PROTECTIVE BEHAVIORAL STRATEGIES AND ALCOHOL-RELATED SEX AMONG COLLEGE STUDENTS

by

ROSELYN SHEA PETERSON
B.A. Seattle University, 2012

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Major Professor: Robert Dvorak

ABSTRACT

Adverse sexual outcomes (e.g., sexual regret, sexual risk, and sexual assault) are a common experience among college students. In particular, regretted sex is reported by a third of college students and may result in psychological harm. Previous literature has found that alcohol is involved in approximately one third of regretted sex experienced by college students. A gap exists in the literature identifying who is more susceptible to experiencing a regretted sexual experience. Previous research has shown that students who implement protective behavioral strategies (PBS) while drinking are able to reduce alcohol-related negative consequences, including regretted sexual experiences. Three sub-types of PBS exist: Stopping/Limiting Drinking (SLD), Manner of Drinking (MD), and Serious Harm Reduction (SHR). The current study examines associations between regretted sexual experiences, alcohol use, and PBS. Participants were a sample of college students (n = 349) who completed a series of online surveys that assessed drinking habits, alcohol-related negative consequences (e.g., regretted sex), and PBS use. A multi-group path analysis (grouped by gender) found that alcohol use was positively associated with regretted sexual experiences. One of the three PBS sub-types, MD, was negatively associated with regretted sexual experiences. This association was mediated by alcohol use. A different PBS subtype, SHR, yielded a direct negative relationship with regretted sexual experiences for women, but not for men. Lastly, the interaction of SHR and alcohol use was significantly associated with regretted sexual experiences and varied by biological sex. Among women, low SHR potentiated the positive association between alcohol and regretted sex; in contrast, high SHR attenuated this association. In order to inform future interventions and subsequently decrease the number of alcohol-related negative consequences, further examination

of differences in relationships between PBS subtypes, alcohol use, and regretted sex for men and women is warranted.

For my parents, Dale and Kelly

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CHAPTER 1: INTRODUCTION

Alcohol use remains a consistent problem on college campuses in the United States (Johnston et al., 2018). A number of alcohol-related negative consequences stem from college student drinking (Kahler, Strong, & Read, 2005; Merrill, Wardell, & Read, 2014; Perkins, 2002b). Regretted sexual experiences are a common alcohol-related negative consequence experienced by college students, with lifetime rates between 29%-71.9% (Merrill, Rosen, Boyle, & Carey, 2018; Oswalt, Cameron, & Koob, 2005) and 31.8% endorsing past year regretted sex (Barnett et al., 2014). While it has be found that sexual violence can lead to a variety of adverse psychological sequalae (e.g., poorer mental health in general and less use of responsible drinking behaviors; Brahms, Ahl, Reed, & Amaro, 2011), it has yet to be found whether regretted sexual experiences lead to maladaptive personal self-evaluation, symptoms of anxiety, or symptoms of depression (Oswalt et al., 2005). Understanding contextual factors that contributed to a regretted sexual experience, such as the use, or lack thereof, of PBS by both men and women may prevent the occurrence of future regretted sexual experiences.

Regret: A Negative Emotion Construct

Regret is a negative emotion construct that often involves self-blame linked to past experiences and behaviors (Connolly & Zeelenberg, 2002; Gilovich & Medvec, 1995). Regrets are connected to repetitive thoughts of how one might change a past action or have achieved a better outcome than what resulted (Roese et al., 2009). Regrets in general (such as regrets of education, career trajectory, and romantic life) have been highly predictive of general distress, anhedonic depression, and anxious arousal (Roese et al., 2009). Additionally, regret is a common experience which can lead to heightened psychological distress (Landman, 1987; Lecci, Okun, & Karoly, 1994; Wrosch, Bauer, & Scheier, 2005) as well as an impact on a wide

range of decision-making, judgments, and other mental health outcomes (Inman, Dyer, & Jia, 1997).

According to a meta-analytic review by Morrison, Epstude, and Roese, (2012), adults and college students experience regret in many areas of life however, regrets of love (romance and family) were most commonly endorsed, followed closely by regrets of both career and education. It has also been found that people tend to rate with a higher intensity regrets of love rather than work, and they blame themselves more for regrets of love than of work (Morrison, Epstude, & Roese, 2012; Ordonez & Connolly, 2000; Zeelenberg, van Dijk, & Manstead, 1998). Previous research shows that regrets that leave the largest impact include those marked by high opportunity for positive action (e.g., being able to correct the regretful experience; Roese & Summerville, 2005).

Regrets of Commission versus Omission

Two distinct types of regret exist, see Figure 1. The first are regrets of action (commission), which includes behaving in a way one wishes they had not (e.g., having sex with someone when they believe they should not have; Gilovich & Medvec, 1995; Zeelenberg, van de Bos, van Dijk, & Pieters, 2002). The second type are regrets of inaction (omission) which includes the absence of behaving in a way one wishes they had (e.g., regretting not acting during a consensual sexual encounter; Gilovich & Medvec, 1994; Oswalt et al., 2005). Given biological sex differences in how sex is considered and viewed (see section below on Gender Norms and Regretted Sex), it is possible there are important gender differences in factors that predict regrets of omission and commission, however this has yet to be examined.

Regretted Sexual Experiences

Regretted sexual experiences are a common alcohol-related negative consequence experienced by college students, with lifetime rates between 29%-71.9% (Merrill et al., 2018; Oswalt et al., 2005) and 31.8% endorsing past year regretted sex (Barnett et al., 2014). Common reasons why sexual regret is experienced by college students include inconsistencies between sexual decision making and morals (37%), decision making being influenced by alcohol at the time (31.7%), and women often feeling pressured by their partner to have sex (23.0%), to name a few (Oswalt et al., 2005). Other reasons for sexual regret were having had engaged in sexual intercourse once (i.e., a one night stand) and having had sexual intercourse with someone known for less than 24 hours (Eshbaugh & Gute, 2008). Oswalt and colleagues call for future research on what emotions are experienced after sexual regret, such as guilt or anxiety. Thus, research on the contextual factors of regretted sexual experiences, and not just the psychological aftermath, are important in helping to identify potential factors for prevention. It was further noted that, while the majority of college students may not experience unintended pregnancy or an STD, the majority will likely experience sexual regret at some point during their time in college (Oswalt et al., 2005). For these reasons, it is important to understand factors associated with regretted sexual experiences.

Regretted Sex and Alcohol

Regretted sexual experiences are often associated with alcohol use (Orchowski, Mastroleo, & Borsari, 2012; Oswalt et al., 2005). Lifetime prevalence of regretted sex among college students have been found to be as high as 72%, with 31.7% stating alcohol negatively influenced their decision making (Oswalt et al., 2005). In a sample of college women reporting on drinking alcohol in the last three months, 35% reported regretting a sexual situation linked to

drinking, 23% neglected to use birth control or protect from STDs while drinking, and 22% had sex with someone they would not ordinarily have sex with while drinking (Moorer, Madson, Mohn, & Nicholson, 2013). Importantly, it's unclear if these rates differ between drinking versus non-drinking. In another sample of college students, 25% (59% men, 41% women) reported at least one instance of alcohol-related regretted sex in the past month (Orchowski et al., 2012).

Gender Norms and Regretted Sex

Previous research has focused on the notion that men and women experience sex and regret differently. Females tend to be more conservative in their views on sex norms, (e.g., viewing prostitution and premarital sex as more wrong than men; Klassen, Williams, & Levitt, 1989). Furthermore, in regard to their first sexual encounter, women report higher rates of wishing they had not had sex (38%), feeling pressured by their partner (23%), and reaching orgasm (8%) versus men (20%, 5%, and 84%, respectively; Sawyer & Smith, 1996). Moreover, Dickson et al. (1998) found that women (7%) felt forced during their first sexual experience at a higher rate than men (0.2%). Factors contributing to this regret included regretting earlier intercourse due to young age and misperceived willingness to engage in sex (Dickson, Paul, Herbison, & Silva, 1998).

As noted above, there is very little research on regretted sexual experiences and what follows after having a regretted sexual experience, however, there is research on unwanted sexual contact and casual sexual encounters. While these constructs are different from each other, a study by Larimer et al., (1999) found that men who had experienced unwanted sexual contact experienced more depressive symptoms than those who had not experienced unwanted sexual contact. No differences were seen for women (Larimer, Lydum, Anderson, & Turner,

1999). Additionally, in a study on casual sexual encounters, it was found that women experienced higher levels of depressive symptoms than those who did not engage in casual sex; the opposite was found for men (Grello, Welsh, & Harper, 2006). For these reasons, the results of the current study are analyzed as a function of biological sex. It is unclear if regret of omission and commission are experienced more or less by men or women, however both often occur in the context of alcohol use.

Why Regretted Sex and not Risky Sex?

Investigating regretted sexual experiences (vs. sexual risk, which is what is more commonly reported on) is quite novel, especially when the link between regretted sexual experiences and indices of mental health, including depression and suicidal ideation, are considered. Regret is related to self-perception and is an emotional construct (Roese et al., 2009), whereas risky sex may be more closely aligned with concerning health behaviors. Furthermore, regretted sexual experiences have the potential to lead to a different type of psychological sequalae. Risky sex is primarily aligned with risk-related health behaviors (e.g., STDs, unwanted pregnancies; Brown & Vanable, 2007; MacDonald, Zanna, & Fong, 1996). There is very little published about the link between PBS and regretted sexual experiences. Understanding factors that may reduce the occurrence of regretted sexual experiences is important as these may provide insight into prevention of future regretted sexual experiences.

Alcohol Use among College Students

Alcohol use among college students is an ongoing public health issue that warrants concern, with 60% of college students ages 18 to 22 having consumed alcohol in the past month, 39% endorsing at least one heavy episodic drinking event in the past month (i.e., binge drinking episode), and 13.2% using alcohol heavily on a regular basis (Lipari & Jean-Francois,

2016). College students enrolled full-time tend to be more likely to drink alcohol in the past month (59.8%) compared to their same-aged peers who are not enrolled in college full-time (51.5%; Lipari & Jean-Francois, 2013). A reported 1,825 fatalities occur each year from alcohol use on college campus, along with 696,000 physical assaults and 97,000 sexual assaults annually (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson, Zha, & Weitzman, 2009). Oftentimes students arrive to college expecting to consume large amounts of alcohol due to perceived drinking behaviors on university campuses and approval of drinking by their peers (Borsari & Carey, 2001, 2003). This perception of social norms tends to create a culture on university campuses that accepts and even encourages alcohol consumption, with a prominent expected feature of college-life being heavy episodic drinking (Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002).

A variety of consequences, both positive and negative, result from college student use of alcohol. Positive alcohol-related consequences include: feeling relaxed, providing an escape from academic problems, and enhanced social experiences (Park & Grant, 2005). Negative alcohol-related consequences include: missing class, university property damage, getting into trouble with campus or local police, medical treatment for overdose, legal problems, violence, unsafe or risky sex, sexual assault, injury and even death (Park, 2004; Perkins, 2002a; Wechsler et al., 2002; Wechsler, Moeykens, Davenport, Castillo, & Hansen, 1995; White & Hingson, 2013). Obviously, negative problems vary in degree of severity. Research examining the severity of problems experienced by college students has shown that heavy episodic drinking strongly predicts more severe alcohol-related negative consequences (Kahler et al., 2005).

Protective Behavioral Strategies

Protective behavioral strategies (PBS) are behaviors that individuals may engage in while drinking to reduce the likelihood of experiencing alcohol-related negative consequences (Pearson, 2013). Increasing PBS use is a basic harm reduction approach (Marlatt, Baer, & Larimer, 1995) and is a useful component of alcohol prevention and intervention programs (Lewis, Rees, Logan, Kaysen, & Kilmer, 2010; Martens et al., 2005). The most common subtypes of protective behavioral strategies include: (a) Manner of Drinking (MD; e.g., avoiding drinking games); (b) Stopping/Limiting Drinking (SLD; e.g., alternating alcoholic/nonalcoholic drinks); and (c) Serious Harm Reduction (SHR; e.g., using a designated driver; Martens et al., 2005). Students who implement PBS are able to reduce the negative consequences associated with alcohol (Cronce & Larimer, 2011; Lewis et al., 2010; Pearson, 2013; Prince, Carey, & Maisto, 2013; Treloar, Martens, & McCarthy, 2015). Furthermore, research has revealed inverse relationships between the two PBS subtypes, MD and SLD, and alcohol use, with SHR PBS being inversely related to alcohol-related negative consequences (DeMartini et al., 2013; Moorer et al., 2013; Pearson, 2013). This association is likely due to the nature of these factors. MD and SLD PBS specifically ask about strategies to limit the consumption of alcohol, while SHR targets strategies more directly linked to consequences (see examples above). Furthermore, some research has shown that PBS are inversely associated with alcohol use and that it can moderate the relationship between use and consequences (Braitman, Henson, & Carey, 2015; Dvorak, Pearson, Neighbors, & Martens, 2015).

Relationship between Alcohol Use, Regretted Sexual Experiences, and PBS

In a study that looked at the association between use of PBS and alcohol-related negative consequences among sexually active college students, PBS use was related to fewer

sex-related alcohol negative consequences when drinking (i.e., (a) Has drinking ever gotten you into sexual situations which you later regretted, (b) Because you had been drinking, have you ever neglected to use birth control or neglected to protect yourself from sexually transmitted diseases, (c) Because you had been drinking, have you ever had sex when you didn’t really want to, and (d) Because you had been drinking, have you ever had sex with someone you wouldn’t ordinarily have sex with; Lewis et al., 2010). For women, (but not men) this finding was mediated by the number of drinks consumed during sexual behavior (Lewis et al., 2010). A separate study found that increased PBS use was related to lower expectancies of sexual risk and disinhibition, as well as decreased perceptions of sexual-related risks and some alcohol-related sexual behaviors (Logan, Koo, Kilmer, Blayney, & Lewis, 2015).

Limited research has examined how each of the three PBS subtypes differentially relate to specific alcohol-related consequences (Martens, Martin, Littlefield, Murphy, & Cimini, 2011; Pearson, D'Lima, & Kelley, 2013). A retrospective study of women found a significant link between controlled consumption (a combination of the SLD and MD PBS subtypes) and SHR for alcohol-related sexual victimization, but not for alcohol-related risky sexual behavior (Moorer et al., 2013). Little research has examined differential associations between PBS subtype and adverse sex-related outcomes. As noted above, there are important differences between sexual consequences indexing risk (as in the case of these studies) and regretted sexual experiences. Furthermore, no studies have examined differences in PBS subtype and regretted sexual experiences. This is important because it may allow for tailored interventions to reduce the likelihood of experiencing adverse consequences such as regretted sexual experiences. The current study addresses this gap in the literature.

Theoretical Model/Background

Safe drinking behaviors and protective strategies utilized by college students are often conceptualized within a harm reduction framework, see Figure 2 (Cronin, 2009; Marlatt, 1998). Dimeff and colleagues (1999) classify the basic harm reduction approach as the assumption that potentially harmful behaviors and consequences of drinking alcohol are placed on a continuum of severity from most severe to less severe alcohol-related negative consequences. Any steps towards reduced severity of harmful consequences is considered an improvement, with abstinence on the lowest end of the spectrum and injury/death on the highest end (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Larimer et al., 1998). Indeed, most college student drinking interventions focus specifically on reducing, not eliminating, consumption as a mechanism for reducing harms (Dimeff et al., 1999). In order to see reductions in potential harm, college students would ideally be motivated to utilize protective behavioral strategies to reduce the likelihood of alcohol-related negative consequences. The underlying hypotheses in the present study were conceptualized through a harm reduction lens in order to further reduce potential harm resulting from regretted sexual experiences.

Hypotheses

The current study aims to examine three hypotheses –

1. Differences in associations between alcohol use, PBS, and regretted sexual experiences. It is expected, and previous research has shown, that alcohol use will inversely mediate the relationship between MD and SLD PBS and regretted sexual experiences due to the fact that MD and SLD PBS both contain behavioral strategies focused on decreasing the amount of alcohol consumed (e.g., avoiding mixing different types of alcohol and drinking slowly, rather than gulping or chugging). Alternatively,

SHR focuses on strategies aimed at reducing serious harm (e.g., using a designated driver, knowing where your drink has been at all times), and thus should be inversely associated with regretted sexual experiences directly, and is less likely to be indirectly associated with regretted sexual experiences via alcohol consumption.

2. Students with higher SHR PBS are expected to experience fewer regretted sexual experiences via a direct inverse association with regretted sexual experiences and attenuating effects on the association between alcohol use and regretted sexual experiences. Meaning, for example, that students who know where their drink has been at all times are less vulnerable to having their drink be tampered with (e.g., drugged) and in turn will be less vulnerable to a regretted sexual experience, especially one perpetrated by someone else.

3. The moderating effects of all three PBS subtypes on the association between alcohol use and regretted sexual experiences will be examined. Exploratory analyses will examine differences in direct and indirect effects by biological sex.

CHAPTER 2: METHOD

Participants and Procedures

Participants were college students in 2015. As noted below, the data for this analysis (n = 349) are a subset of a larger dataset (N = 532) focused on a Deviance Regulation Theory-based PBS intervention. As PBS use occurs in the context of alcohol use, the analysis was restricted to a sample of college student drinkers who endorsed weekly alcohol use over the past six months (n = 349). Finally, to isolate "regretted sexual experiences" versus "sexual risk," individuals who endorsed engaging in sexual activity without protection against STD and/or pregnancy were removed from the analysis. A total of four individuals endorsed both regretted sexual experiences and unprotected sex, thus, we removed all individuals who endorsed unprotected sex (n = 17) and redid all the analyses just including those who endorsed regretted sexual experiences. The University IRB approved all study procedures prior to recruitment under the study name "Longitudinal Use of Protective Strategies" (protocol number: SM14005). The analyzed data comes from the initial screen, collected prior to intervention initiation. Participants completed an online screen assessing alcohol use and consequences, use of PBS, and demographic information. The screen was available to students registered with the University's online subject pool. Participants were compensated with course credit.

Measures

Alcohol Use

Alcohol consumption was assessed via participant self-report using the Alcohol Use Disorders Identification Test – Consumption Scale (AUDIT-C; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT-C is a 3-item measure assessing alcohol use frequency, intensity, and heavy episodic use. Previous research supports the reliability and validity of the

AUDIT-C as a measure of alcohol consumption among college students (Demartini & Carey, 2012). The AUDIT-C had acceptable internal consistency in the current sample (α = .79).

Regretted Sexual Experiences

Regretted sexual experiences were assessed by a single item from the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006). The item states, "My drinking has gotten me into sexual situations I later regretted," with participants responding yes or no. Participants referenced the past six months in response to this item (Read, Kahler, Strong, & Colder, 2006). Previous research has used this item as an outcome for regretted sexual experiences in college student samples (see Simons, Maisto, & Wray, 2010).

Protective Behavioral Strategies

The Protective Behavioral Strategies Survey (PBSS) (Martens et al., 2005) assessed use of PBS while drinking. Three subtypes of PBS were assessed in the 20-item survey: (a) MD (five items, e.g., "Avoid mixing different types of alcohol"), (b) SLD (seven items, e.g., "Drink water while drinking alcohol"), and (c) SHR (three items, e.g., "Use a designated driver"). Responses ranged from 1 (Never), 2 (Rarely), 3 (Occasionally), 4 (Sometimes), 5 (Usually) and 6 (Always). Reliability and validity of the PBSS among college students has been supported by previous research (Martens et al., 2005; Martens, Pedersen, LaBrie, Ferrier, & Cimini, 2007). Internal consistency was acceptable for all three subscales in the current sample: MD α = .70, SLD α = .82, and SHR α = .87.

Data Preparation and Analysis Overview

The analysis utilized a multigroup (grouped by biological sex) observed variable path model in Mplus 8.11 (Muthén & Muthén, 2017). The WLSMV estimator was utilized, which is

appropriate for categorical outcomes. Missing data (<4% of total data) was replaced using multiple imputation. Conditional effects were examined at high (+1SD) and low (-1SD) levels of moderator variables across biological sex. Indirect effects were tested using bootstrapped bias corrected 95% confidence intervals from 5,000 random draws (MacKinnon, 2008). Standardized coefficients (β) and Odds Ratios (OR) are reported for ease of interpretation.

The following hypotheses (see Figure 3) were tested using a multigroup path analysis. Hypothesis 1 (H1): Stopping/Limiting Drinking and Manner of Drinking will be indirectly associated with regretted sexual experiences via alcohol consumption, with greater PBS use resulting in few regretted sexual experiences. Hypothesis 2 (H2): Serious Harm Reduction, will be directly related to regretted sexual experiences, with greater SHR use resulting in fewer instances of regretted sexual experiences. Hypothesis 3 (H3): All three PBS subtypes will moderate the association between alcohol use and regretted sexual experiences. Exploratory analyses will examine differences in direct and indirect effects by biological sex.

CHAPTER 3: RESULTS

Descriptive and Bivariate Statistics

Descriptive statistics and bivariate correlations are listed in Table 1. Age differed by biological sex in the overall sample (t(347) = -2.25, p = .025, Cohen's d = -0.25) with females being older than men. Men reported higher alcohol consumption rates (M = 5.39, SE = 0.23) than women (M = 3.65, SE = 0.14; t(369) = -6.96, p < .001, Cohen's d = 0.71). Women (18.47%) experienced slightly higher rates of regretted sexual experiences than men (15.20%) in the past six months, but these rates did not differ significantly (χ2(1) = 0.60, p = .440).

Multigroup Path Analysis

A multigroup path model was tested allowing for the examination of indirect effects of PBS subtypes (i.e. MD and SLD) through alcohol use, as well as conditional effects at high and low levels of SHR PBS, across men and women. Regretted sexual experiences in the past six months was specified as a dichotomous outcome variable, with alcohol use as a mediator between MD and SLD PBS subtypes and regretted sexual experiences. A model was initially tested in which all three PBS subtypes acted as moderators on the alcohol use→regretted sexual experiences path (H3) and had direct paths to both alcohol use and regretted sexual experiences. Only SHR PBS significantly moderated the alcohol→regretted sexual experiences association, thus the other interactions were removed from the model. In addition, only SHR PBS had a significant direct effect on regretted sexual experiences (consistent with H2); the direct paths from MD and SLD to regretted sexual experiences were trimmed for model parsimony. All paths were initially constrained to be equal across biological sex. The initial model showed adequate fit to the data, $\chi^2(20) = 26.72$, p = .143, CFI = .99, RMSEA = .04 (90% CI = .00, .08), SRMR = 0.39. Modification indices indicated significant biological sex differences in the

SHR→regretted sexual experiences path and the SHR × alcohol use→regretted sexual experiences path. These paths were freed across biological sex, and the model was re-estimated. Freeing these paths improved model fit (see Figure 4), $\Delta\chi^2(2) = 7.53$, $p = .023$; $\chi^2(18) = 18.80$, $p = .403$, CFI = 1.00, RMSEA = .02 (90% CI = .00, .04), SRMR = 0.39.

There was a direct inverse association between alcohol use and MD, but not SLD PBS. In addition, alcohol use was positively associated with the likelihood of a regretted sexual experience over the past six months. Indirect associations from MD PBS to regretted sexual experiences, via alcohol use, were tested using bias corrected SEs. MD PBS was indirectly associated with a lower likelihood of regretted sexual experiences via alcohol use (IND = -0.14, 95% CI = -0.21, -0.07). There was a direct inverse association between SHR PBS and regretted sexual experiences for women; this association was not significant for men.

Finally, the alcohol use × SHR PBS interaction was examined across biological sex. Among men, SHR PBS did not moderate the association between alcohol use and regretted sexual experiences ($\beta = 0.05$, $p = .776$). Among women, SHR PBS significantly moderated the association between alcohol use and regretted sexual experiences ($\beta = -0.29$, $p = .008$). This relationship was examined at high (+1 SD) and low (-1 SD) levels of SHR PBS (see Figure 5). At low levels of SHR PBS, there was a positive association between alcohol use and regretted sexual experiences ($\beta = 0.50$, OR = 1.27, $p < .001$). This association was diminished and no longer statistically significant at high levels of SHR PBS ($\beta = -0.05$, OR = 0.97, $p = .776$). Additionally, indirect effects from MD PBS to regretted sexual experiences, via alcohol use, were not statistically significant for women at high levels of SHR PBS, as alcohol consumption was no longer associated with regretted sexual experiences (IND = 0.03, 95% CI = -0.18, 0.25).

CHAPTER 4: DISCUSSION

The current study investigated the relationship between different subtypes of PBS, alcohol use, and alcohol-related regretted sexual experiences, as well as biological sex differences in these associations. Results revealed that Manner of Drinking was negatively associated with alcohol use, and alcohol use was positively associated with regretted sex. Furthermore, there was a direct, negative relationship between SHR PBS and regretted sex for women, but no direct relationship for men. Lastly, although SHR PBS was not associated with alcohol use directly, the interaction between these two variables was significantly associated with regretted sex, and this interaction varied by biological sex.

The present findings are partially consistent with previous research which has found that MD PBS and SLD PBS are inversely related to alcohol use, while SHR PBS is inversely related to alcohol consequences (DeMartini et al., 2013; Moorer et al., 2013; Pearson, 2013). Also consistent with past research (Lewis et al., 2010), alcohol use was positively linked to regretted sexual experiences, regardless of biological sex. Importantly, overall model fit improved after freeing two paths across biological sex, indicating some relationships between PBS, alcohol use, and regretted sexual experiences vary across biological sex.

The relationship between alcohol use and regretted sexual experiences was moderated by SHR PBS for women, but not men. This association was potentiated for women who reported using less SHR strategies. Among women who reported using more SHR strategies, the relationship between alcohol use and regretted sexual experiences was diminished and nonsignificant. Thus, there is a connection between SHR PBS and regretted sexual experiences, which may be broadly protective for women, but not men. Given biological sex differences in

how sex is considered and viewed, it is possible there are important sex differences in factors that predict regrets of omission and commission as well. Among men, the results could reflect the theory that men are more likely to regret inaction (regrets of omission), which may not have been reported in response to the item used in this study to measure sexual regret ("My drinking has gotten me into sexual situations I later regretted"). This question does not encompass regrets of omission as these regrets assume individuals did not find themselves acting in a sexual situation. A more comprehensive measure that gets at both omission and commissions would be ideal and critical for future research. Future research should seek to tease apart the reasons (i.e., omission or commission) participants endorse a positive response to this question.

Of particular interest is the magnitude of effect of SHR PBS for women. First, despite the interaction with alcohol use, SHR PBS had a direct, robust, negative association with regretted sexual experiences for women. Thus, women who implement more SHR PBS concurrently experience less regretted sexual experiences. This was not true for men, who had virtually no direct relationship between SHR and regretted sexual experiences. In addition, among women, it was found that SHR effectively eliminated the positive robust association between alcohol consumption and regretted sexual experiences. This too was not observed for men which could, again, be due to the difference in type of regret experienced by men and women. For women, there is the possibility that there may be a latent, hidden feature leading to safer drinking which future research should investigate. These findings may have important clinical implications, as it appears that increasing use of SHR PBS among women may reduce the role of alcohol use, which is the main risk factor in this analysis.

Given these results, future research should evaluate the utility of PBS as an intervention for both alcohol use and regretted sexual experiences. Because PBS is a behavioral construct, it

has been found to be a malleable intervention target (Pearson, 2013). Indeed, previous PBS-based interventions have been effective in reducing alcohol use and related consequences (Dvorak, Kramer, Stevenson, Sargent, & Kilwein, 2017; Dvorak et al., in press; Lewis et al., 2010; Martens et al., 2005). However, there are currently no PBS interventions directly focused on regretted sexual experiences.

Limitations

The present study is not without its limitations. The sample was primarily Caucasian, thus generalizing across other racial/ethnic groups should be done with caution. Additionally, the study was cross-sectional, precluding any conclusions regarding causality. Not enough data was available to be able to differentiate regretted sexual experiences from sexual assault. And finally, the measurement of regretted sexual experiences was a single item from the YAACQ. However, previous research has noted adequate measurement of a construct with a single-item question, if said construct is sufficiently narrow and well-defined (Sackett & Larson, 1990; Wilson & Scarpa, 2012). Unfortunately, it is unlikely that the single-item used in this case is narrow and well-defined. Nonetheless, it poses a starting point for analyzing regretted sexual experiences. Given group differences in men and women surrounding regrets of omission and commission, future research should aim to measure a broader construct of regretted sexual experiences.

Conclusion

Findings from this study support the influence of PBS on instances of regretted sexual experiences as a result of alcohol use in college students. The current study supports previous findings that MD strategies have a negative relationship with alcohol use (and, indirectly, alcohol-related consequences), and that SHR strategies are directly inversely related to alcohol-

related consequences (such as regretted sexual experiences). In addition, for women, the robust relationship between alcohol use and regretted sexual experiences was attenuated in those reporting high use of SHR, but not for men. These results suggest that SHR strategies may be especially protective against regretted sexual experiences for women. Though the current study presents promising findings, further research and more inclusive measurements are needed in order to better understand the multitude of factors that contribute to regretted sexual experiences and its psychological aftermath.

Table 1: Descriptive Statistics

Variables	1	2	3	4	5	6	7
1. Age	----						
2. Gender	.12*	----					
3. AUDIT-C Score	.03	.34*	----				
4. SLD PBS	-.03	-.10	-.23*	----			
5. MD PBS	.03	-.16*	-.47*	.47*	----		
6. SHR PBS	-.04	-.34*	-.26*	.43*	.47*	----	
7. Regretted Sex	-.11*	-.04	.23*	-.04	-.09	-.07	----
Mean	19.35	0.36	4.28	2.80	2.98	4.31	0.17
SD	1.78	0.48	2.46	0.86	0.82	0.77	0.38
Skew	2.63	0.58	0.47	0.20	0.18	-1.78	1.73
Range: Lower Limit	18	0	1	1	1	1	0
Range: Upper Limit	32	1	11	5	5	5	1

Note. AUDIT-C = Alcohol Use Disorders Identification Test – Consumption Scale; SLD = stopping/limiting drinking; PBS = protective behavioral strategy; MD = manner of drinking; SHR = serious harm reduction; SD = standard deviation.

$^{*}p < .05$.

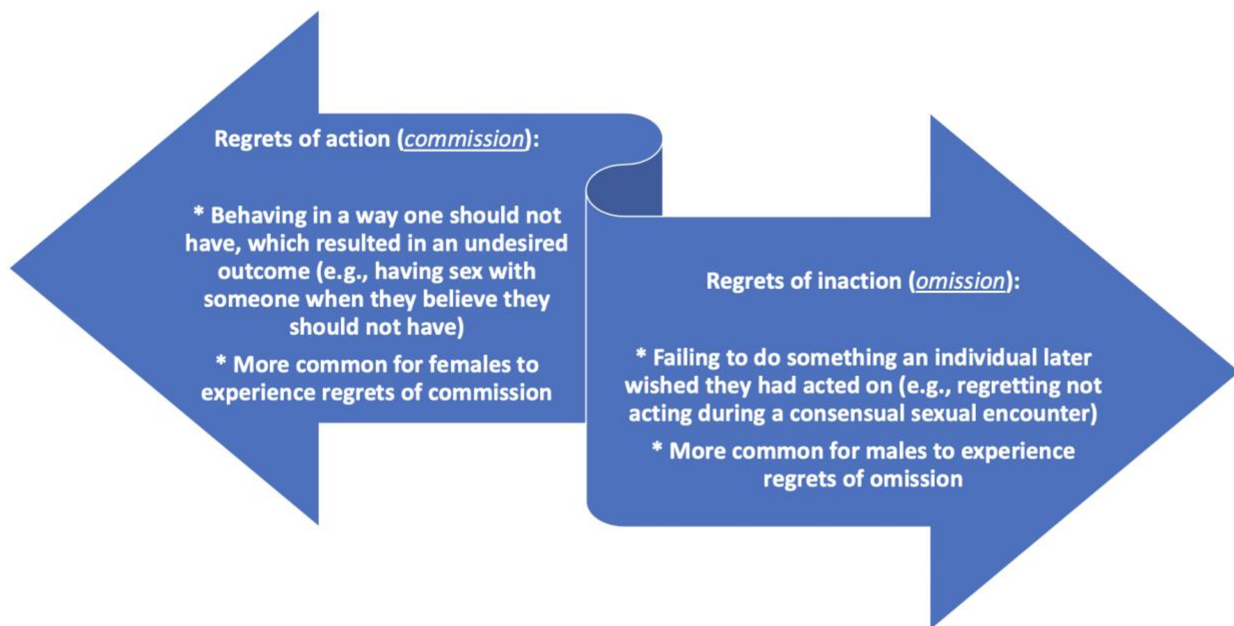

Figure 1: Regretted Sexual Experiences

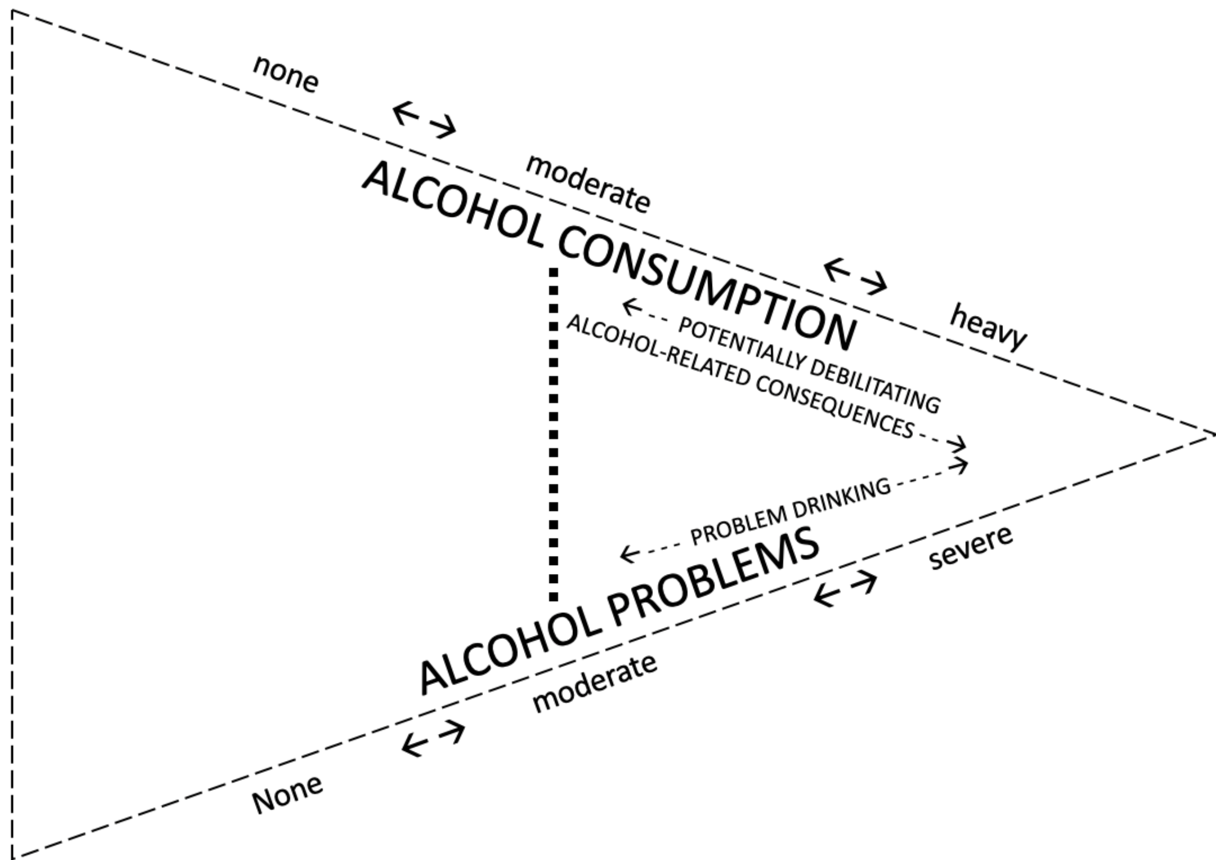

Figure 2: Theoretical harm reduction framework

Note. Adapted from *Marlatt, G. A. (1998). Harm reduction: Pragmatic strategies for managing high-risk behaviors. New York, NY, USA: Guilford Press*

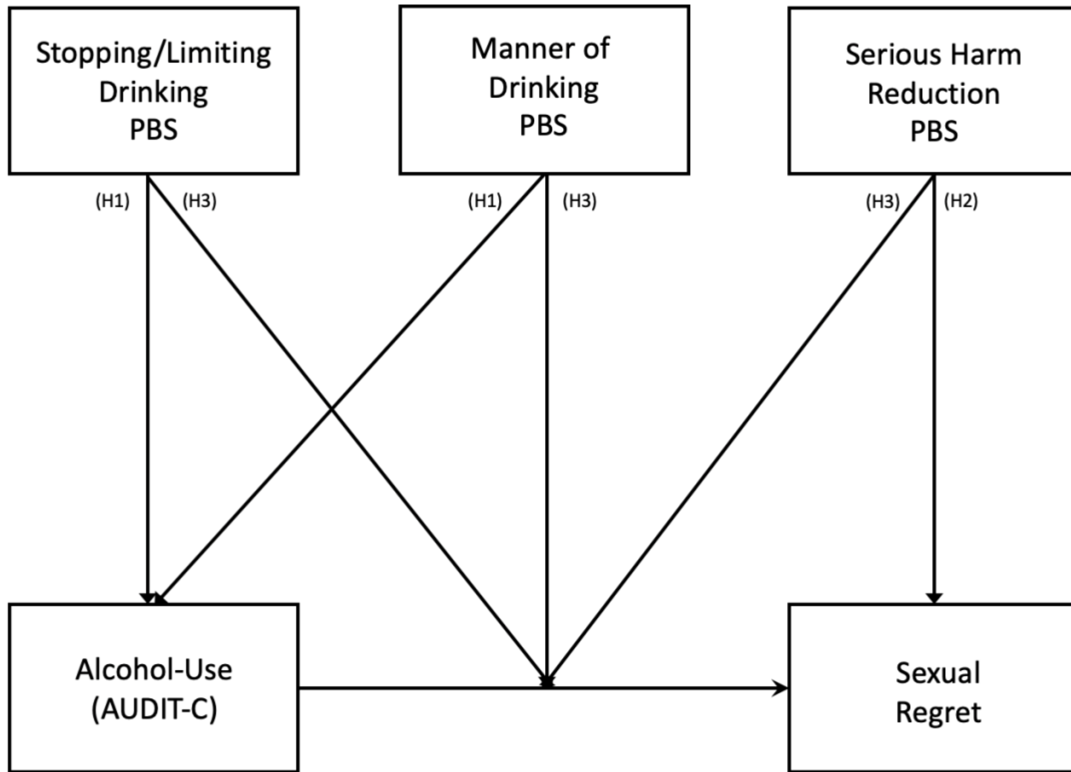

Figure 3: Multigroup path analysis of regretted sexual experiences

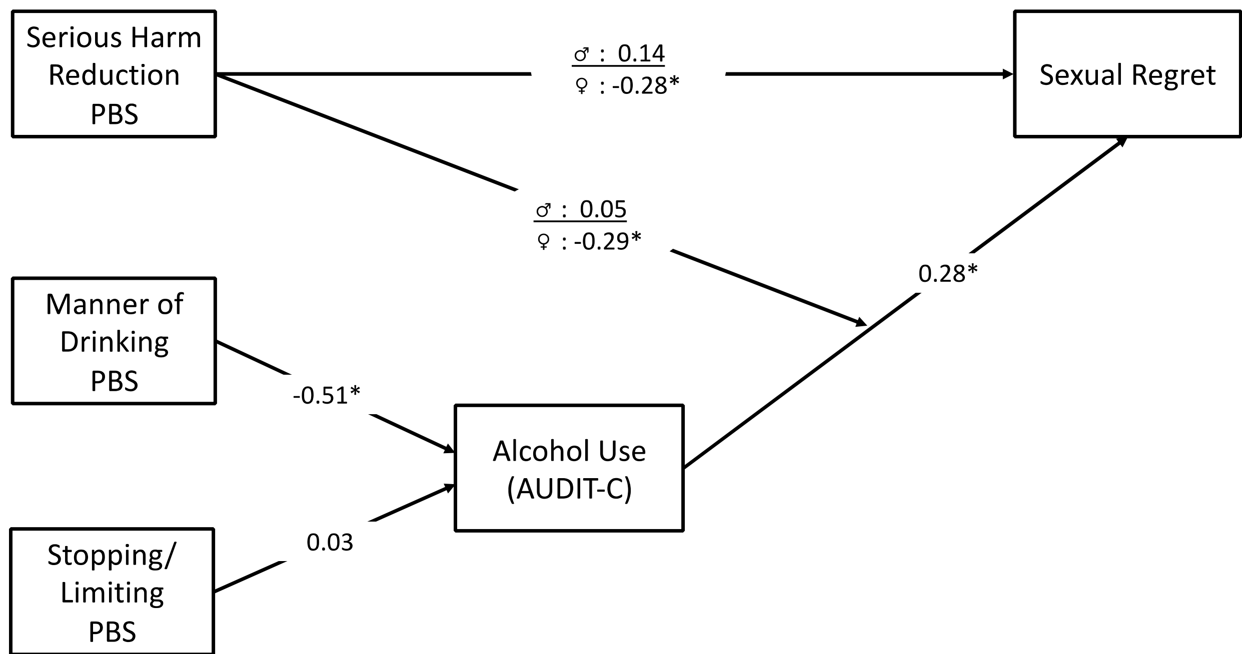

Figure 4: Multigroup path analysis of regretted sexual experiences

Note. All paths listed above are standardized for ease of interpretation. Men are listed above, and women below, the vinculum where paths differ by biological sex.

*$p \leq .008$

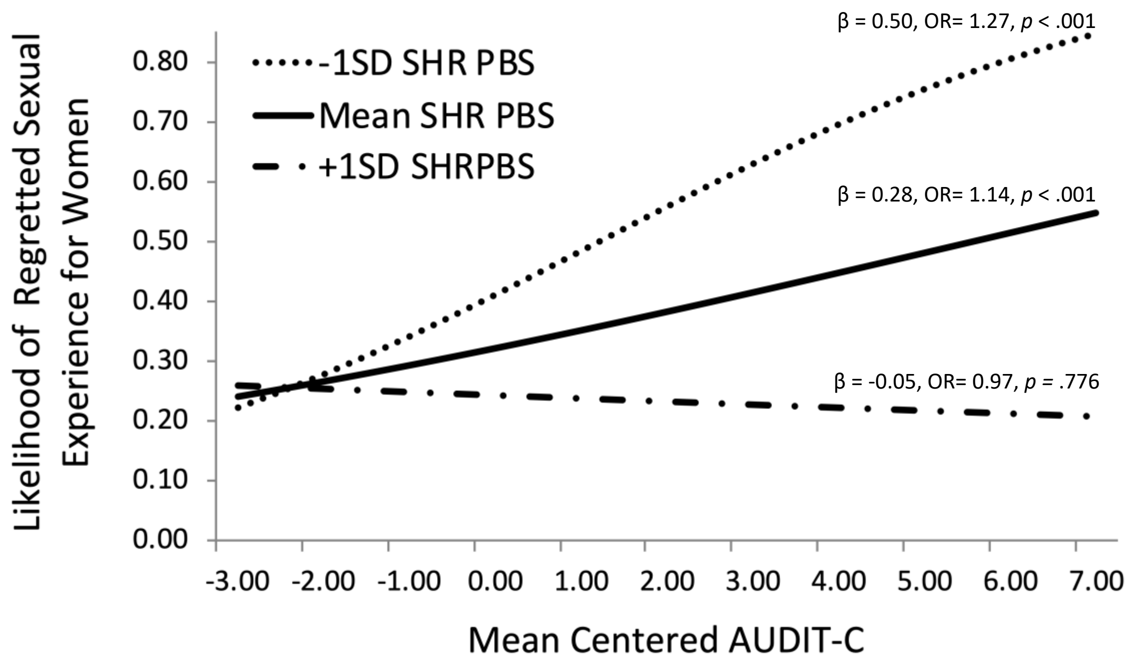

Figure 5: Association between alcohol use and regretted sexual experiences at high (+1 SD) and low (-1 SD) levels of Serious Harm Reduction Protective Behavioral Strategy use among women

Note. Beta Coefficient is standardized. OR = Odds Ratio.

APPENDIX A: MEASURES

1. Alcohol Use Disorder Identification Test (AUDIT)
2. Young Adult Alcohol Consequences Questionnaire (YAACQ)
3. Protective Behavioral Strategies Scale–20 (PBSS-20)

1. Alcohol Use Disorder Identification Test (AUDIT)

How often do you have a drink containing alcohol?

- *Never*
- *Monthly or less*
- *2 to 4 times a month*
  2 to 3 times a week
- *4 or more times a week*

How many drinks containing alcohol do you have on a typical day when you are drinking?

- *1 or 2*
- *3 or 4*
- *5 or 6*
- *7, 8, or 9*
- *10 or more*

How often do you have six or more drinks on one occasion?

- *Never*
- *Less than monthly oMonthly*
- *Weekly*
- *Daily or almost daily*

How often during the last year have you found that you were not able to stop drinking once you had started?

- *Never*
- *Less than monthly oMonthly*
- *Weekly*
- *Daily or almost daily*

How often during the last year have you failed to do what was normally expected from you because of drinking?

- *Never*
- *Less than monthly oMonthly*
- *Weekly*
- *Daily or almost daily*

How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

- *Never*
- *Less than monthly oMonthly*
- *Weekly*
- *Daily or almost daily*

How often during the last year have you had a feeling of guilt or remorse after drinking?

- *Never*
- *Less than monthly oMonthly*

- *Weekly*
- *Daily or almost daily*

How often during the last year have you been unable to remember what happened the night before because you had been drinking?

- *Never*
- *Less than monthly*
- *Monthly*
- *Weekly*
- *Daily or almost daily*

Have you or someone else been injured as a result of your drinking?

- *No*
- *Yes, but not in the last year*
- *Yes, in the last year*

Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?

- *No*
- *Yes, but not in the last year*
- *Yes, in the last year*

2. Young Adult Alcohol Consequences Questionnaire (YAACQ)

Below is a list of things that sometimes happen to people either during, or after they have been drinking alcohol. Next to each item below, please select No or Yes to indicate that has happened to you IN THE PAST 3 Months.

While drinking, I have said or done embarrassing things.

The quality of my work or schoolwork has suffered because of my drinking.

I have felt badly about myself because of my drinking.

I have driven a car when I knew I had too much to drink to drive safely.

I have had a hangover (headache, sick stomach) the morning after I had been drinking.

I have passed out from drinking.

I have taken foolish risks when I have been drinking.

I have felt very sick to my stomach or thrown up after drinking.

I have gotten into trouble at work or school because of drinking.

I often drank more than I originally had planned.

My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.

I have been unhappy because of my drinking.

I have gotten into physical fights because of drinking.

I have spent too much time drinking.

I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.

I have felt like I needed a drink after breakfast.

I have become very rude, obnoxious or insulting after drinking.

I have felt guilty about my drinking.

I have damaged property, or done something disruptive such as setting off a false fire alarm, or other things like that after I had been drinking.

Because of my drinking, I have not eaten properly.

I have been less physically active because of drinking.

I have had "the shakes" after stopping (eg., hands shake so that coffee cup rattles in the saucer or have trouble lighting a cigarette).

My boyfriend/girlfriend/spouse/parents have complained to me about my drinking.

I have woken up in an unexpected place after heavy drinking.

I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.

As a result of drinking, I neglected to protect myself or my partner from a sexually transmitted disease (STD) or an unwanted pregnancy.

I have neglected my obligations to family, work, or school because of drinking.

I often have ended up drinking on nights when I had planned not to drink.

When drinking, I have done impulsive things that I regretted later.

I have often found it difficult to limit how much I drink.

My drinking has gotten me into sexual situations I later regretted.

I've not been able to remember large stretches of time after drinking heavily.

While drinking, I have said harsh or cruel things to someone.

Because of my drinking I have not slept properly.

My physical appearance has been harmed by my drinking.

I have said things while drinking that I later regretted.

I have awakened the day after drinking and found that I could not remember a part of the evening before.

I have been overweight because of drinking.

I haven't been as sharp mentally because of drinking.

I have received a lower grade on an exam or paper than I ordinarily could have because of my drinking.

I have tried to quit drinking because I thought I was drinking too much.

I have felt anxious, agitated, or restless after stopping or cutting down on drinking.

I have not had as much time to pursue activities or recreation because of drinking.

I have injured someone else while drinking or intoxicated.

I often have thought about needing to cut down or stop drinking.

I have had less energy or felt tired because of my drinking.

I have had a blackout after drinking heavily (i.e., could not remember hours at a time).

Drinking has made me feel depressed or sad.

3. Protective Behavioral Strategies Scale–20 (PBSS-20)

Please indicate the degree to which you engage in the following behaviors when using alcohol or "partying"

Response items include 0=Never, 1=Rarely, 2=Occasionally, 3=Sometimes, 4=Usually and 5=Always

1. Use a designated driver
2. Determine not to exceed a set number of drinks
3. Alternate alcoholic and nonalcoholic drinks
4. Have a friend let you know when you've had enough to drink
5. Avoid drinking games
6. Leave the bar/party at a predetermined time
7. Make sure that you go home with a friend
8. Know where your drink has been at all times
9. Stop drinking at a predetermined time
10. Drink water while drinking alcohol
11. Put extra ice in your drink
12. Avoid mixing different types of alcohol
13. Drink slowly, rather than gulp or chug
14. Avoid trying to keep up or out-drink others
15. Refuse to ride in a car with someone who has been drinking
16. Only go out with people you know and trust
17. Avoid combining alcohol with marijuana
18. Avoid "pre-gaming" (i.e., drinking before going out)
19. Make sure you drink with people who can take care of you if you drink too much
20. Eat before or during drinking

APPENDIX B: APPROVAL OF HUMAN SUBJECTS

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Robert Dvorak:**

Date: **December 13, 2018**

Dear Researcher:

On 12/13/2018 the IRB approved the following human participant research until 12/12/2019 inclusive:

Type of Review:	UCF Initial Review Submission Form Expedited Review Category #7; This approval includes a Waiver of Written Documentation of Consent
Project Title:	College Students Use of Protective Behavioral Strategies
Investigator:	Robert Dvorak
IRB Number:	SBE-18-14270
Funding Agency:	
Grant Title:	
Research ID:	N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 12/12/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

Page 1 of 2

Signature applied by Renea C Carver on 12/13/2018 02:18:01 PM EST

Designated Reviewer

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