66	1	**.017**	**2.74**	1.19	6.30
Needed medical treatment	**-**.369	1.19	.094	1	.759	.692	.066	7.25
Verbally abused someone	1.35	.343	15.66	1	**.000**	**3.89**	1.98	7.62
Physically abused someone	**-**.606	.686	.781	1	.377	.545	.142	2.09

Table 10:

Male Students' (n = 277) odds of Experiencing Second-Hand Consequences due to Risky Alcohol Consumption Compared to Females Students.

Second-Hand Consequences by Males							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Got insulted or humiliated	-.019	.194	.010	1	.922	.981	.671	1.43
Got into serious argument	.622	.227	7.51	1	**.006**	**1.86**	1.19	2.90
Got hit, pushed, abused	1.04	.303	11.91	1	**.001**	**2.84**	1.57	5.14
Had property damage	.659	.324	4.14	1	**.042**	**1.93**	1.02	3.64
Had to babysit student	.337	.153	4.84	1	**.028**	**1.40**	1.03	1.89
Found vomit	.105	.225	.219	1	.640	1.11	.714	1.72
Had study/sleep interrupted	.197	.185	1.13	1	.287	1.21	.847	1.74
Had unwanted sexual advance	.518	.224	5.32	1	**.021**	**1.67**	1.08	2.60
Became a victim of sexual assault	-.219	.936	.055	1	.815	.803	.128	5.03

Discussion

The present study aimed to investigate the prevalence, determinants, consequences and gender differentials of risky alcohol consumption among Australian university students. In addition to measuring prevalence of risky alcohol consumption, we also investigated alcohol dependence among students. We investigated consequences in terms of first-hand and second-hand effects and examined whether students risky alcohol consumption was better predicted by personal or social motives.

Prevalence of Risky Alcohol Consumption

We firstly examined the prevalence and gender differences of risky alcohol consumption among university students. The descriptive analysis of the study based on AUDIT data showed 49% of students consumed alcohol within the healthy guidelines and 39% of students were found to consume alcohol at risky levels. It was anticipated that there would be a higher prevalence of risky alcohol consumption than what was found among university students. Nonetheless, our results are in accordance with prior Australian and international studies. Past studies report risky alcohol consumption with a prevalence rate of 40% to 82%; typically dependent upon sample size (Beenstock et al. 2011; Dawson et al., 2004; Gunby et al., 2012; Heather et al., 2011; Kypri et al., 2005; Kypri et al., 2009; Nourse et al., 2017; Slutske et al., 2004; Wechsler et al. 1994).

Furthermore, although some contest the gender gap is diminishing (Hoeppner et al., 2013; Keeling, 2002; Young et al., 2005), we did not find evidence consistent with this supposition. Our results are in line with earlier research (Gunby et al., 2012; Hallett et al., 2012; Heather et al., 2011) that identifies male students pose a higher risk than females with regards to consuming alcohol at risky levels. In particular, we found males had a higher average AUDIT score ($M = 9.4$) and were 1.8 times more likely to consume alcohol at riskier levels in contrast to female students ($M = 7.3$). In addition to the aforementioned findings, our results are also in accordance with prior research that demonstrates risky alcohol consumption peaks at 21 to 25 years and generally declines with increasing age (Beenstock et al., 2011; Dawson et al., 2004; Hallett et al., 2012; Kypri et al., 2005). We found that risky alcohol consumption peaked at 21 to 25 years and was maintained with minimal change until age 30; where it progressively declined for each age group thereafter. It is speculated that this decline is due to students maturing out of their risky alcohol use phase and transitioning into healthier drinking patterns (Beenstock et al., 2011; Ham & Hope, 2003). However, of concern are the

students who become alcohol dependent before such maturation. For instance, once we collapsed the AUDIT into its four risk constituents, we found 41% of students who consume alcohol at risky levels also showed incipience of alcohol dependence within the past year; with 4.6% of these students showing daily alcohol dependence. The high prevalence of emerging alcohol dependence found in this study was expected and is similar with past research measuring alcohol use in university students.

For instance, Knight et al. (2002) found 31% of university students met the criteria for alcohol abuse over a 12 month period and six percent met the diagnostic criteria for alcohol dependence. Furthermore, Blanco et al. (2008) reported in their large epidemiological study that 20% of university students met the DSM-IV criteria for an alcohol use disorder within the past year. Whereas, Clements (1999) ascertained 13% met the criteria for alcohol abuse with 11% meeting the criteria for alcohol dependence. Collectively, these results as well as our own reinforce the finding that risky alcohol use is clinically problematic as it increases the likelihood of alcohol dependence and abuse during this period, in turn increasing exposure to long term adverse consequences; in addition to the short term adverse consequences experienced (Blanco et al., 2008; Clements, 1999; Knight et al., 2002; Ridout et al., 2012).

Risky Alcohol Consumption and Adverse Consequences

Our next analysis measured the association of risky alcohol consumption in terms of first-hand and second-hand consequences and found significant positive relationships. Our main effects logistic binary regression model identified that a significant proportion of university students who consume alcohol at risky levels experienced alcohol-related consequences in almost all cases analysed. Collectively the most frequent consequence experienced by students was a hangover. Interestingly, once we added an interaction effect of gender, experiencing a hangover was no longer

significant for either gender. Although this is inconsistent with past research, it is likely a result of biological factors such as metabolic processing or other confounding variables (Hallett et al., 2013; Perkins, 2002). Nonetheless, we were more interested in the interaction of gender, in particular males compared to females.

We found the most frequent first-hand consequences experienced by male students were verbally abusing someone, forgetting where they were or what they were doing, getting injured, having unplanned sex, and missing university classes. We further identified that in contrast to females, male students were two to three times more likely to experience the second-hand consequences of property damage, physical assault, verbal assault and having to look after an inebriated student or friend. Moreover, both genders were equally likely to experience unwanted sexual advances, although, females were two times more likely to be a victim of sexual assault.

These results support our hypothesis and are consistent with several other studies both nationally and internationally that show university students, in particular males, who consume alcohol at risky levels are more vulnerable to adverse alcohol-related consequences (Gill, 2002; Hallett et al., 2012; Hallett et al., 2013; Karam et al., 2007; Martinez et al., 2008; Mundt et al., 2009; Thombs et al., 2009). Moreover, despite experiencing negative consequences many students continue to drink at risky levels. This suggests that drinking alcohol may provide immediate positive reinforcement thereby negating the adverse consequences that will ensue (Cooper et al., 1992). Additionally, it may be the case that the continued high prevalence of risky alcohol consumption, regardless of the consequences is due to students' perception of what constitutes a negative consequence.

For instance, although the aforementioned consequences are conventionally considered adverse experiences of excessive alcohol consumption, research indicates

such negative consequences have been reported as positive by university students; with the experience being regarded as a sign of distinction (Ham & Hope, 2003; Mallett et al., 2008). This raises duty-of-care concerns about alcohol practices across the student populations and universities sampled; thereby reinforcing the need for an intervention to be developed in order to reduce the risk of harm associated with excessive alcohol use. However, the use of adverse consequences as a deterrent in an intervention program may be injudicious and should be approached with caution (Mallett et al., 2008).

Determinants of Risky Alcohol Consumption

In order to ascertain the determinants related to consuming alcohol at risky levels we measured two types of motives; social and personal motives. As theorised all motives showed a significant positive correlation with risky alcohol consumption. We further hypothesised that males would consume alcohol at riskier levels than females for both social and personal motives. We significantly predicted that in contrast to females, males were two to four times as likely to engage in risky alcohol consumption in order to make social gatherings more enjoyable and because their friends are drinking. This is consistent with previous research that indicates students tend to seek out social situations that facilitate drinking and such exposure increases the likelihood that students will partake in risky alcohol use themselves (Amonini & Donovan, 2006; Clapp et al., 2003; Clapp & McDonnell, 2000; Clapp & Shillington, 2001; Lo, 1995; Wechsler et al., 2002; Weitzman et al., 2003). Previous research conducted by Wechsler et al. (2002) found university students were 40% more likely to engage in risky alcohol use and this was influenced by their peers in social settings. In contrast, other researchers (Baer, 2002; Ham & Hope, 2003) assert social motives are the only motives that are not related to problematic or risky alcohol use as those that drink for social

motivation tend to drink more frequently but consume less on each occasion; thus only personal motives can explain the risky alcohol use among students.

Consistent with this theory, when we measured personal motivations as a predictor of risky alcohol consumption, we also revealed this to be significant too. We found males were twice as likely to engage in risky alcohol consumption when they drink because they like the feeling (self-enhancement). This result is in agreement with McCabe (2002) and Boekeloo et al. (2011) who state, those who drink for self-enhancement purposes will generally yield a higher level of problematic drinking. Moreover, we also found males were twice as likely to engage in risky alcohol use to forget their worries (coping). Although the majority of the research (Geisner et al., 2004; Hussong, 2007; Stewart & Devine, 2000) states females drink at riskier levels to cope and minimise psychological distress, our results are more consistent with the emergence of a minority of studies showing males are more likely to drink to cope and alleviate psychological distress (Nolen-Hoeksema & Harrell, 2002; Park & Levenson, 2002).

In particular, Parks and Levenson (2002) performed regression analyses on data collected from university students and revealed drinking to cope with psychological distress or social stressors was a strong predictor of risky alcohol use among males. Moreover, the same authors found males relied more on alcohol and consumed alcohol at riskier levels in order for self-enhancement reasons. Of interest is the fact we found this effect among male ($n = 853$) students even though females outnumbered them immensely ($n = 2466$); and, keeping in mind the aforementioned past research asserts males do not consume alcohol at risky levels for personal reasons (Geisner et al., 2004; Hussong, 2007; Stewart & Devine, 2000). Our results raise concerns regarding the mental health of male university students in our study; more so if we consider we did

not find any significant evidence for females consuming alcohol at riskier levels for the personal motives analysed.

While not all social and personal motivations loaded into the regression model were found to be significant, our results are consistent with both schools of thought in the literature; those who attest personal motives are better predictors of risky alcohol consumption (Baer, 2002; Cooper et al., 1994; Ham & Hope, 2003) and those who state social motivation is a more accurate predictor of risky alcohol consumption among students (Amonini & Donovan, 2006; Clapp et al., 2003; Clapp & Shillington, 2001; Haden & Edmundson, 1991; Weitzman et al., 2003; Wechsler et al., 2002). It is noteworthy that the personal and social influences underlying university students reasons for consuming alcohol at risky levels is not completely understood across the literature yet. What we can assert with certainty from previous research is that those who consume alcohol at risky levels are not a homogeneous group. Therefore, some of the insignificant findings in our study may be due to a number of confounding variables such as state-trait interactions or the variation in the social environments across universities, for example. Nonetheless, as theorised we have found evidence that risky alcohol consumption occurs for both social and personal reasons; it does not have to be one motive or the other as past researchers argue.

Limitations, Strengths, Future Research

Although we ascertained the results we were hoping for, the results drawn from this research should be understood with an appreciation of the strengths and limitations. The strength of this study was the use of the AULS as it captures drinking data from several different measures and is psychometrically sound. Although, it should be noted that the data we used was collected in 2011. Therefore the results may not be an accurate description of the current alcohol use of university students. Furthermore, we

had unequal gender; 2466 females and 853 males. If future research was to be conducted using the AULS such limitations such as gender inequality could be corrected upon recruiting.

Lastly, caution should always be taken when using self-report measures as some individuals may over or under estimate their alcohol consumption use. Even though we maintained privacy and encouraged the participants to complete the real information, the results might be subject to social desirability bias. We propose that recruiting a larger sample size will evenly distribute any self-bias among the sample.

Clinical Implications

The risky alcohol consumption among university students is an issue for concern, predominantly for male students. The results of this study add additional insight into the prevalence, determinants and consequences of risky alcohol use among Australian university students, especially male students. Our results highlight the importance of a deeper understanding of students' motives to consume alcohol at risky levels and point to a unique and potentially important gender difference in the relationship among motives. We found male students do not consume alcohol uniformly, but instead consume alcohol at risky levels for personal and social reasons, with both motives resulting in the experience of adverse consequences. Our results could be used as a starting point for the development of an intervention. The intervention could assess students' alcohol consumption via the AUDIT. From this score, students could be given brief intervention regarding the potential risk of adverse consequences that may arise surrounding their alcohol use. Moreover, based on our results it may prove beneficial for any intervention developed to assess students' motivations for drinking. Any intervention provided to students could then be developed to be 'reason specific'. For example, if a student identifies as drinking at

risky levels for personal reasons, information could be provided that addresses healthier ways of coping with psychological distress; and vice versa for social pressures.

Additionally, this research can be used to inform policy makers that heavy alcohol use and alcohol-related harms still remain an enduring problem for university students. As a starting point policy makers could use the results of this study to gain an understanding of students' motives to drink at risky levels and the consequences that ensue. Policy makers could re-evaluate the practices in place concerning the alcohol environment on campuses by addressing special promotions regarding pricing, as well as time and quantity of alcohol availability. Intervening assertively with the alcohol environment on campuses may see the alcohol related first and second hand consequences reduce among students, and in turn the wider population.

Conclusion

In conclusion, alcohol has been shown to be a drug of concern when it is consumed outside of the safe guidelines. We found a risky alcohol use prevalence of 39% among Australian university students. Moreover, university students aged between 18 and 30 were found to be at greater risk of adverse alcohol-related consequences and developing alcohol use disorders. Once we added an interaction effect these results were heightened for male students; suggesting males pose a higher risk than females. Our results therefore reflect the results found in the literature. Moreover, while not all predictors analysed were significant indicators of risky alcohol consumption, there were several that explained why males drink at such risky levels. We found students drink for both social motives, such as peer affiliation and conformity and for personal motives such as self-enhancement and coping to alleviate psychological distress. This result is not in accordance with the literature that typically asserts students consume alcohol at risky levels for only one motive; not both as demonstrated in our study. Nonetheless,

the results of this study reinforce the importance for the development of an alcohol intervention program for university students in order to reduce harm associated with risky alcohol consumption.

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Appendix A

The Alcohol and University Life Survey (AULS).

Participant Information and Consent Statement

Alcohol and University Life Questionnaire

You are invited to participate in the research project, **Alcohol and University Life Questionnaire**, which is being conducted by Associate Professor John Germov from the Faculty of Education and Arts at the University of Newcastle, with colleagues from the University of Sydney, University of Queensland, Monash University, and Griffith University. This project is part of a wider funded Australian Research Council (ARC) Linkage Project, which involves partner organisations (NSW Health, Victorian Department of Health Services, and the Australian Heads of University Colleges and Halls).

Why is the research being done?

The purpose of this research is to produce a better understanding of the alcohol-related practices and harm minimisation strategies used by college and non-college based university students in Australia.

Who can participate in the research?

We are seeking the participation of women and men who are university students in Australia.

What choice do you have?

Participation in this research is entirely voluntary—you are under no obligation to take part in the study. Whether or not you decide to participate, your decision will not disadvantage you.

If you do decide to participate, you may withdraw from the project without giving a reason and without affecting your current or future relationship with any university. If you decide to complete the online questionnaire, you have the option of not answering all of the questions. However, it will not be possible to withdraw after you have submitted it because the responses do not contain identifying information.

What would you be asked to do?

If you agree to participate, you will be asked to undertake an online questionnaire. You will be asked questions about your opinions and experiences about alcohol consumption, drug taking, and related harm minimisation strategies, along with some demographic questions about yourself. You will be given the option of participating in a 'lucky draw' with a chance to win one of 10 x $50 Coles Group & Myer Gift Vouchers. You will also be asked whether you would be willing to take part in a follow-up interview.

How much time will it take?

The questionnaire should take around 20 minutes to complete.

What are the risks and benefits of participating?

In undertaking the questionnaire, you may experience some mild discomfort answering questions about your alcohol consumption and the harms that may be associated with it. Should you become distressed while doing the questionnaire, you can stop and opt out of the questionnaire at any time. You may also wish to access your university counselling service.

It is expected that this project will not directly benefit you, but it will add to our understanding of alcohol use among university students and may inform harm minimisation policies and programs on university campuses.

All participants can choose to go into a 'lucky draw' for a chance to win one of 10 x $50 Coles Group & Myer Gift Vouchers. You do not have to answer every question in order to be eligible to enter the prize draw. You will also be asked if you would like to take part in a follow-up interview.

How will your privacy be protected?

All responses to the questionnaire are anonymous and strictly confidential. The names of individual persons are not required in any of the responses and no data will be collected on the questionnaire that could identify you.

The data will be stored on the password protected computers of the researchers, and once finalised will be transferred onto disc and stored securely for at least five years. After the project is completed, the non-identifiable data will be transferred from storage and deposited with the Australian Social Sciences Data Archive in Canberra. The Australian Research Council, the body who funded this research, requires that the data be archived in this location.

If you decide to go into a 'lucky draw' for a chance to win a gift voucher, and/or indicate your willingness to take part in a follow-up interview, you will be asked to supply your contact details. These details will be collected separately from your responses to the online questionnaire so that you will not be identifiable in the collection or reporting of any results.

How will the information collected be used?

The findings of this research will be presented and published via academic conferences, journals, books and other publications. A project report will also be produced that summarises the key findings and may be made publicly available on the project website. You will be able to access a summary of the research findings by emailing Chief Investigator John Germov via the details listed below. Findings from the study will be tabled in reports for partner organisations participating in the study (NSW Health, Victorian Department of Health Services, and the Australian Heads of University Colleges and Halls) and may be used in media releases.

Individual participants will not be identified in any reports or publications arising from the project.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. We encourage you print a copy of this Information Statement for your records.

You can indicate whether or not you would like to consent to participate in this project by clicking on one of the options below.

Further information

If there is anything you do not understand, or if you have any questions about the research, please contact Associate Professor John Germov via the details listed below.

Thank you for considering this invitation.

Associate Professor John Germov

Acting Pro Vice-Chancellor

Faculty of Education & Arts

Callaghan NSW 2308

T: 02 492 15175 **F:** 02 492 16993

John.Germov@newcastle.edu.au

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2010-1319.

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

Alcohol & University Life Questionnaire

Q62 Participant information and consent form inserted here.

To start, we are going to ask you some questions about your alcohol consumption.

Q1	Have you <u>ever</u> tried alcohol?	**1.** Yes	**2.** No Skip to q5 then q16 then q20
Q2	Have you ever had a <u>full</u> serve of <u>alcohol</u>? (e.g. a glass of wine, a whole nip of spirits, a glass of beer)	**1.** Yes	**2.** No Skip to q5 then q16 then q20

Q3	About what age were you when you had your <u>first</u> full serve of alcohol?	<age in years>

Source: Australian Institute of Health & Welfare (AIHW) (2010) Question E1&E2&E3

Q6	What type of alcohol is your main drink, the one you drink most often? (Mark one response only)	
		Main drink
	1. Cask wine	
	2. Bottled wine	
	3. Regular strength beer (greater than 4% Alc/Vol)	
	4. Mid strength beer (3% to 3.9% Alc/Vol)	
	5. Low alcohol beer (1% to 2.9% Alc/Vol)	
	6. Home-brewed beer	
	7. Pre-mixed spirits in a can (e.g. UDL, Jim Beam & Cola)	
	8. Bottled spirits and liqueurs (e.g. scotch, brandy, vodka, rum, Kahlua, Midori, Baileys, etc.)	
	9. Pre-mixed spirits in a bottle (e.g. Bacardi Breezer, Sub Zero, Lemon Ruski/Stoli)	
	10. Cider	
	11. Fortified wine, port, vermouth, sherry, etc.	
	12. Other	

Source: AIHW (2010) Question E8a and E8b

	What other types of alcohol do you usually drink? (Mark <u>all</u> that apply)	
		Usual others
Q68_1	Cask wine	
Q68_2	Bottled wine	
Q68_3	Regular strength beer (greater than 4% Alc/Vol)	
Q68_4	Mid strength beer (3% to 3.9% Alc/Vol)	
Q68_5	Low alcohol beer (1% to 2.9% Alc/Vol)	
Q68_6	Home-brewed beer	

Q68_7	Pre-mixed spirits in a can (e.g. UDL, Jim Beam & Cola)	
Q68_8	Bottled spirits and liqueurs (e.g. scotch, brandy, vodka, rum, Kahlua, Midori, Baileys, etc.)	
Q68_9	Pre-mixed spirits in a bottle (e.g. Bacardi Breezer, Sub Zero, Lemon Ruski/Stoli)	
Q68_10	Cider	
Q68_11	Fortified wine, port, vermouth, sherry, etc.	
Q68_12	Other	
Q68_13	No other type of alcohol	

Source: AIHW (2010) Question E8a and E8b

Q8	How often do you have a drink containing alcohol?	**1.** Never	**2.** Monthly or less	**3.** 2-4 times a month	**4.** 2-3 times a week	**5.** 4 or more times a week
Q9	How many drinks containing alcohol do you have on a typical day when you are drinking?	**1.** 1 or 2	**2.** 3 or 4	**3.** 5 or 6	**4.** 7 to 9	**5.** 10 or more
Q10	How often do you have six or more drinks on one occasion?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily
Q11	How often during the last year have you found that you were not able to stop drinking once you had started?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily
Q12	How often during the last year have you failed to do what was normally expected of you because of drinking?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily

		1.	2.	3.	4.	5.
Q13	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily
Q14	How often during the last year have you had a feeling of guilt or remorse after drinking?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily
Q15	How often during the last year have you been unable to remember what happened the night before because of your drinking?	**1.** Never	**2.** Less than monthly	**3.** Monthly	**4.** Weekly	**5.** Daily or almost daily
Q16	Have you or someone else been injured because of your drinking?	**1** No		**2.** Yes, but not in the last year		**3.** Yes, during the last year
Q17	Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	**1.** No		**2.** Yes, but not in the last year		**3.** Yes, during the last year

Source: Appendix B: Suggested Format for AUDIT Self-Report Questionnaire. Babor, Higgins-Biddle, Saunders & Monteiro (2001). AUDIT: The Alcohol Use disorder Identification Test: Guidelines for Use in Primary Care. **Q9:** Visual guide to what constitutes a standard drink will be imbedded in the online version of the questionnaire. Source: http://www.alcohol.gov.au/internet/alcohol/publishing.nsf/Content/E9E12B0E00E94FD5CA25718E0081F1DC/$File/std0910.pdf

	How many standard drinks did you drink on <u>the last time</u> you were at the following venues? [Link to standard drinks pictures]					
		1.	**2.**	**3.**	**4.**	**5.**

		Not applicable	1 or 2 drinks	3 or 4 drinks	5 or 6 drinks	7 or more drinks
Q19_2	Student college / halls of residence					
Q19_5	University (not including colleges / halls of residence)					
Q19_6	Private home					
Q19_11	Licensed premises off-campus (e.g. pubs, clubs)					
Q19_13	In public places (e.g. parks, beaches)					

Source: Harvard School of Public Health College Alcohol Study (Harvard CAS)(2001) Question C14, AIHW (2010) Question E11 + added item 'at a university college' + changed 'At School, TAFE, University, etc.' to 'At University (not including colleges)'

	In the past 30 days have you done any of the following: (Tick all that apply). **Yes =1**
Q20_1	Happy hours
Q20_2	Low-priced promotions at off-campus bars
Q20_3	Special promotions by beer/alcohol companies
Q20_4	Cover charge for unlimited drinks at an off-campus bar
Q20_5	Small admission fee for unlimited drinks at a private party
Q20_6	Free unlimited drinks at a student college / halls of residence party
Q20_7	Free unlimited drinks at a private party
Q20_8	Drinking games
Q20_9	Buying rounds of drinks when out drinking with friends
Q20_10	Secretly brought in alcohol to a licensed venue
Q20_11	None of the above

Source: Harvard CAS (2001) Question C15 + four new items at end

Q21	When you are getting ready for a night out, do you drink at a private residence (home / college / friend's house) before you go out?	**1.** Yes **Q22** If yes, how many standard drinks did you consume the last time you did this?	**2.** No

	How do you find out where parties and other social events where people drink alcohol, are going to be held?	**1.** Almost always	**2.** Often	**3.** Sometimes	**4.** Almost Never	**5.** Never
Q23_1	Word of mouth					
Q23_2	Facebook					
Q23_3	MySpace					
Q23_4	Twitter					
Q23_5	Email					
Q23_6	SMS					
Q23_7	Other – **Q24** please state					

	How frequently do each of the following reasons for drinking alcohol apply to you?	**1.** Almost always	**2.** Often	**3.** Sometimes	**4.** Almost never	**5.** Never
Q25_1	As a way to celebrate	1				
Q25_3	Because you feel more self confident or sure of yourself	3				
Q25_5	To be sociable	5				

Q25_7	Because it makes you feel good	7					
Q25_9	Because it is customary on special occasions	9					
Q25_11	Because it makes a social gathering more enjoyable	11					
Q25_13	To relax	13					
Q25_15	Because it is what most of your friends do when you get together	15					
Q25_2	To forget your worries	2					
Q25_4	Because it's exciting	4					
Q25_6	To get high	6					
Q25_8	Because it is fun	8					
Q25_10	Because it helps you when you feel depressed or nervous	10					
Q25_12	To cheer up when you're in a bad mood	12					
Q25_14	Because you like the feeling	14					

Source: Adapted from Cooper, Russell, Skinner, and Windle (1992). Added often and sometimes and never to the response format.

	Since the beginning of the academic year, how often has your drinking caused you to…? (Choose one answer in each row)					
		1. Not at all	2. Once	3. Twice	4. 3 times	5. 4 or more times
Q26_1	Have a hangover					
Q26_2	Miss a class					
Q26_3	Get behind in academic work					
Q26_4	Do something that you later regretted					
Q26_5	Forget where you were or what you did					
Q26_6	Argue with friends					
Q26_7	Engage in unplanned sexual activity					
Q26_8	Not use protection when you had sex					
Q26_9	Damage property					

Q26_10	Get into trouble with the campus security or local police					
Q26_11	Get hurt or injured					
Q26_12	Require medical treatment for an alcohol overdose					

Source: Harvard CAS (2001) Question C17. Changed 'school' to 'academic' in the question and item 3.

	When you have an alcoholic drink, how often do you do any of the following? (Mark one response for each row below)					
		1. Always	2. Most of the time	3. Sometimes	4. Rarely	5. Never
Q27_1	Count the number of drinks you have					
Q27_2	Deliberately alternate between alcoholic and non-alcoholic drinks					
Q27_3	Make a point of eating while consuming alcohol					
Q27_4	Quench your thirst by having a non-alcoholic drink before having alcohol					
Q27_5	Only drink low-alcohol drinks					
Q27_6	Limit the number of drinks you have in an evening (e.g. when driving)					
Q27_7	Refuse an alcoholic drink you are offered because you really don't want it					
Q27_8	Drink slowly					
Q27_9	When going out to drink, you make sure that there is a designated driver (someone who does not consume alcohol on that occasion)					
Q27_10	Make sure you are prepared for possible sexual encounters					
Q27_11	Drink at venues where you feel safe					

Source: AIHW (2010) Question E16 with last three items based on NHMRC (2009, p. 87). 'Drink slowly' based on the Alcohol Skills Training Program (see Neighbors, Larimer, Lostutter & Woods, 2006, p. 306).

	In the last 12 months, did you undertake the following activities while under the influence of alcohol?	1. Not at all	2. Once	3. Twice	4. 3 times	5. 4 or more times
Q29_1	Went to work					
Q29_2	Went swimming					
Q29_3	Operated a boat					
Q29_4	Drove a motor vehicle					
Q29_5	Operated hazardous machinery					
Q29_6	Created a public disturbance or nuisance					
Q29_7	Caused damage to property					
Q29_8	Stole money, goods, or property					
Q29_9	Verbally abused someone					
Q29_10	Physically abused someone					

Source: AIHW 2010 Question Y17 + CAS C17 response format

	If you choose not to drink at all or to limit your drinking, how important is each of the following reasons for you? (Choose one answer in each row)	1. Very important	2. Important	3. Somewhat important	4. Not at all important
Q5_1	Drinking is against my religion				
Q5_2	Drinking is against my values				
Q5_3	People in my family have had alcohol problems				
Q5_4	I'm not old enough to drink legally				
Q5_5	I'm going to drive				

Q5_6	It costs too much money				
Q5_7	I don't like the taste				
Q5_8	My friends don't drink				
Q5_9	I don't want to disappoint someone I care about				
Q5_10	I'm going on a date				
Q5_11	It's bad for my health				
Q5_12	It interferes with my studying				
Q5_13	It interferes with my athletic activities				
Q5_14	I've decided to cut down				
Q5_15	I don't want to lose control				
Q5_16	I recently drank too much				
Q5_17	I've had problems with alcohol				
Q5_18	It's fattening				
Q5_19	I am afraid of getting caught when under legal age				

Source: Harvard CAS (2001) Question C22; added when under legal age to items

	In the last 12 months, how often have you experienced any of the following because of other students' drinking? (Choose one answer in each row.)				
		1. Not at all	**2.** Once	**3.** 2-3 times	**4.** 4 or more times
Q28_1	Been insulted or humiliated				
Q28_2	Had a serious argument or quarrel				
Q28_3	Been pushed, hit, or assaulted				
Q28_4	Had your property damaged				
Q28_5	Had to 'babysit' or take care of another student who drank too much				
Q28_6	Found vomit in the halls or bathroom of your residence				
Q28_7	Had your studying or sleep interrupted				
Q28_8	Experienced an unwanted sexual advance				

| Q28_9 | Been a victim of sexual assault | | | | |

Source: Harvard CAS (2001) D1. Changed 'school' to 'academic'. Changed 'sexual assault or date rape' to 'sexual assault'.

Q33	How often, if at all, do you <u>now</u> smoke cigarettes?				
	1. Daily		->	**Q34** How many per day?	
	or				
	2. At least weekly (but not daily)		->	**Q35** How many per week?	
	or				
	3. Less often than weekly		->	**Q36** How many per month?	
	or				
	4. Not at all				

Source: AIHW 2010 Question D13

	Which of the following drugs have you ever used for non-medical purposes, and how recently have you used them?	1. Never used	2. Have used but not in the last 12 months	3. Used in the last 12 months	4. Used in the last month
Q37_1	Cannabis (Marijuana)				
Q37_2	Heroin				
Q37_3	Cocaine/crack				
Q37_4	Antidepressants				
Q37_5	Tranquilisers/sleeping pills				
Q37_6	Pain killers/analgesics				
Q37_7	Barbiturates				
Q37_8	Meth/amphetamine				
Q37_9	Ecstasy				

Q37_10	Other					
Q37_11	Cocktail/combination					
		Skip to q23 if never for all				

Source: Adapted from AIHW (2010) Question C1 and MUSP27

	If you have used drugs (either illegal drugs and/or prescription drugs for non-medical purposes), have you used them:		
Q38_1	With alcohol	1. Yes	2. No
Q38_2	Instead of alcohol	1. Yes	2. No

Now we are going to ask a few questions about who you are and the family you grew up in.

Q39	Are you male or female?	
	1. Male	
	2. Female	

Source: AIHW (2010) Question ZZ1

Q40	Do you think of yourself as. . .? (Mark one response only)	
	1. Heterosexual or straight	
	2. Homosexual (gay or lesbian)	
	3. Bisexual	
	4. Not sure; undecided	
	5. Something else; other	

Source: AIHW (2010) Question ZZ4

Q41	What is your current age? (i.e. the age you turned at your last birthday)	Age in years

Source: AIHW (2010) Question ZZ2

Q60	In which country were you born?	1. Australia 2. Other **Q65** Other country, please state. **Q64** In what year did you first arrive in Australia?

Q61	What best describes the area you live when NOT attending university?	1. City (for example Sydney, Melbourne, or Brisbane) 2. Regional (for example, Newcastle, Geelong, or Townsville) 3. Rural (for example, Emerald, Dubbo, or Beechworth)

Q42	Where do you live during semester, while you are attending university?	
	1. Student college / halls of residence	
	2. Off-campus house or apartment with other students / friends / housemates	
	3. Off-campus house or apartment with parents or other relatives	
	4. Off-campus house or apartment with partner and / or children	
	5. Off-campus house or apartment with no other residents	
	6. Other	**Q69** What other location do you live?
		Q45 How many years have you lived there?

Q46	At which university are you enrolled?	1. University of Sydney 2. University of Melbourne 3. Monash University 4. University of Queensland 5. University of Newcastle 6. Griffith University 7. Other (**Q47** Please state the other university at which you are enrolled)	
Q48	Which degree are your studying?		
Q49	How many years have you been a university student?		
Q50	Are you enrolled full time or part time?	1. Full time	2. Part time
Q51	Are you an international student?	1. Yes	2. No

	How important is it for you to participate in the following activities at university? (Choose one answer in each row)				
		1.	**2.**	**3.**	**4.**

		Very important	Important	Somewhat important	Not at all important
Q52_1	Athletics				
Q52_2	Sports / Social clubs				
Q52_3	Arts (e.g. theatre, choir, bands etc.)				
Q52_4	Academic work				
Q52_5	Activities at student colleges / halls of residence				
Q52_6	Political activism				
Q52_7	Parties				
Q52_8	Community service				
Q52_9	Volunteer work				
Q52_10	Religion				
Q52_11	Attend sports events				
Q52_12	Student representative on a university body				

Source: Harvard CAS (2001) Question A8 + student rep + volunteer work

Q56	What is the main occupation of the highest income earner (mother/father/guardian) in your family of origin? (Mark one only)	
	1. Manager or administrator (eg magistrate, farm manager, general manager, director of nursing, school principal)	
	2. Professional (eg scientist, doctor, registered nurse, allied health professional, teacher, artist)	
	3. Associate professional (eg technician, manager, youth worker, police officer)	
	4. Tradesperson or related worker (eg hairdresser, gardener, florist)	
	5. Advanced clerical or service worker (eg secretary, personal assistant, flight attendant, law clerk)	
	6. Intermediate clerical, sales or service worker (eg typist, word processing / data entry operator, receptionist, child care worker, nursing assistant, hospitality worker)	
	7. Intermediate production or transport worker (eg sewing machinist, machine operator, bus driver)	
	8. Elementary clerical, sales or service worker (eg filing / mail clerk, parking inspector, sales assistant, telemarketer, housekeeper)	

	9. Labourer or related worker (eg cleaner, factory worker, general farm hand, kitchenhand)	
	10. No paid job	

Source: Women's Health Australia (WHA) (2009) Young cohort survey Q113

Q57	What is the highest qualification of the highest income earner (mother/father/guardian) in your family of origin? (Mark one only)	
	1. No formal qualifications	
	2. Year 10 or equivalent (eg School Certificate)	
	3. Year 12 or equivalent (eg Higher School Certificate)	
	4. Trade / apprenticeship (eg hairdresser, chef)	
	5. Certificate / diploma (eg child care, technician)	
	6. University degree	
	7. Higher university degree (eg Grad Dip, Masters, PhD)	

Source: WHA (2009) Young cohort survey Q115

Q53	Describe your father's (or that person who served as your father in raising you) use of alcohol during most of the time that you were growing up. (Choose one answer)	
	1. Not applicable (no father or father substitute)	
	2. Abstainer	
	3. Abstainer - former problem drinker in recovery or recovered	
	4. Infrequent or light drinker	
	5. Moderate drinker	
	6. Heavy drinker	
	7. Problem drinker	
	8. I don't know	

Source: Harvard CAS (2001) Question G14

Q54	Describe your mother's (or that person who served as your mother in raising you) use of alcohol during most of the time that you were growing up. (Choose one answer)	
	1. Not applicable (no father or father substitute)	
	2. Abstainer	
	3. Abstainer - former problem drinker in recovery or recovered	
	4. Infrequent or light drinker	

	5. Moderate drinker	
	6. Heavy drinker	
	7. Problem drinker	
	8. I don't know	

Source: Harvard CAS (2001) Question G15

Q58	Have we missed anything?
	If you have anything else you would like to tell us, please write in the text box below.

| **Q66** | If you would like to have your details added to a 'lucky draw' for a chance to win one of 10 x $50 Coles Group & Myer Gift Vouchers, please click the link below. It will take you to another web page that is not linked to the questionnaire you have just completed. This ensures that your personal contact details cannot be matched to your responses on this questionnaire.

Click here to submit your details for the prize draw. |

Q67 For further information on university counselling services and healthy alcohol consumption, please use the links below.

Support services:

Australian Alcohol Guidelines

http://www.alcohol.gov.au/internet/alcohol/publishing.nsf/Content/guidelines

Alcohol and Drug Prevention Links

http://www.alcohol.gov.au/internet/alcohol/publishing.nsf/Content/contacts

TurningPoint Alcohol and Drug Centre

http://www.turningpoint.org.au/

University Counselling Services:

If you need to access counselling support, please contact the conselling services at the university where you are enrolled.

Griffith University

http://intranet.secure.griffith.edu.au/community-welfare-recreation/counselling

Monash University

http://www.monash.edu.au/counselling/contact/index.html

University of Melbourne

http://cms.unimelb.edu.au/studentservices/counsel

University of Newcastle

http://www.newcastle.edu.au/service/counselling/

University of Queensland

http://www.uq.edu.au/student-services/Counselling

University of Sydney

http://sydney.edu.au/stuserv/counselling/

Appendix B

Newcastle's Human Research Ethics Committee, Approval No.

HUMAN RESEARCH ETHICS COMMITTEE

Notification of Expedited Approval

To Chief Investigator or Project Supervisor: **Professor Billie Bonevski**
Cc Co-investigators / Research Students: **Doctor Ross Wilkinson**
Professor John Germov
Miss Lisa Macgregor

Re Protocol: **Identification of risk factors associated with risky alcohol consumption among Australian university students.**

Date: **03-Aug-2017**

Reference No: **H-2017-0201**

Date of Initial Approval: **03-Aug-2017**

Thank you for your **Initial Application** submission to the Human Research Ethics Committee (HREC) seeking approval in relation to the above protocol.

Your submission was considered under **L1 Low Risk Research**

Expedited review by the Ethics Administrator. I am pleased to

advise that the decision on your submission is **Approved** effective

03-Aug-2017.

In approving this protocol, the Human Research Ethics Committee (HREC) is of the opinion that the project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research, 2007, and the requirements within this University relating to human research.

Approval will remain valid subject to the submission, and satisfactory assessment, of annual progress reports. *If the approval of an External HREC has been "noted" the approval period is as determined by that HREC.*

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal *Certificate of Approval* will be available upon request.

Your approval number is **H-2017-0201**.

If the research requires the use of an Information Statement, ensure this number is inserted at the relevant point in the Complaints paragraph prior to distribution to potential participants You may then proceed with the research.