Sex Differences in Alcohol-Related Consequences Among Undergraduates

Carolyn M. Gaspar

Thesis Supervisor: Dr. Christopher J. Mushquash, C.Psych.

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Abstract

Research on alcohol use has examined alcohol-related consequences associated with heavy episodic drinking in undergraduates. This study examined sex differences in alcohol-related consequences. Undergraduates self-reported on positive and negative consequences they experienced during drinking occasions. It was hypothesized that males would experience more positive and negative interpersonal alcohol-related consequences than females, and females would experience more intrapersonal consequences. It was also hypothesized that when alcohol consumption was controlled for, sex differences would be non-significant. The sample consisted of 402 undergraduates with a mean age of 21. Findings indicate that sex is predictive of negative alcohol-related consequences. Both males and females experienced more positive alcohol-related consequences than negative consequences. The results of this study may assist future strategies aimed at interventions related to heavy episodic drinking. Interventions can be based on sex differences in alcohol-related consequences.

Keywords: heavy episodic drinking, negative and positive consequences, sex differences

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Alcohol Use in Undergraduates

Alcohol is the most frequently used substance on university campuses (Adlaf, Demers, & Gliksman, 2005; Perkins, 2002). Four out of five university students report consuming alcohol within their lifetime (Wagoner et al., 2012; O'Malley & Johnston, 2002; Presley & Pimntel, 2006; Wechsler, Lee, Kuo, & Lee, 2000; Lee, Maggs, Neighbors & Patrick, 2011; Patrick & Maggs, 2008) and more than two-thirds of undergraduates report drinking alcohol in the past month (Borsari, Murphy, & Barnett, 2007). Of these, 44% report problematic drinking (Dawson, Grant, Stinson, & Chou, 2004; Wagoner et al., 2012). University marks a transitional time for many young adults and alcohol use often plays an integral part of the post-secondary experience (Arbeau, Kuiken, & Wild, 2011). During university, students experience many new freedoms and responsibilities, including independence from parents or guardians, in an environment where drinking is common (Read, Merrill, Kahler, & Strong, 2007).

Heavy Episodic Drinking

Heavy episodic drinking (formerly known as binge drinking) is a problematic drinking pattern common in undergraduates (Bosari et al., 2007; Jackson, Sher, & Park, 2005). This can result from women consuming four or more alcoholic beverages or men consuming five or more drinks within a two-hour time frame (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2004), causing an individual's blood alcohol concentration to reach .08 grams, or above (Hingson & White, 2013; Keyes & Miech, 2013; Li, Hewitt, & Grant, 2007). Heavy episodic drinking and alcohol-related consequences are common among undergraduates (Jackson et al., 2005; Sylvers, Landfield, & Lilienfeld, 2011).

Negative Alcohol-Related Consequences

Alcohol use can result in acute and chronic negative consequences (Li et al., 2007; Oesterle et al., 2004). Acute consequences may be physiological or social in nature (e.g., intentional and unintentional injury, hangover and other ailments, and conflicts with family, friends, or strangers; Graham et al., 2011; Keyes & Miech, 2013). Negative alcohol-related consequences are common among university students and include problems with academics, risky sexual behaviour, driving under the influence, physical injury, and legal problems (e.g., destruction of property, and violence; Abbey, 2002; Borden et al., 2011; Dawson et al., 2004 Lee, Geisner, Patrick, & Neighbors, 2010; Park, 2004; Wechsler, Lee, Nelson, Lee, 2003). Heavy episodic drinkers are 16 times more susceptible to experience negative consequences compared to non-heavy episodic drinkers (Wechsler et al., 2000).

Alcohol consumption can lead to impairments in cognitive ability (e.g., decision-making, impulse control, and motor skills) and result in injuries to both the individual as well as others requiring the need for medical attention (Hingson & White, 2013; Park et al., 2013). Undergraduates who engage in heavy episodic drinking experience an increase in emergency department visits, often as a result of motorized accidents, violence, alcohol poisoning and engaging in risky sexual behaviours (Mundt & Zakletskaia, 2012; Perkins, 2002; Wells, Speechley, Koval, & Graham, 2007).

Negative consequences of alcohol use also result in a heavy burden on university campuses (Borges et al., 2013) and may affect other students, faculty members, and the general public (Perkins, 2002). Property damage is a common complaint associated with students drinking, including vandalising or vomiting on others' property (Perkins, 2002). Aggressive behaviour and violence are also associated with heavy episodic drinking (Borges et al., 2013;

Perkins, 2002; Wells et al., 2007). These include intentional and unintentional injuries, suicide, and traffic accidents associated with driving under the influence (Borges et al., 2013; Park, 2004; Perkins, 2002).

Negative alcohol-related consequences are increased when a student experiences an alcohol-induced blackout (White, 2003). Alcohol-induced blackouts refer to the inability to recall events due to impaired memory formulation capacity, similar to amnesia (Mundt & Zakletskaia, 2012). A total of 31% of students who drank in the past year reported blackouts as a common experience (Perkins, 2002). Individuals who experience a blackout are capable of walking, talking, and engaging in sexual activities and some believe they can operate a motorized vehicle, but fail to form long-term memories of these events (Mundt & Zakletskaia, 2012).

Alcohol use is related to an increase in unplanned sexual encounters (Abbey, 2002; Benson, Gohm, & Gross, 2007). Heavy episodic drinkers are 7 to 10 times more likely to engage in unplanned sex than non-heavy episodic drinkers (Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998; Scott-Sheldon, Walstrom , Carey, Johnson, & Carey, 2013), with 32% of undergraduates reporting regretting a sexual encounter when involving alcohol (Barnett et al., 2014). Alcohol use contributes to the so-called "hook-up culture", where individuals engage in casual sexual activity with people they are not committed to (e.g., friends, acquaintances, or strangers; Gidycz et al., 2007; Littleton, Tabernik, Canales, & Backstrom, 2009). During hook-ups, one or both students are under the influence of alcohol (Littleton et al., 2009). Undergraduates are less likely to use condoms when engaging in sexual intercourse under the influence of alcohol (Poulson et al., 1998) and are at an increase risk of sexually transmitted diseases/infections and unwanted pregnancies (Abbey, Saenz, & Buck, 2005). Sexually

transmitted infections are most common among young adults between the ages of 18 and 24 years (NIAAA, 2004b; Scott-Sheldon et al., 2013).

Undergraduates also experience negative consequences related to academic performance (Harford, Wechsler, & Muthén, 2003). Those who engage in heavy episodic drinking experience higher rates of alcohol-related academic problems than those who do not (Perkins, 2002). Academic consequences for students who engage in heavy episodic drinking include missing class or examinations, poor academic performance, and/or falling behind in class (Perkins, 2002; Presley & Pimntel, 2006). The academic consequences associated with drinking influence failure and drop out rates in undergraduates (Perkins, 2002).

Negative consequences are associated with experience with drinking (Makela & Mustonen, 2000) such that inexperienced drinkers experience more negative alcohol-related consequences when engaging in heavy episodic drinking patterns (Lewis, et al., 2010; Scaglione et al., 2013). Individuals with low tolerance levels to alcohol may experience more negative consequences (Lewis et al., 2010). When alcohol consumption is held constant, less frequent drinkers are at a greater risk of experiencing negative consequences (Lewis et al., 2010).

Despite experiencing a variety of negative consequences, undergraduates continue to engage in problematic drinking. One explanation for this may be that undergraduates do not perceive some of these consequences as negative (Lee et al., 2010; Mallett, Bachrach, & Turrisis, 2008). Many behaviours associated with alcohol consumption may be viewed as normative in undergraduate populations (Lee et al., 2010; Perkins, 2002); hangovers and other ailments are experienced by half of university students who engage in drinking, one-quarter of undergraduates reported driving under the influence and experiencing blackouts, and one-fifth reported falling behind on course work (Perkins, 2002).

Positive Alcohol-Related Consequences

Positive consequences are those that occur during or as a result of alcohol consumption and are perceived as favourable by the user (Capron & Schmidt, 2012). The most reported positive consequences are socializing, having fun, and expressing oneself (Park, 2004). University students' drinking behaviour increases when accompanied by positive consequences (Park & Grant, 2005). Undergraduates report alcohol-related activities as more enjoyable than alcohol-free activities and heavy drinking occasions are more appealing than moderate to light drinking occasions (Lang et al., 2012). Positive expectancies regarding the effect of alcohol are associated with higher levels of heavy episodic drinking (Park & Grant, 2005).

Students view positive consequences as worth the long-term effects of the negative consequences associated with alcohol use (Capron & Schmidt, 2012). This may be because positive consequences are experienced more immediately following alcohol use than negative consequences and have a greater effect on students (Park, 2004). The proximity of positive consequences of drinking enhances the rewarding effects of alcohol use (e.g., meeting friends or potential dating partners; Capron & Schmidt, 2012). Undergraduates report experiencing internal and external positive outcomes (e.g., relieving tension or being social) associated with drinking (Park, Kim, & Sori, 2013). Frequent drinkers and social drinkers report more positive consequences and are more likely to evaluate the drinking experience positively (Lee et al., 2010).

Drinking in university is viewed as a social activity (Capron & Schmidt, 2012). Alcohol acts as a social lubricant providing undergraduates with confidence in social settings (Leigh & Lee, 2008). Alcohol's anxiolytic properties may be a positive consequence because it reduces social anxiety symptoms and reduces tension (Lewis et al., 2008). Students who drink to reduce

tension and relieve negative mood states are positively reinforced by their drinking behaviours (Park & Grant, 2005). Undergraduates report that drinking enhances their enjoyment of social interactions and allows them to facilitate or engage in social activity (Read, Wood, Kahler, Maddock, & Palfai, 2003), which may allow socially anxious individuals to form relationships with peers with increased ease (Lewis et al., 2008).

Sex Differences

Female undergraduates are approaching male students' level of alcohol consumption and alcohol-related consequences (Ham & Hope, 2003). From 1993 to 2001, there has been an increase in the heavy episodic drinking of females from 5.3% to 11.9%, respectively (Ingersoll et al., 2005). Undergraduate females report heavily drinking more often than their non-university cohort (Kaysen et al., 2014) and also report higher rates of heavy episodic drinking in their first year of university compared to males (Ingersoll et al., 2005; McCabe, 2002). Males engage in more heavy episodic drinking in sophomore, junior, and senior years (Ham & Hope, 2003; McCabe, 2002;).

Males experience the most frequent and most negative alcohol-related consequences in university compared to females (Graham et al., 2011; Ham & Hope, 2003). Males tend to experience negative interpersonal consequences and also engage in public deviance (e.g., property damage, violence, and driving under the influence of alcohol) as a result of alcohol consumption (Graham et al., 2011; Ham & Hope, 2003; Jackson, 2008; Neighbors et al., 2011; Perkins, 2002; Wells et al., 2007). The relationship between alcohol-related negative consequences and anxiety, hostility, and paranoid ideation is also stronger in males (Geisner, Larimer, & Neighbors, 2004). Distressed males, who drink to cope with depression, (Geisner et al., 2004; Leigh & Lee, 2008; Nolen-Hoeksema, 2004; Nolen-Hoeksema & Hilt, 2006) and those

with low self-esteem, experience more negative consequences (Borden et al., 2011; Zeigler-Hill, Clark, & Beckman, 2011; Zeigler-Hill, Stubbs, & Madson, 2013). Females conversely tend to report negative consequences related to intrapersonal experiences (e.g., feeling sad and depressed; Barnett et al., 2014), loss of valuables (Makela & Mustonen, 2000), and more private consequences (e.g., poor academic performance, unplanned sexual behaviours, and self-harm; Barnett et al., 2014; Ham, & Hope, 2003).

Males and females also differ on negative consequences depending on the context; males experience more public consequences (e.g., fighting; Perkins, 2002; Wells et al., 2007), while females experience more private consequences (e.g., self-harm) and those related to social sanction (e.g., females who drink are negatively viewed in comparison to males; Barnett et al., 2014; Nolen-Hoeksema, 2004; Nolen-Hoeksema & Hilt, 2006). Females with depressed mood report higher rates of both positive and negative consequences compared to males with depressed mood (Park & Grant, 2005).

Both males and females report increased levels of unplanned sexual activity when under the influence of alcohol (Barnett et al., 2014). Females have a higher rate of experiencing unplanned sexual behaviours (Barnett et al., 2014; Davis, George, & Norris, 2004; Kerbs, Lindquist, Warner, Fisher, & Martin, 2009; Nolen-Hoeksema, 2004). Males who drink are at an increased risk of initiating unprotected sexual behaviours. Female university students experience shame, regret, and emptiness after hooking up while under the influence of alcohol (Norval & Marguadt, 2001; Barnett et al., 2014).

Males and females endorse positive consequences, more frequently than negative consequences (Leigh & Lee, 2008; Park, 2004; Patrick & Maggs, 2008). Both males and females report an equal number of positive consequences, however they experience these

consequences in different domains; males tend to report interpersonal positive consequences (e.g., "talked to someone I was attracted to") and females tend to report intrapersonal positive consequences (e.g., "felt more sexy"; Barnett et al., 2014). Males and females both report social benefits associated with drinking; however, while males report an increase in their social attractiveness (e.g., witty, funny), females report that alcohol allows them to express their feelings (Makela & Mustonen, 2000).

Future Drinking Patterns

Undergraduates make decisions related to future drinking behaviours based on prior drinking experiences (Lee et al., 2011; Mallett, Lee, Neighbors, Larmier, & Turrisi, 2006) such that experiencing positive consequences increases drinking (Park et al., 2013; Leigh & Lee, 2008). Patrick and Maggs (2008) found that after students experienced less positive consequences, they plan to drink less in the future. However, consequences are not experienced in isolation; both positive and negative consequences occur simultaneously (Lee et al., 2011; Leigh & Lee, 2008). Students are more motivated to experience a positive consequence rather than to avoid a negative consequence associated with alcohol use (Capron & Schmidt, 2012; Leigh & Lee, 2008).

Males and females do not differ in future drinking behaviour based on positive consequences (Park, 2004). Students will engage in drinking behaviour if they experienced positive consequences in a social setting previously and will continue to drink in similar settings in the future (Mallett et al., 2006). Negative consequences are accepted as normative and do not dissuade university students from drinking. Males view negative consequences as normative rather than self-inflicted (Lee et al., 2010; Leigh & Lee, 2008). Their continued drinking

suggests they view negative consequences as counterbalanced by positive consequences (Coleman & Cater, 2005; Leigh & Lee, 2008; Mallett et al., 2008).

Gaps in Research

Literature often focuses on the negative consequences in university students and their perception of the consequences (Barnett et al., 2014) and there has been little focus on positive consequences of heavy episodic drinking (Capron & Schmidt, 2012). There is a lack of assessment tools examining positive alcohol-related consequences, which warrants further research (Barnett et al., 2014; Lee et al., 2011; Mallet et al., 2013). Negative alcohol related consequences are discrete and objective, whereas positive consequences are more subjective and less distinct, which may contribute to the higher reports of positive consequences (Barnett et al., 2014; Patrick & Maggs, 2011). Sex is another consideration; males typically score higher on measurement tools that assess negative and positive alcohol-related consequences of alcohol consumption (Makela & Mustonen, 2000). Measurement tools may be biased in the sample of behaviours measured and behaviours and consequences experienced by females are absent from current measures (Nolen-Hoeksema, 2004).

Hypotheses

The present study examined sex differences in both positive and negative alcohol consequences among undergraduates. It is hypothesized that males will experience more negative consequences and more positive interpersonal consequences than females, while females will experience more of both negative and positive intrapersonal consequences than males. It is hypothesized that when the level of drinking is held constant, females will experience more negative alcohol-related consequences. Furthermore, it is hypothesized that both males and females will experience more positive alcohol-related consequences than negative consequences.

Method

Participants

A total of 457 undergraduates completed the survey. Participants with a score of two or more on the Infrequency Scale and those who did not meet eligibility criteria were excluded from analyses. Participants were categorized as drinkers or non-drinkers, using an established criterion of having consumed a minimum of one alcoholic beverage in the last four months (one standard drink is defined as one bottle/can of beer, one glass of wine, or one shot of hard liquor, either straight or with a mixer). A total of 402 participants (76.1% female; mean age of 20.9 years (SD = 4.4)) met the eligibility criterion. Self-identified ethnicities of participants were Caucasian (83.5%), Aboriginal (2.9%), and Other (13.5%). The majority of students were in their 3rd year at Lakehead University (32.0%).

Procedure

Undergraduates were recruited by poster advertisements and through the psychology department's research participant sign up system (Sona Experiment Management System). The study was conducted using SurveyMonkey, an online survey system. Eligible students were asked to provide informed consent prior to participating in the study and, once consent was obtained, they were directed to a series of self-report questionnaires. Following the completion of questionnaires students were debriefed and provided with additional mental health supports if needed. Students were compensated 1% towards an undergraduate psychology course or entered into a $100 cash draw. Participants were provided with instructions for clearing their Internet browser in order to maintain confidentiality and privacy.

Measures

Demographic information. A basic demographic questionnaire collected students' age, sex, and ethnicity, as well as relationship status, occupation, family income, university major, and year of study in university (Mushquash et al., 2011).

Alcohol Consumption. Participants reported on the maximum number of beverages they consumed in a two-hour time frame and how often they consumed four or more drinks in a two-hour time frame in the past seven days (Mushquash et al., 2014).

Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2007). The YAACQ assesses a variety of consequences associated with alcohol consumption in university students across eight domains: social interpersonal problems, impaired control, self-perception, self-care, risky behaviours, academic, occupational consequences, physiological dependence, and blackout drinking, with 48 "yes" or "no" dichotomized items, measuring if the consequence occurred in the past year (Read et al., 2007). The YAACQ has demonstrated high internal consistency for the individual domains and the overall scale with Cronbach's alpha ranging from .79 to .89 (Read, Beattie, Chamberlain, & Merill, 2008).

College Alcohol Problem Scale-Revised (CAPS-R; Maddock, Laforge, Rossi, & O'Hare, 2001). The CAPS-R measures alcohol-related consequences in post secondary populations. The revised scale is an eight-item measure that forms two subscales measuring community and socioemotional problems. Response options range from "never" to "10 or more times" measuring how often students have had any problems over the past 12 months related to drinking alcoholic beverages (Maddock et al., 2001).

Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The RAPI is a 23-item scale measuring alcohol-related consequences within the last three years, as well as the last

seven-days on a scale ranging from zero ("never") to four ("more than 10 times"; Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007). The RAPI provides good internal reliability (Cronbach's α =. 92; Corbin et al., 2008). The measure also demonstrates construct and criterion validity (Corbin et al., 2008).

Alcohol Use Disorder Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT is a 10-item questionnaire measuring three domains of alcohol use: alcohol consumption, drinking behaviour, and alcohol-related problems. Questions measured students' alcohol consumption and how often during the last year alcohol has caused problems. All questions are scored zero to four, with a possible total score ranging from 0 to 40 (Saunders et al., 1993). The AUDIT demonstrates high internal consistency (Cronbach's α = .94; O' Hare & Sherrer, 1999).

Drinker Inventory of Consequences (DrInC; Miller, Tonigan, & Longabaugh, 1995). The DrInC measures the frequency of behaviour as a result of alcohol, across five domains: physical, inter- and intrapersonal, impulse control, and social responsibility. Participants report if the event has ever happened (0 "no" or 1 "yes"), and how often it has happened in the past three months, ranging from 0 "never" to 3 "daily or almost every day" (Miller et al., 1995). The DrInC demonstrates high internal consistency (ranging from .70 to .80; Miller et al., 1995). Evidence of construct validity is provided based on the relationship between the DrInC and amount of alcohol consumed ($r = .36$, $p < .001$; Forcehimes, Tonigan, Miller, Kenna, & Baer, 2007). The DrInC was related to measures of alcohol dependence symptoms, $r = .62$, $p < .001$ demonstrating concurrent validity (Forcehimes et al., 2007).

Positive Drinking Consequences Questionnaire (PDCQ; Corbin, Morean, & Benedict, 2008). Frequency of positive alcohol-related consequences within the last three

months was measured with the 14-item PDCQ. Items included "I approached a person that I probably wouldn't have spoken to otherwise", "I told a funny story or joke and made others laugh", and "I felt especially confident that other people found me attractive". Items are scored from "0" to "greater than 10" (Corbin et al., 2008). The PDQ is internally consistent (Cronbach's α =. 88; Corbin et al., 2008) and has good split-half reliability (r = .80, p <. 01; Corbin et al., 2008).

Results

Data Management

Listwise deletion was used with remaining participant data. Prior to the primary analyses, data were examined for outliers and assumptions of normality; no outlier removal was necessary. The DrInC was log transformed to correct for skewedness tested by the Shapiro-Wilks test.

Descriptive Statistics

Means and standard deviations of alcohol consumption and alcohol-related consequences are shown in Table 1. The values for the DrInC subscales were consistent with published norms (Miller et al., 1995). Heavy episodic drinking patterns in undergraduates were lower than previous studies (Read et al., 2007). A post-hoc comparison was conducted using an independent samples t-test. The heavy episodic drinking mean from the study was significantly lower by 1.43 (95% CI, 1.10 to 1.77) than previous research (M = 4.19), t (356) = -8.46 p < 0.01.

Relationship Between Alcohol Consumption, Sex, and Alcohol-Related Consequences

Bivariate correlations were computed to examine the relationship between alcohol consumption and both positive and negative alcohol-related consequences. Results indicated that the experience of negative and positive alcohol-related consequences was related to higher levels

of alcohol use for females, but the strength of the correlation was modest (Cohen, 1992; see Table 1). Both alcohol-related consequences and level of alcohol consumption were not statistically significant for males (see Table 1).

Age, Sex, and Alcohol Consumption as Predictors of Alcohol-Related Consequences

Hierarchical (sequential) multiple regression analyses were computed to determine if the addition of age, sex, and quantity of alcohol consumption in a period of two hours predicts both negative and positive alcohol-related consequences (see Table 2). The full model of age, sex, and quantity of alcohol in two hours was statistically significant for negative and positive alcohol-related consequences, consistent with hypotheses. Sex significantly predicted intrapersonal negative alcohol-related consequences, in addition to impulse control consequences (see Table 2). Males were more likely to experience negative alcohol-related consequences, but females and males did not differ in their experience of positive alcohol-related consequences (see Table 3).

Discussion

The present study examined sex differences in both positive and negative alcohol-related consequences among undergraduates. Consistent with hypotheses one and two, results supported sex as a predictor of negative alcohol-related consequences in an undergraduate sample such that males experienced more negative alcohol-related consequences than females. This is consistent with findings from Park and Grant (2005). Males also reported more intrapersonal negative alcohol-related consequences than females, inconsistent with the study's third hypothesis. Negative alcohol-related consequences are associated with increased alcohol consumption for females. Both males and females reported higher rates of positive alcohol-related consequences compared to negative consequences, which is consistent with the study's fourth hypothesis.

Sex was a predictor of negative alcohol-related consequences, however the report of few specific negative alcohol-related consequences differentiated the sexes. Contrary to past research (Graham et al., 2011) and our hypothesis, males experienced more intrapersonal and impulse control negative alcohol-related consequences. This finding was unexpected given the literature that males experience more interpersonal consequences associated with drinking (Graham et al., 2011; Ham & Hope, 2003; Jackson, 2008; Neighbors et al., 2011; Perkins, 2002; Wells et al., 2007). An explanation for this inconsistency may lie in sex differences in regards to drinking to cope. Depressive and anxiety symptoms moderate males' alcohol use and the effects of life stress (Park & Levenson, 2002). Males who experience distress may report more negative alcohol-related consequences. These consequences may be intrapersonal in nature (e.g., "I have felt bad about myself because of my drinking" or "I have been unhappy because of my drinking"; Miller et al., 1995). The inconsistency between our study's hypothesis and previous literature may be the result of males with low self-esteem experiencing more negative alcohol-related consequences (Borden et al., 2011; Zeigler-Hill et al., 2011; Zeigler-Hill et al., 2013;).

Females reported less intrapersonal consequences associated with drinking compared to males. The moderating role of sex on alcohol-related consequences may be due to gender norms concerning alcohol use (Neighbors, Walker, & Larimer, 2003). Women generally consume lower amounts of alcohol than men, however females' consumption of alcohol is increasing within the past decade (Ingersoll et al., 2005). Women consume less alcohol for various reasons such as avoiding unwanted behaviours and social sanction (Barnett et al., 2014; Nolen-Hoeksema, 2004; Nolen-Hoeksema & Hilt, 2006). Alcohol use is a more acceptable and integral part of males' social lives than of females' (Neighbors et al., 2003). Heavy episodic drinking among men can be seen as "boys will be boys", whereas the opposite is true of females

(Neighbors et al., 2003). Females who engage in heavy episodic drinking are viewed as sexually promiscuous (Neighbors et al., 2003).

Skweness was suspected as a reason for males experiencing more intrapersonal consequences than females. Items were measured on a 5-point scale ranging from 1 "never" to 5 "monthly". The data was skewed with "never" being the most frequently endorsed item, causing the mean of negative alcohol-related consequences to be lower than previous research (Park, 2004; see Table 1). Data was transformed to correct for skewness, and the result remained inconsistent with the study's hypothesis and previous research.

Males tend to score higher on measurement tools that assess alcohol-related consequences (Allen, 2003). Females may have endorsed items measuring intrapersonal consequences less frequently than males due to wording of the scale item. Items on the DrInC intrapersonal subscale were private in nature, but do not measure items demonstrated in previous research that females endorse more frequently. Items on the subscale include "when drinking, my personality has changed for the worse", "because of my drinking, I have not had the kind of life that I want", and "my spiritual and moral life has been harmed by my drinking" (Miller et al., 1995). Females tend to report intrapersonal consequences related to self-harm and loss of valuables (Barnett et al., 2014; Ham & Hope, 2003). Such items are not found on the intrapersonal subscale of the DrInC measure.

A distinguished sex difference emerged in the analysis; males experienced more consequences related to impulse control (e.g., "when drinking, I have done impulsive things that I regretted later", "I have driven a motor vehicle after having three or more drinks", and "I have been arrested for driving under the influence of alcohol"; Miller et al., 1995) than females. This was expected based on the literature. Previous research has found males report more public

consequences associated with alcohol use compared to females (Graham et al., 2011; Ham & Hope, 2003; Jackson, 2008; Neighbors et al., 2011; Perkins, 2002; Wells et al., 2007). An explanation for this discovery is the DrInC is not commonly used in research, and few instruments measure impulse control (e.g., CAPS-R, AUDIT, RAPI).

Higher levels of alcohol consumption were significantly related to higher levels of negative alcohol-related consequences in females, but this relationship was of a modest strength. These results are consistent with other studies, which noted negative consequences modestly linked to heavy episodic drinking (Park & Grant, 2005). This finding also demonstrates that heavy episodic drinking and alcohol-related consequences are different, and the experience of negative alcohol-related consequences are based more on personality traits (e.g., impulsivity, hopelessness, and anxiety sensitivity; Loxton, Bunker, Dingle, & Wong, 2015) than on the amount of alcohol used (Park, 2004). Previous research illustrates that females who engage in heavy episodic drinking are as likely to experience negative consequences as males (Perkins, 2002).

Results are in agreement with past research indicating that males and females experience more positive alcohol-related consequences than negative alcohol-related consequences (Patrick & Maggs, 2008). This suggests that experiencing positive alcohol-related consequences reinforces alcohol use (Mallett et al., 2006); students are likely aware of the effects of alcohol and continue to drink to experience these rewarding effects (Patrick & Maggs, 2008). Expectancies of positive alcohol-related consequences reinforce alcohol consumption, as individuals believe that alcohol use leads to more fun and less tension and acts as a social lubricant (Park, 2004). Depending on the proximity to the drinking event, undergraduates may also report positive consequences more frequently than negative consequences (Capron &

Schmidt, 2012). Proximity of consequences may further enhance the rewarding effects of positive consequences, such that they occur during or immediately following alcohol consumption, whereas negative consequences are more distal (Capron & Scmidt, 2012). Events happening close to a drinking occasion are more likely to be recalled than those occurring at a later time, which can be explained by flashbulb memories. Positive flashbulb memories in individuals who view an event as positive demonstrate higher rates of reliving and sensory imagery of the event, resulting in more rehearsal and encoding of the event into memory (Brown & Kulik, 1977).

Limitations and Future Directions

This study does have some limitations. The sample is from a single university campus so results may not generalize to other campuses or non-university settings. Another limitation is the exclusive use of self-report measures, however, past studies have shown that self-report measures of alcohol consumption are both reliable and valid when completed under appropriate conditions (Corbin et al., 2008). The undergraduates in the current sample were not selected based on problematic drinking patterns, therefore reporting relatively low levels of consumption (M = 2.76, SD = 3.20) and relatively low levels of negative alcohol-related consequences (see Table 1) was expected. Lastly, the criterion for heavy episodic drinking does not adequately identify those experiencing alcohol-related consequences. It may be more appropriate to use behavioural indices to measure alcohol-related consequences (e.g., police records and academic disciplinary files; Park & Grant, 2005).

Current measures of alcohol-related consequences have not been designed for research purposes and are primarily used in clinical work to screen for alcohol use problems and identify individuals who may require treatment or further assessments (Allen, 2003). While the current

study used instruments commonly used in research, their utility in research still raises concerns and additional research is necessary to develop measures that may be more appropriate for research purposes. Additional research is needed to develop measures assessing positive alcohol-related consequences as well. Research focuses on negative alcohol-related consequences with few measures developed to assess positive consequences associated with alcohol consumption. The positive alcohol-related consequence measure used in the current study, the PDCQ, was developed based on a measure used to assess positive expectancies associated with drinking (Park, 2004). Items on the PDCQ were modified to reflect actual occurrences associated with drinking rather than expectancies (Park, 2004).

Developers of measures of this nature should examine the difference in the wording of negative and positive consequence scale items. Negative consequences are objective and discrete (e.g., "I have gotten into a physical fight while drinking" or "I have been sick or vomited after drinking"; Miller et al., 1995), while positive consequences are subjective and less discrete (e.g., "I found myself in a frightening situation and I felt surprisingly fearless" or " I stood up for a friend or confronted someone who was in the wrong"; Corbin et al., 2008). Individuals may endorse positive consequences more frequently than negative consequences due to the subjectivity in the nature of the items.

Alcohol expectancies and alcohol-related consequences should be examined to explain individual's differences in drinking. Research examining the effects of alcohol expectancies related to changes in drinking behaviour, has reported contrasting findings between expectancies and drinking patterns (Bot, Rutger, Engels, & Knibbe, 2005). Some studies found moderate relationships between expectancies and drinking over a period of time (e.g., one year) and other studies found alcohol expectancies are primarily related to specific stages of alcohol use (e.g.,

onset of drinking) or drinking in young adults (Bot et al., 2005). Outcome expectancies are beliefs that individuals have about the effects of alcohol on their mood, behaviour, and emotions. These expectancies can be categorized as both positive (e.g., happy and sociable) and negative (e.g., depressed and aggressive; Corbin et al., 2008). Prospective research can also examine the relationship between setting and alcohol-related consequences. Individuals with a positive expectancy to experience a positive alcohol-related consequence are more likely to drink alcohol in a social setting (e.g., public drinking places and with peers; Bot et al., 2005). Those with a negative expectancy associated with drinking alcohol may be likely to drink in solitary (Bot et al., 2005).

Although self-report studies predominate the field of psychology, research-examining undergraduate drinking through field research is needed (Midanik et al., 1998). An ideal methodology would be natural observation to assess drinking behaviour and consequences. Natural observation provides a deeper understanding of students' actual behaviour in their natural setting and is particularly helpful in gaining insight into how the participants view their behaviour (Midanik et al., 1998). However, this research method cannot reveal the underlying motivation of the behaviour (Midanik et al., 1998). Daily diary studies are useful in assessing behaviours proximal to their occurrence. Participants in diary studies are asked to make estimates of their alcohol-consumption using calendars kept over a period of time (Midanik et al., 1998). This research method has demonstrated good validity and reliability (Midanik et al., 1998); however, generalizing from the results of field research is problematic.

Undergraduates experience many negative consequences associated with their drinking, but also experience numerous positive consequences. This finding has clinical implications and suggests that psychoeducation on positive consequences should be incorporated into alcohol

interventions on university campuses. These results also suggest that the amount of alcohol consumption is not likely a helpful objective of intervention programs. Rather, interventions might do better to focus on sex specific consequences to reduce negative consequences associated with alcohol consumption.

Conclusion

Results of this study suggest that males and females are more alike than different in terms of alcohol-related negative consequences. Sex emerged as a predictor of intrapersonal and impulse control specifically, consistent with the first hypothesis, however the direction was reversed (i.e., males experienced more intrapersonal consequences). Thus, our second hypothesis that females experience more intrapersonal consequences was also not supported. Females reported more negative alcohol-related consequences compared to males when level of alcohol was held constant, consistent with the study's third hypothesis. Lastly, males and females experienced more positive alcohol-related consequences than negative consequences. Further research correcting the noted limitations are suggested to extend literature investigating sex differences associated with alcohol-related consequences allowing for generalization of results.

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Table 1

Mean and Standard Deviations for Negative and Positive Alcohol-Related Consequences and Correlations with Quantity in 2 Hours by Sex

Variable	Male			Female		
	M	*SD*	*r*	*M*	*SD*	*r*
Alcohol Consumption						
HED	8.48	4.15		5.57	2.02	
Number of Drinks	5.10	3.55		4.40	4.54	
Consequences						
DrInC Physical	1.05	.13	-.035	1.04	.09	.308**
DrInC Intrapersonal	1.00	.15	.034	.10	.01	.186**
DrInC Social Responsibility	.93	.13	-.056	.93	.90	.286**
DrInC Interpersonal	1.00	.15	-.018	1.06	.06	.249**
DrInC Impulse Control	1.17	.11	.047	1.13	.07	.284**
DrInC Control	1.04	.19	.121	1.00	.14	.335**
PDCQ	26.00	9.30	.108	26.71	8.04	.234**

Note: DrInC = Drinker Inventory of Consequences (Miller et al., 1995); PDCQ = Positive Drinking Consequence Questionnaire (Corbin et al., 2008).

**$p < .01$.

Table 2

Hierarchical Multiple Regression Analyses Predicting Alcohol-Related Consequences

Predictors	R^2	*Adj* R^2	β	ΔR^2	ΔF	*df*
Physical Consequences (DrInC)						
Model 1: Age	.000	-.004	.015	.000	.136	1, 263
Model 2: Sex	.001	-.007	-.019	.000	.069	1, 262
Model 3: Quantity 2 Hours	.052	.041	.230*	.051	14.05	1, 261
Intrapersonal Consequences (DrInC)						
Model 1: Age	.010	.006	.101	.010	2.68	1, 258
Model 2: Sex	.025	.017	-.123*	.015	3.878	1, 257
Model 3: Quantity 2 Hours	.053	.042	.172*	.028	7.694	1, 256
Social Responsibility Consequence (DrInC)						
Model 1: Age	.002	-.002	.039	.002	.400	1, 262
Model 2**:** Sex	.007	-.001	-.073	.005	1.370	1, 261
Model 3: Quantity 2 Hours	.047	.036	.205*	.040	10.923	1, 260
Interpersonal Consequences (DrInC)						
Model 1: Age	.020	.017	.143*	.020	5.367	1, 257
Model 2: Sex	.024	.016	-.061	.004	.948	1, 256
Model 3: Quantity 2 Hours	.057	.046	.184	.033	8.801	1, 255
Impulse Control Consequences (DrInC)						
Model 1: Age	.009	.005	.092	.009	2.271	1, 264
Model 2: Sex	.035	.028	-.165*	.027	7.282	1, 263
Model 3: Quantity 2 Hours	.094	.084	.248**	.059	17.087	1, 262
Control Consequences (DrInC)						
Model 1: Age	.011	.007	.104*	.011	2.898	1, 264
Model 2: Sex	.013	.006	-.047	.002	.584	1, 263
Model 3: Quantity 2 Hours	.106	.095	.310**	.092	27.087	1, 262
Positive Consequences (PDCQ)						
Model 1: Age	.011	.007	-.106*	.011	2.990	1, 265
Model 2: Sex	.012	.004	-.022	.000	.131	1, 264
Model 3: Quantity 2 Hours	.095	.085	.297**	.083	24.213	1, 263

Note: Sex coded: 1 = male, 2 = female; DrInC = Drinker Inventory of Consequences (Miller et al., 1995); PDCQ = Positive Drinking Consequence Questionnaire (Corbin et al., 2008).

* $p < .05$. ** $p < .01$.

Table 3

Bivariate Correlations with Sex and Alcohol-Related Consequences

Variable	1	2	3	4	5	6	7	8
1. Sex	-	-.081	-.149*	-.104	-.085	-.181*	-.098	.036
2. Physical (DrInC)		-	.710**	.780**	.734**	.756**	.550**	.584**
3. Intrapersonal (DrInC)			-	.743**	.685**	.672**	.349**	.416**
4. Social Responsibility (DrInC)				-	.745**	.761**	.390**	.489**
5. Interpersonal (DrInC)					-	.793**	.395**	.528**
6. Impulse Control (DrInC)						-	-.452**	.519**
7. Control (DrInC)							-	.566**
8. Positive Consequences (PDCQ)								-

Note: Sex coded: 1 = male, 2 = female; DrInC = Drinker Inventory of Consequences (Miller et al., 1995); PDCQ = Positive Drinking Consequence Questionnaire (Corbin et al., 2008).

* $p < .05$. ** $p < .01$.