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**PSYCHOLOGICAL FACTORS ASSOCIATED WITH RISKY DRINKING IN
LATER LIFE**

A Dissertation in
Biobehavioral Health

by
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ABSTRACT

Studies indicate older adults are particularly at risk for negative effects of risky drinking: Risky drinking may cause more physical and mental health problems for older adults than younger. For example, age-related decreased functioning of the kidneys and liver may be compounded by alcohol use; and risky drinking in older adults is linked to very high rates of major depression in the prior year. Although theory-based psychological factors such as increased perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope motives are associated with risky drinking in younger populations, there is a dearth of literature examining the relationships between those psychological factors and risky drinking behaviors in older adults. This dissertation examined the associations between perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives, and risky alcohol use [i.e., heavy drinking (HD) and heavy episodic drinking (HED)] in a sample of older males and females. *Aim 1* focused on the associations between psychological constructs and risky drinking behaviors. *Aim 2* examined whether there are sex differences in the relationships between psychological constructs and risky drinking behaviors. A sample of 97 adults aged 65 and older (27 males, 70 females) completed a series of surveys on perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives, and risky drinking behavior. Hypotheses for both aims were tested using path analysis, with the latter aim using multiple group analyses. Aim 1 analyses revealed partially support for all of the hypotheses. Only feeling like difficulties were piling up so high they could not be overcome emerged as being positively associated with risky drinking (i.e., HED). For positive alcohol outcome expectancies, feeling more energetic and enjoying the buzz when drinking were positively associated with HD and HED, respectively. Of the IDNs reference groups, only the

friends group was positively associated with HD and HED. Regarding drinking to cope motives, drinking because it helps when feeling depressed or nervous was the only motive positively with risky drinking (i.e., HED). The hypotheses for injunctive drinking norms were not supported. Lastly, analyses for Aim 2 also revealed partial support for the positive alcohol outcome expectancy hypothesis. There were significant sex differences only in the positive association between enjoying the buzz while drinking and HED, with the association being stronger in males than females. Future work should examine possible mediators of the relationships between perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives, and risky drinking behavior. Also, examine how specific facets of stress and stressors (e.g., chronicity and controllability) affect daily drinking behavior.

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CHAPTER 1: INTRODUCTION

Excessive drinking¹ can exacerbate current health conditions and increase morbidity, particularly in older adults² (Blow & Barry, 2012; Rendell, 2004). Alcohol abuse causes more physical and mental health problems in older adults than younger (e.g., decreased functioning of the kidneys and liver due to aging compounded by alcohol use; Hunter & Gillen, 2006; St. John, Snow, & Tyas, 2010). Additionally, older adults tend to take multiple over-the-counter and prescription medications to manage their diagnosed or undiagnosed health conditions; the medications may interact adversely with alcohol (Hunter & Gillen, 2006). The reasons for excessive drinking in older adults is not well-established, although heightened stress and other psychological factors associated with drinking in younger adults may play roles in older adults as well.

Despite established sex differences in alcohol consumption, such that males are more likely to drink and be heavier drinkers than females, there is little research examining how drinking and stress may differ in older adults nor whether they differ by sex (Kuhn, 2011; Lemke et al., 2008; St. John, Montgomery, & Tyas, 2009). Coping may be important in the alcohol-stress relationship. For example, males are more likely to develop alcohol use disorders and to drink to escape, to cope with distress, and to relieve depression, which consequently, increases alcohol-related problems; and females are less likely to use alcohol to cope due to being less likely to expect drinking to have positive outcomes (Nolen-Hoeksema & Hilt, 2006). Males may also be more susceptible to alcohol dependence due to heavier alcohol use and/or increased stress

¹ Cutoffs determining risky alcohol use in older adults vary between studies. While some use the National Institute of Alcohol Abuse and Alcoholism's (NIAAA) guidelines, others use the NIAAA's older adult specific guidelines or the American Geriatrics Society recommendations.

²The age in which adults are considered 'older' varies from study to study. Studies on alcohol use in older adults typically define this population as being 50 and older, 55 and older, 60 and older, or 65 and older.

reactivity (they have a more pronounced physiological response to stress compared to females; Kirschbaum, Wüst, & Hellhammer, 1992; Sacco, Bucholz, & Harrington, 2014; Walter et al., 2003).

Drinking behavior is associated with alcohol outcome expectancies and drinking norms in young adults. Studies have reported that higher beliefs in positive alcohol outcome expectancies, or beliefs about the effects of drinking alcohol will be positive, are correlated with heavier and more frequent drinking (Carrigan et al., 2009). However, there are age differences in whether positive or negative outcome expectancies are related to rates of drinking (Leigh & Stacy, 2004; Nicolai, Moshagen, & Demmel, 2012). Negative outcome expectancies have been found to be associated with quantity and frequency of drinking more strongly than positive expectancies in older adults. Finally, higher perceptions of approval of drinking behaviors by normative individual or groups (e.g., close friends; known as injunctive drinking norms) are associated with more risky drinking (Moos et al., 2010; Wild, 2002). Taken together, these psychological factors have been found to be associated with drinking behavior in adults, with studies focusing primarily on younger populations.

The overarching goal of the present study was to examine whether four theory-based psychological factors (i.e., perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope motives) are related to risky drinking³ in older adults⁴, as they are in young adults. The current study also examined whether there were differences in these relationships between older males and females. This work may be used to enhance

³ The current study defined risky drinking behaviors as ‘heavy drinking’ which was operationalized drinking more than three drinks a day or 7 drinks per week and ‘heavy episodic drinking’ was operationalized as consuming 4 or more drinks if female, or 5 or more drinks if male.

⁴ The current study defines older adults as those aged 65 and older.

intervention strategies targeted to older populations to prevent risky alcohol use through modification of psychological correlates of maladaptive health behaviors.

The next four chapters include a literature review in Chapter 2 to examine the current state of knowledge on the drinking in older adult populations and factors associated with risky drinking. Chapter 3 presents the methods and procedures used to address the aims of the study. Chapter 4 presents the findings for the study aims as well as the exploratory analyses. Lastly, Chapter 5 discusses the findings, implications for the findings, study limitations, and future directions for this research area.

CHAPTER 2: LITERATURE REVIEW

The following literature review is comprised of three parts in which I examine research on drinking behavior and associated psychological factors in adults in general, as well as by sex, that inform the current study. First, I provide statistics on the prevalence of alcohol use and discuss its consequences in later life. Second, I review literature on the link between psychological factors and risky alcohol use in older adults, in general as well as by sex. Given the dearth of literature in some areas in this population, I also review research on younger adults that may translate to older adults. Finally, I conclude Chapter 2 with a description of the theoretical frameworks that underlie the current study.

Alcohol Use in Older Adults

Statistics. In 2030, the United States population of adults aged 65 and older is expected to be almost double that of 2008, then accounting for nearly one in five (19.3%) of the U.S. population (Barry & Blow, 2016). The so-called “silver tsunami,” or the increase in the aging population, will substantially affect many segments of society including the health care system. Although heavier drinking is found in fewer older than younger adults, alcohol is the most commonly abused substance in adults 50 and older (Bogunovic, 2012). In fact, as the Baby Boom cohort (individuals born in the US between the years 1946 and 1964) moves into later life, they are likely to consume more alcohol than previous generations of older adults (Barry & Blow, 2016).

Sex differences in alcohol use and risky drinking found in younger adults continue have been found to persist into later life. Kirchner and colleagues (2007) examined alcohol consumption patterns and the characteristics associated with at-risk drinking in a sample of older primary care patients from 6 outpatient VA medical centers; 3 community health centers; and 2

hospital based networks in the US aged 65 to 103 years. The authors found that males were more likely (33%) to drink alcohol at all than females (17%). Furthermore, older males were eight times more likely to binge drink, or engage in heavy episodic drinking, than older females. Merrick and colleagues (2008) investigated the prevalence of risky drinking patterns and its association with sociodemographic and health characteristics in a sample of community-dwelling Medicare beneficiaries aged 65 and older. Females were less likely to be risky drinkers (i.e., monthly use exceeding 30 drinks per typical month and heavy episodic drinking of four or more drinks in any single day during a typical month in the previous year) than males (Merrick et al., 2008). Blazer and Wu (2009) sought to estimate the prevalence, distribution, and correlates for risky alcohol use in adults aged 50 years and older. Approximately 14% of males and 3% of females report engaging in heavy episodic drinking, defined as five or more drinks on one occasion, on at least one day in the past month (Blazer & Wu, 2009).

Alcohol problems in this population are often not only unrecognized but usually undertreated despite the increasing at-risk use and abuse of alcohol (Barry & Blow, 2016). In fact, there continues to be a scarcity of medical professionals who specialize in working with older adults (e.g., geriatric psychiatry) that would allow for prevention and intervention of the consequences associated with alcohol abuse and dependence.

Consequences. A large body of literature has found that alcohol use is associated with incidence of injury, fatalities, and cognitive impairment. Sorock, Chen, Gonzalgo, and Baker (2006) examined the relationship between drinking history and causes of fatalities from motor vehicle crashes, falls, and suicides in a sample of adults aged 55 and older. The authors found that having 12 or more drinks a year was associated with a 50-70% increase in risk of motor vehicle crashes, suicides, and falls. Consuming 12 or more drinks a year was found to increase

odds of dying from suicide by 60%, with females having a higher risk than males when compared to those who drank less than 12 drinks a year (ORs = 2.5 and 1.3, respectively; Sorock, Chen, Gonzalgo, & Baker, 2006). However, males who engaged in moderate to heavy drinking were more likely to die from falls than their female counterparts.

More rapid cognitive decline also has been found in older adults who engaged in low-to-moderate drinking, as well as increased risk of Alzheimer's disease (Kim et al., 2012).

Additionally, a high incidence of comorbid excessive alcohol intake and dementia, as well as increased risk of dementia and severe cognitive impairment, have been found in adults aged 65 and older (Ferreira & Weems, 2008; Lee et al., 2010; Oscar-Berman & Marinković, 2007).

Taken together, more alcohol use can result in adverse consequences in older adults. Engaging in risky drinking also can result in drinking-related consequences. Choi, DiNitto, and Marti (2016) examined risk factors for older adults' driving under the influence (DUI) alcohol and/or drugs in a sample of adults aged 50 and older. Greater numbers of days of drinking over the past 12 months were associated with increased odds of reporting a DUI in the past year. Compared to those who reported consuming alcohol less than 50 days in the past year, those who reported consuming alcohol 300 or more days had nearly fivefold greater odds of reporting a DUI (Choi et al., 2016). Males, in particular, were more likely to report a DUI in the past year. Collectively, evidence suggests risky alcohol use in older adults, while less than younger adult, is an increasing problem and the alcohol-related consequences for this population are of considerable.

Psychological Factors Related to Alcohol Use & Risky Drinking

Research has demonstrated that psychological factors such as perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope motives are related to risky drinking in younger adults. However, little research exists on if or how those

factors are associated with risky alcohol use in older adults. What is known about each of these factors in younger adults, older adults, and differences by sex are presented in turn below.

Perceived stress. An association between stress and alcohol consumption has been found for different stressors. Keyes, Hatzenbuehler, and Hasin (2012) reviewed epidemiologic studies on the relationship between stressors and alcohol consumption and alcohol use disorders. The authors found that alcohol consumption increased following fateful/catastrophic events, such as natural or man-made disasters. Following the attacks on the World Trade Center, for example, alcohol consumption increased in residents of the tri-state area of Connecticut, New York, and New Jersey and survivors of the attack on the Pentagon, and persisted up to two years post-disaster (Keyes et al., 2012).

Keyes and colleagues (2012) also found that most forms of childhood maltreatment (e.g., exposures to sexual, emotional and physical abuse, emotional or physical neglect during the first 18 years of life) were associated with increased alcohol use as an adult. However, these findings may be confounded with family history of alcohol abuse because child maltreatment is more likely to occur in children of alcoholics (Keyes et al., 2012). Regarding interpersonal, occupational, financial, and legal stressful life events, the authors found that studies in small to medium adult community samples report a positive relationship between counts of perceived stressful life events and alcohol consumption. As discussed below, research has demonstrated that there are possible tension-reducing effects of alcohol use.

For example, from a physiological perspective, alcohol consumption can be both a reward and a stressor. Acute doses of alcohol simultaneously increase brain concentrations of dopamine, and other reinforcing neurotransmitters, as well as levels of corticotropin-releasing hormone (CRH), blood levels of adrenocorticotrophic hormone (ACTH) and cortisol (major

players in the HPA axis response; Anthenelli, 2012; Stephens & Wand, 2012). Alcohol's rewarding properties may mask or counterbalance its stress-provoking effects. Alcohol also effects the release of cortisol in the periphery triggering further rewarding properties in the brain. Chronic alcohol consumption can lead to lower dopamine levels that may motivate the consumer to seek alcohol in order to restore the normal levels of dopamine (Stephens & Wand, 2012).

Sex differences in the role of perceived stress on risky drinking. When stressed, males tend to have more greatly increased physiological stress reactivity than females. Males release more ACTH than females, which releases glucocorticoids (e.g., cortisol); males, also, have more free cortisol as well as increased testosterone (Kudielka & Kirschbaum, 2005; Taylor et al., 2000). It seems possible that the reinforcing effects of ACTH and cortisol in addition to alcohol's effect on release of greater amounts of reinforcing neurotransmitters (e.g., dopamine) in males may result in heavier drinking as compared to females.

Studies have found that more negative life events are related to increased alcohol consumption with the magnitude of these effects being more prominent for males than for females (Cooper et al., 1992; Dawson, Grant, & Ruan, 2005). In a community sample of 831 US adults aged 62 to 74 years, who had had some outpatient health care within the prior 3 years and were comparable to similar-aged community samples with regard to prevalence of chronic illness and hospitalization, Lemke and colleagues (2008) found that males had greater drinking reactivity in response to more stressors than females. In particular, family/interpersonal problems, financial/legal problems, health problems, death of someone close, and general emotional distress resulted in more reactivity in males (Lemke et al., 2008). Thus, alcohol may be more reinforcing in males due to increased physiological and behavioral reactivity to stress.

Positive alcohol outcome expectancies. Alcohol outcome expectancies has been defined as the beliefs about the effects of drinking alcohol (Sher et al., 1996). Positive alcohol expectancies are expectations that positive outcomes will result from drinking alcohol (e.g., feeling more relaxed) while negative alcohol expectancies are expectations that negative outcomes will result from drinking (e.g., impairment). Studies have found that alcohol outcome expectancies, specifically higher positive outcome expectancies, are associated with elevated alcohol consumption and risky drinking (Armeli et al., 2000; Leigh & Stacy, 1993). This relationship may vary with age. Nicolai, Moshagen, and Demmel (2012) investigated the association between alcohol outcome expectancies and alcohol use in a national probability sample of community-dwelling adults in Germany adults aged 18 to 59 years old using data from the Epidemiological Survey of Substance Abuse. The authors found that, overall, alcohol outcome expectancies were less endorsed with older age. Higher expectancies about negative outcomes from drinking were also found to be more strongly related to quantity and frequency of drinking than positive expectancies in older than younger age groups. Specifically, negative alcohol outcome expectancies related to impairment were negatively associated with quantity and frequency of drinking among respondents older than 23 years of age (Nicolai et al., 2012).

Pabst, Baumeister, and Kraus (2010) found that age seemed to modify positive alcohol outcome expectancies' relationship with alcohol consumption. Respondents under the age of 30 drank more heavily and more frequently when they expected more social assertiveness as a positive outcome of alcohol use; however, increased social assertiveness was related to less frequent drinking for those 30 years of age and older (Pabst et al., 2010). In addition, younger respondents who endorsed higher expectations of sexual enhancement drank more heavily and

more frequently than respondents ages 30 years and older who had the same expectancy level (Pabst et al., 2010).

Pabst and colleagues (2014) found similar results in a population-based sample of 6,823 adults aged 18 to 64 years from the 2009 German Epidemiological Survey of Substance Abuse. Respondents aged 18 to 24 drank more heavily and engaged in more frequent heavy episodic drinking when they expected an increase in their social assertiveness as an outcome of alcohol use. The authors also found that, in those aged 25 to 44 years old, as well as in adults aged 45 and above, tension reduction was positively associated with average alcohol intake (Pabst et al., 2014).

Sex differences in the role of positive alcohol outcome expectancies. Studies that have reported sex differences in the role of positive alcohol outcome expectancies have focused on specific samples of individuals, specifically, adolescents, college students, alcohol dependent individuals, and/or those living with a psychiatric disorder. Armeli and colleagues (2000) found that, in a US sample of community-dwelling adults aged 25 to 50 years old, males who endorsed positive alcohol outcome expectancies drank more on high stress days than females. Similarly, in a national probability sample of community-dwelling adults in Germany adults aged 18 to 59 years old using data from the Epidemiological Survey of Substance Abuse, males reported overall stronger expectancies than females (Nicolai, Moshagen, & Demmel, 2012). The authors found that these effects of sex seemed to diminish with increasing age. Despite these findings, there is a dearth of literature examining the role of alcohol outcome expectancies, both positive and negative, on drinking behavior in an older adult sample (i.e., adults aged 65 years and older). The proposed study will add to the literature by examining the relationship between positive alcohol expectancies and drinking behavior specifically in a sample of late-life adults.

Injunctive drinking norms. Injunctive drinking norms are how an individual perceives others' approval of drinking behaviors. A review of the literature found over 300 articles addressing the role of injunctive norms specific to drinking focusing on college populations. Overall, it has been found that higher injunctive drinking norms are associated with engagement in more risky drinking (Moos et al., 2010; Wild, 2002). Wild (2002) examined the relationships between personal drinking and perceived social norms for alcohol use in a representative sample of Ontario residents ($N = 937$) aged 18 to 88 years old, and found that individuals who were frequent heavy drinkers had more biased norm perceptions. That is, they were more likely to believe that their drinking behavior was common among friends, coworkers, and the general public. Additionally, they tended not to hold private reservations about the alcohol use of their friends, coworkers, or the general public (Wild, 2002). Moos and colleagues (2010) found, in a sample of 719 US community-residing adults aged 55 to 85 that were comparable to similarly aged community samples with regard to prevalence of chronic illness and hospitalization, that one of the most consistent predictors of heavy drinking and drinking problems was social network members' approval of drinking.

Sex differences in the role of injunctive drinking norms on risky drinking. Borsari and Carey (2003) completed a meta-analysis of 23 studies evaluating the influence of norm type (descriptive or injunctive), sex, reference group, question specificity, and campus size on self-other discrepancies (i.e., the perceived discrepancy between personal behaviors and attitudes and those of others). The authors found greater self-other discrepancies for injunctive drinking norms. They found that females tended to have greater self-other discrepancies for descriptive and injunctive drinking norms as compared to males; thus, females perceived that others engaged in more drinking than they did and approved of drinking more than they do (Borsari & Carey,

2003). A later study focusing on older adults by Moos and colleagues (2010) found similar results. Using longitudinal data of 719 US community-residing adults aged 55 to 85, who were comparable to similarly aged community samples with regard to prevalence of chronic illness and hospitalization, followed over 20 years, males were found to respond more strongly to friends' approval of drinking than females, resulting in increased excessive alcohol consumption in males.

Drinking to cope. It has been suggested that drinking may serve as a coping response to stress, and that individuals who rely on avoidance coping strategies (e.g., drinking to cope) are likely to drink more heavily (Cooper, Russell, & George, 1988; Woodhead et al., 2014). Although it has been posited that drinking-to-cope motives may influence maladaptive drinking behavior, findings have been mixed. Some studies have demonstrated that there is no association, while others have found weak (positive or negative) associations between stress/negative affect and drinking for individuals endorsing high levels of drinking to cope motives.

For instance, Cooper and colleagues (1995) found that higher endorsement of drinking to cope motives were associated with more alcohol consumption in a community sample of adults drawn from a longitudinal follow-up of a random sample of household residents in Erie County, New York, aged 20 years and older. Similarly, Carrigan and colleagues (2009) found, in a sample of 76 community adults residing in the US aged 21 to 62, that those who were high in drinking to cope motives reported more heavy drinking than those who had lower levels. Finally, in a study examining a random sample of 2,100 older adults aged 65 and older living in Finland, at-risk users (i.e., defined as those consuming >7 drinks per week, or ≥ 5 drinks on a typical drinking day, or using ≥ 3 drinks several times per week) reported drinking because of having a

“meaningless life,” to relieve depression and/or anxiety, and to relieve loneliness (Immonen, Valvanne, & Pitkälä, 2011).

Studies in younger adults have demonstrated that perceived stress and positive alcohol outcome expectancies may be positively associated with drinking to cope motives (Carrigan et al., 2009; Peirce et al., 1996; Rice & Van Arsdale, 2010). There is little work examining the relationship between injunctive drinking norms and drinking to cope motives; however, in college students, drinking to cope may be viewed as normative (Rice & Van Arsdale, 2010). The proposed study will add to the literature by examining whether there is a relationship between drinking to cope and risky alcohol use in an older population.

Sex differences in the role of drinking to cope. Similar to positive alcohol outcome expectancies, studies that have reported sex differences in the role of drinking to cope have focused on specific samples (i.e., adolescents, college students and alcohol dependent adults). Males tend to be more likely to drink to cope (e.g., to escape, to cope with distress, relieve depression) while females are less likely to use alcohol to cope which may be due to lower positive alcohol outcome expectancies (Ayer et al., 2011; Nolen-Hoeksema & Hilt, 2006; Wu & Blazer, 2014). There is a dearth of literature examining the role of drinking to cope on drinking behavior in older adult samples. The proposed study will add to the literature by examining the relationship between drinking to cope motives and drinking behavior in a sample of older males and females.

Theories Applied to Understanding Risky Drinking in Later Life

Stressor-Vulnerability Model of Alcohol Consumption. Cooper, Russell, and George’s (1988) Stressor-Vulnerability Model of Alcohol Consumption asserts that individuals with stronger beliefs concerning alcohol’s positive outcomes and those with limited coping skills

might be more likely to drink heavily in response to stressful situations (see Figure 1; Cooper et al., 1988). Positive alcohol outcome expectancies (e.g., tension reduction) and general coping skills are expected to make significant independent contributions to the prediction of motives to drink to cope (use alcohol to escape, avoid, or regulate negative emotions), and positive expectancies is posited to moderate the relationship between general coping skills and motives to drink to cope (e.g., to cheer up when in a bad mood; Cooper et al., 1988). Finally, alcohol abuse and dependence are hypothesized to be a direct function of positive expectancies, endorsement of drinking to cope motives, and heavy alcohol consumption.

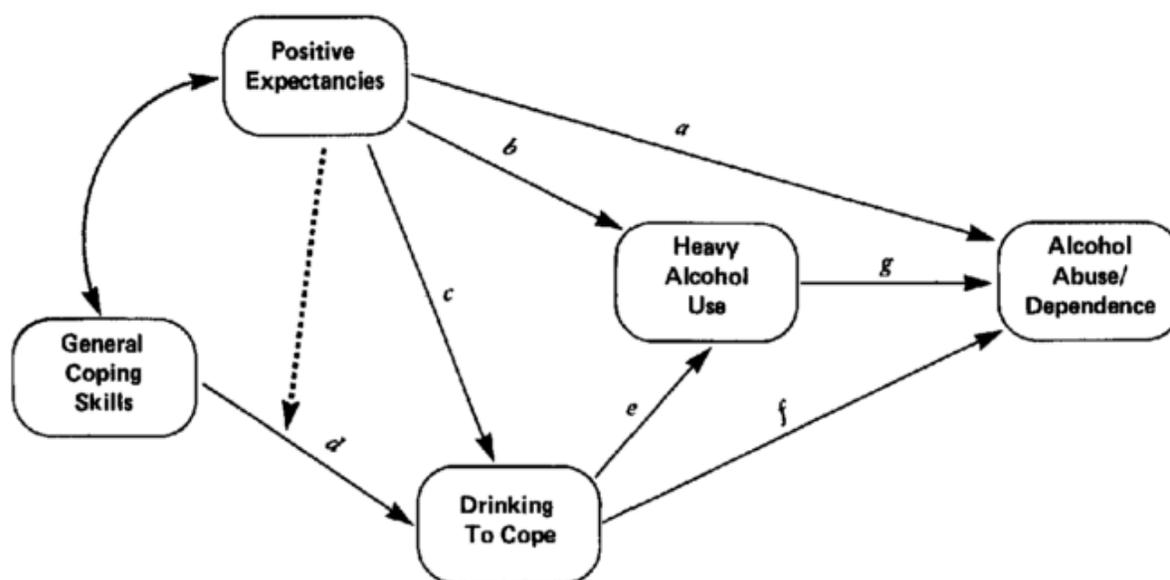


Figure 1. Stressor-Vulnerability Model of Alcohol Consumption. Adapted from “Coping, Expectancies, and Alcohol Abuse: A Test of Social Learning Formulations,” by M. L. Cooper, M. Russell, and W. H. George, 1988, *Journal of Abnormal Psychology*, 97, p. 220. Copyright 1998 by the American Psychological Association.

Theory of Reasoned Action. This theory suggests that direct determinants of behavioral intentions are 1) attitudes toward performing the behavior (e.g., drinking to cope) and 2) subjective norms associated with the behavior (see figure 2; Ajzen & Fishbein, 1980; Montaño &

Kasprzyk, 2008). Attitudes toward performing a behavior are evaluations of whether performing the behavior is beneficial or negative; while subjective norms about a behavior are perceptions of approval or disapproval from others for performing said behavior (Montaño & Kasprzyk, 2008).

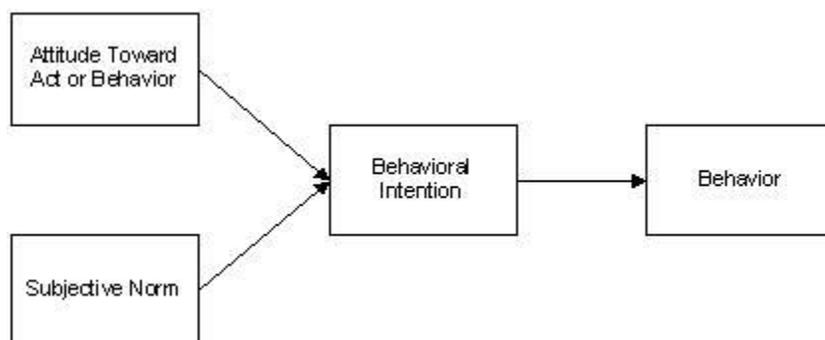


Figure 2. Theory of Reasoned Action. From “*Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*,” by M. Fishbein and I. Ajzen, 1975. Reading, MA: Addison-Wesley.

The Current Study

The present study was developed in consideration of the previously presented literature, which demonstrates that risky drinking is multi-determined and may occur more or less in the presence of specific psychological characteristics (e.g., positive alcohol outcome expectancies). However, much of the previous work in this area has focused only on young adult samples with the exclusion of older adults. Thus, the present study sought to address these gaps by incorporating positive alcohol outcome expectancies and drinking to cope motives from the Stressor-Vulnerability Model (Cooper, Russell, & George, 1994), which there is a dearth of literature for older adults. Perceived stress also was included given that the model was developed to understand risky drinking in the context of stress. Also, from the Theory of Reasoned Action, the concept of subjective drinking norms, specifically focusing on injunctive norms which have not been well studied in older adults.

Study Aims and Hypotheses

Aim 1. The first aim of the study examined the relationships between perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives, and risky drinking behaviors (i.e., heavy drinking and heavy episodic drinking). Literature focusing on younger populations has demonstrated that increased perceived stress, higher endorsement of positive alcohol outcome expectancies, higher perceived approval of drinking behaviors by others, and higher endorsement of drinking to cope motives are all associated with more frequent heavy drinking and heavy episodic drinking as well as higher quantities of alcohol consumed (e.g., Keyes, Hatzenbuehler, and Hasin, 2012; Nicolai, Moshagen, & Demmel, 2012). Similar studies focused on older adults are lacking. Given these findings on younger adults, yet the lack of literature on older populations, it was hypothesized that:

1a. Perceived stress will be positively associated with risky drinking.

1b. Positive alcohol outcome expectancies will be positively associated with risky drinking.

1c. Injunctive drinking norms will be positively associated with risky drinking.

1d. Endorsement of drinking to cope motives will be positively associated with risky drinking.

Aim 2. The second aim examined whether the relationships between perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives, and risky drinking differed by sex as found in young adult samples. Evidence suggests that there are sex differences in younger populations, such that males tend to have more drinking reactivity to stress, more highly endorse beliefs concerning the positive alcohol outcome expectancies, and higher perceived approval of drinking behaviors by others (e.g., Ayer et al., 2011; Lemke et al.,

2008; Moos et al., 2010; Nicolai, Moshagen, & Demmel, 2012). It was hypothesized that:

2a. The strength of the positive association between perceived stress and risky drinking will be stronger for males than females.

2b. The strength of the positive association between positive alcohol outcome expectancies and risky drinking will be stronger for males than females.

2c. The strength of the positive association between injunctive drinking norms and risky drinking will be stronger for males than females.

2d. The strength of the positive association between drinking to cope and risky drinking will be stronger for males than females.

CHAPTER 3: METHODS

Primary cross-sectional data were collected and analyzed to examine the associations between theoretically-based psychological constructs (i.e., perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives) and risky drinking behaviors (i.e., heavy drinking and heavy episodic drinking; Aim 1). This study also sought to examine whether there are sex differences in the relationships between psychological constructs and risky drinking behaviors (Aim 2). This chapter provides details on data collection procedures, how constructs were measured and how they were modified for analysis (if applicable). It also details the analyses employed to address the aims and hypotheses of this dissertation study.

Procedures

For the present study, participants were 97 community-dwelling older males ($n = 27$) and females ($n = 70$) residing in the U.S (see Appendix A for sampling flowchart). Eligible participants a) were aged 65 years of age or older and b) had consumed alcohol in the past month, or 30 days. Participants were recruited throughout the community via flyers on community bulletin boards, online via Pennsylvania State University's research volunteer website and StudyFinder, through the Osher Lifelong Learning Institute (OLLI) listserv, via a Facebook page designed specifically for the study, and through the Penn State University Center of Healthy Aging's Research PALS (Participation Across the Life Span) database (see Appendix B for recruitment materials). Individuals in the PALS database voluntarily provided their contact information to be used for research participation opportunities. The potential subject pool from Research PALS is sent, in the form of an excel file, to the approved applicant based on age range and sex distribution requested and number of subjects expected to be able to recruit in a three-month period.

To be eligible for this study, participants had to: 1) be 65 years of age or older; 2) fluent in English, and 3) have consumed alcohol in the past month. Exclusion criteria included: 1) significant physical or cognitive impairment preventing completion of the study; 2) elevated depressive symptoms over the past week as measured by the 8-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1997; Steffick, 2000); and 3) inability to consent. Individuals who contacted the research team were screened for the above inclusion criteria over the phone or through email. Those who received the advertisement through the OLLI listserv, and those who contacted the research team through the Facebook page messaging system, had the additional option to complete a self-screening Qualtrics questionnaire to determine eligibility. The Qualtrics questionnaire contained identical screening questions as the telephone and email versions (see Appendix C for all versions of screening forms). Skip and branch logic was used to exclude those who did not meet the inclusion criteria and/or met the exclusion criteria (see Appendix C for skip and branch logic diagram). Those individuals were sent to a page stating their ineligibility and thanking them for their time. Conversely, those who met the inclusion criteria and not any of the exclusion criteria were redirected to a Qualtrics webpage to the waiver of written documentation of informed consent.

Study data were collected and managed using REDCap electronic data capture tools hosted at the Penn State Milton S. Hershey Medical Center and College of Medicine. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies (Harris et al., 2009). This application allows for tracking data manipulation and export procedures for data downloads to common statistical packages. Once participants agreed to the terms of the waiver of written documentation of informed consent, they were redirected to REDCap to complete the study.

Similarly, after eligibility was determined through email or over-the-phone screening, the participant either set up a time and location for in-person completion of the informed consent process and study or received a Qualtrics link to the waiver of written documentation of informed consent (see Appendix D for waiver of documentation and consent form). Once the agreed to the terms of the consent form, they were redirected to REDCap to complete the study. For in-person participants, after informed consent was completed, they were presented with a tablet with the REDCap survey already on the screen or a paper-and-pencil packet to version of the demographic and health information, as well as relevant study measures and questionnaires. Once all forms and measures were completed, each participant received \$25 in compensation. Participants who completed the study in person received \$25 cash; however, anyone who completed the study online were redirected to another Qualtrics survey upon submission of the last questionnaire. This final Qualtrics survey asked the participant to enter the mailing address they would like to receive their compensation in the form of a \$25 Visa gift card. Lastly, for all study participants who completed the paper-and-pencil version of the study, data was immediately entered directly into the REDCap database and paper copies. All study procedures were approved by The Pennsylvania State University Institutional Review Board prior to implementation.

Measures

Outcome Measures. Risky drinking behaviors were examined using two measures designed to assess typical and binge, or heavy episodic, drinking (see Appendix E). The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) assessed number of drinks consumed each day during a typical week over the past month ($\alpha = .97$). Risky drinkers were determined from the National Institute of Alcohol Abuse and Alcoholism's (NIAAA; 2016a)

recommendation for drinking behavior in those that are 65 and older. Thus, participants who reported drinking more than three drinks a day or 7 drinks per week were considered ‘heavy drinkers.’

The second measure was an item assessing heavy episodic drinking (HED)/binge drinking over the past month (see Appendix E). Participants indicated how often they have consumed 4 or more drinks if female, or 5 or more drinks if male, as defined by NIAAA’s guidelines for binge drinking (NIAAA, 2016b). Responses ranged from 0 (‘Never’) to 5 (‘9 or more times’). The definition of a standard drink (12 oz. of beer or wine cooler, 8.5 oz. of malt liquor, 4 oz. of wine, 3.5 oz. fortified wine, or 1.5 oz. of hard liquor) was provided for both measures of risky drinking behavior to assist with drink estimates (NIAAA, 2000; Wechsler et al., 2002). Participants who reported engaging in heavy episodic drinking at least once in the past month were considered ‘heavy episodic drinkers.’

Psychological Factors Measures.

Perceived Stress. The 4-item Perceived Stress Scale (PSS-4) was used to assess perceived stress over the past month (see Appendix F; Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). Participants indicated how often they felt or thought a certain way with item responses and scores ranged from 0 (“Never”) to 4 (“Very Often”). Positively worded questions, items 2 and 3, were reverse coded then a sum of the 4 items were used to determine level of perceived stress. Studies have found the PSS-4’s Cronbach’s alpha values to be marginally acceptable to acceptable as compared to the PSS-10 and -14, depending on sample examined (US vs. English adults; Warttig, Forshaw, South, & White, 2013). For the present study, item scores ranged from 0 to 4 with higher scores indicating more perceived stress ($\alpha = .57$). Reliability was deemed poor, however, further item analysis revealed that removing any

individual item would further reduce reliability (alphas if deleted: item 1 = .51, item 2 = .53, item 3 = .48, and item 4 = .47). A low alpha may be attributed to the PSS-4's including fewer items than the other versions and Cronbach's alpha tends to increase with the number of items in a measure (Lee, 2012; Tavakol & Dennick, 2011).

Positive Alcohol Outcome Expectancies. Given that studies have found that specifically higher positive outcome expectancies are associated with elevated alcohol consumption and risky drinking, the present study focused on those rather than negative outcome expectancies (Armeli et al., 2000; Leigh & Stacy, 1993). The 11 positive items from Leigh and Stacy's (2004) 21-item alcohol outcome expectancies scale assessed positive alcohol outcome expectancies (see Appendix G). Item responses and scores ranged from 0 ("Very Unlikely") to 3 ("Very Likely") with higher scores indicating more endorsement of positive outcome expectancies. Reliability analyses determined that internal consistency was good, $\alpha = .86$.

Injunctive Drinking Norms. Injunctive drinking norms were assessed using adapted versions Baer's (1994) item (see Appendix H). This measure assessed approval of four specific alcohol-related behaviors including drinking every weekend, daily, after driving, and enough to pass out. Baer's (1994) original version was designed to assess norms in college populations, the items were adapted to be asked in parallel for four reference groups applicable to older adults: the perceived approval of drinking behaviors by the typical older adult, the typical same-sex older adult, their friends, and their spouse or partner. Response options were based on a 7-point Likert scale (-3 = strong disapproval to 3 = strong approval).

Due to lack of variance, the following two items for each reference group were dropped from analyses: after driving and enough to pass out. The alphas of the original scales for the typical older adult, typical same-sex older adult, friends, and spouse/partner reference groups

were .52, .61, .55, and .70 (spouse/partner reference group alpha was based on 3 items due to zero variance resulting in ‘drinking enough to pass out’ being excluded). Further analyses revealed that internal consistency improved for all reference group scores with the removal of ‘drinking enough to pass out’ and ‘driving a car after drinking.’ The final alphas after dropping the two items from each reference group were .71, .80, .85, .83 for the typical older adult, typical same-sex older adult, friends, and spouse/partner reference groups. Thus, internal consistency for each reference group ranged from acceptable to good. Scores for each reference group was taken as the mean of the two corresponding items (drinking every weekend and daily), with higher scores indicating more perceived approval.

Drinking to Cope Motives. Drinking to cope motives were assessed using the 5-item drinking to cope motives subscale of the Drinking Motive Questionnaire Revised (DMQ-R) in which respondents reported the frequency of drinking to manage or cope with negative emotions (see Appendix I; Cooper, 1994). Item responses and scores were answered on a 5- point Likert scale and ranged from 0 (“Almost Never/Never”) to 4 (“Almost Always/Always”) with higher scores indicating higher endorsement of drinking to cope. Reliability analyses determined internal consistency to be acceptable, $\alpha = .79$.

Additional Measures.

Demographics and Health Information. Demographic and health information were collected to as possible covariates in analysis of Aims (see Appendix J). Information collected are factors often associated with drinking behavior in adults, specifically in older adults.

Demographic information reported consisted of age, sex (0 = Female, 1 = Male), race/ethnicity (e.g., White, Asian; Hispanic/Latino), socioeconomic status (e.g., highest level of education), current retirement status, and marital relationship status (e.g., never been married, widowed,

married, living with a partner). Health information acquired from the participants included calculated body mass index $\text{weight (lb)} / [\text{height (in)}]^2 \times 703$, self-reported diagnosis of chronic health conditions (e.g., diabetes arthritis/rheumatism), diagnosis of depression and anxiety, number of a list of medications currently used (i.e., prescription, over-the-counter, and supplements), use of medication for pain, current smoking behavior, whether there was a family history of alcoholism, and alcohol use by a spouse or partner, if applicable.

Screening items. In addition to the demographic and health questionnaire, the screening survey included additional sets of questions determining participant eligibility (Appendix C). First, participants were asked their age. Second, participants were asked if they spoke English fluently, if they have consumed alcohol in the past month or 30 days, and if they had ever been diagnosed with a pervasive developmental disorder or other cognitive impairment. Lastly, participants were asked several questions to determine elevated depressive symptoms using an 8-item version of the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1997; Steffick, 2000). Participants indicated whether they felt a certain way over the past week by responding ‘yes’ or ‘no.’. The total score is the sum of six negative items (e.g., felt that everything was an effort) and two positive items that were reverse coded (e.g., enjoyed life) and ranged from 0 to 8. If their score was greater than 4 then they were deemed ineligible to participate in the study.

Analytic Strategy

Preliminary Analyses. Bivariate analyses (cross-tabulations and correlations) were run for all study variables to describe the sample, to discern the strength of the associations, as well as to determine relevant covariates to use in subsequent analysis of aims and exploratory analyses. All items were adjusted for outliers using procedures outlined by Tabachnick and Fidel

(2013) in which values that fell outside of ± 3.29 standard deviations from the mean were adjusted to equal the value of 3.29 deviations from the mean. Mean differences between males and females on all items were assessed using *t*-tests. Missing responses were minimal (< 5% on any variable) and addressed using imputation of missing data with maximum likelihood estimation (MLE) for descriptive statistics and path analyses for aims and exploratory analyses applied by SPSS and AMOS (Arbuckle, 2016). The use of path analysis in AMOS (over multiple regression in SPSS or SAS) allowed for bootstrapping to account for non-normally distributed constructs. Missing data were imputed by including observed variables in a model and allowing them to be uncorrelated with one another. This allowed for data to be imputed based on observed variables only without specifying particular relationships. Of the demographics and health characteristics collected, bivariate correlations revealed that only three variables emerged as significantly correlated with heavy drinking (HD) or heavy episodic drinking (HED; see Appendix K for correlation table): educational attainment (0 = less than high school, 1 = high school diploma or equivalent/GED, 2 = some college/less than 4 years, 3 = college/4 year degree, 4 = graduate/professional); retirement status (0 = no, 1 = yes); and sum of chronic health conditions (range 0-5 conditions). Pearson's correlations revealed that educational attainment was positively associated with HD ($r = .22, p \leq .05$) while retirement status and sum of chronic health conditions were both negatively associated with HD ($r = -.27, p \leq .01$; $r = -0.21, p \leq .05$, respectively)

Analysis of Study Aims.

Aim 1. The current study's first aim was to examine the relationships between psychological factors (perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives) and risky drinking behaviors. Four path models were

conducted. The first model examined perceived stress (PS; Model 1a). HD and HED were regressed onto the four PS items and the covariates (retirement status, educational attainment, and sum of chronic health conditions). The second model examined positive alcohol outcome expectancies (PAOEs; Model 2a). HD and HED were regressed onto the 11 PAOE items and the covariates. The third model examined injunctive drinking norms (IDNs; Model 3a). HD and HED were regressed onto the four IDN reference groups and the covariates. The final model for Aim 1 examined drinking to cope motives (DTCs; Model 4a). HD and HED were regressed onto the five DTC items and the covariates. Significance of all regression estimates was assessed using bootstrapped asymmetrical 95% confidence intervals.

Aim 2. The second aim of the study was to examine whether there were sex differences in the relationships between the psychological factors (perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, drinking to cope motives) and risky drinking behaviors (HD and HED). Four sets of multiple group path analyses were conducted. The first set of models examined perceived stress (Model 1b). Two separate models of HD and HED were regressed onto the four PSS items and the covariates then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. The second set of models examined PAOE (Model 2b). Two separate models of HD and HED were regressed onto the 11 PAOE items and the covariates then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex.

The third set of models examined IDNs (Model 3b). Two separate models of HD and HED were regressed onto the four IDN reference groups and the covariates then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. The fourth set of models examined DTCs (Model 4b). Two separate models of HD and HED were regressed onto the five DTC items and the covariates then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. Significance of all regression estimates was assessed using bootstrapped asymmetrical 95% confidence intervals.

Exploratory Analyses. Exploratory analyses examined whether PS, PAOEs, and IDNs were associated with DTCs, as well as whether there were sex differences in these associations. First, three path models were conducted to examine the overall associations. The first model examined PS (Model E.1a). For this model, DTCs were regressed onto the four PS items. The second model examined PAOEs (Model E.1b). For this model, DTCs were regressed onto the 11 PAOE items. The final model exploring the overall associations examined IDNs (Model E.1c). This model regressed DTCs onto the four IDN reference groups.

Three additional path models using multiple group analysis were conducted to examine sex differences in the associations between DTCs and PS, PAOEs, and IDNs. The first set of models examined PS (Model E.2a). Two separate models of DTCs were regressed onto the four PS items then were compared: one model allowed parameters to be freely estimated and the

other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. The second set of models examined PAOEs (Model E.2b). Two separate models of DTCS were regressed onto the 11 PAOE items then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. The third set of models examined IDNs (Model E.2c). Two separate models of DTCs were regressed onto the four IDNs referent groups then were compared: one model allowed parameters to be freely estimated and the other constrained parameter estimates to be equal between males and females. Differences in slopes were calculated to determine whether there were significant differences in the freely estimated model's parameters by sex. Significance of all regression estimates was assessed using bootstrapped asymmetrical 95% confidence intervals.

CHAPTER 4: RESULTS

In this chapter, the results of preliminary bivariate and multivariate analyses, as well as follow-up exploratory analyses are provided. Results are presented for the overall sample as well as separately by sex.

Preliminary Analyses

Bootstrapped means, standard errors, and t-values comparing males and females on all variables can be found in Table 1.

Demographics. The mean age for the sample was 72.92 years ($SD = 7.02$) with no significant differences between males ($m = 74.07$, $sd = 8.51$) and females ($m = 72.47$, $sd = 6.37$). The majority of the sample was White (96.9%) and non-Hispanic/Latino (100%) with no significant differences between males (100% White) and females (95.7% White). Most of the sample was highly educated, completing a college (4-year degree; 27.1%) or graduate/professional degree (53.1%) with no significant differences between males (29.6% and 59.3%) and females (26.1% and 50.7%). Approximately 89.4% considered themselves to be retired at the time with no significant differences between males (87.5%) and females (90.0%). More than half of the sample was currently married (56.7%) with 23.7% being widowed and 16.5% being divorced. There were significant differences between males and females on marital status, Pearson $\chi^2(4) = 14.42$, $p = .01$, with higher frequencies of males living with a partner (3.7%) than females (1.4%) and more males being married (85.2%) as compared to females (45.7%). Females had higher frequencies of being separated (1.4% vs 0% of males), widowed (31.4% vs 3.7% of males), and divorced (20.0% vs 7.4% of males).

Health characteristics. Participants had, on average, 1.31 chronic health conditions ($SD = 0.62$) with males having a mean of 1.44 health conditions ($sd = 0.70$) and females having a

mean of 1.25 conditions ($sd = 0.58$). Most reported not ever being told by a doctor that they had depression (14.4%) or anxiety (12.9%). There were with no sex differences between males (11.1%) and females (15.7%) on depression but females reported significantly higher rates of anxiety (18.2%) than males (0%), Pearson $\chi^2(1) = 5.64, p = .02$. Approximately 24.7% of the sample reported currently taking over-the-counter or prescription medications to manage pain (18.5% of males, 27.1% of females). Only 2.1% of the sample reported currently smoking tobacco (3.7% of males, 1.4% of females). Regarding alcohol use, 24.7% older adults were classified as 'heavy drinkers' based on weekly consumption (37.0% of males, 20.0% of females) and 20.6% engaged in HED at least once in the past month (25.9% of males, 18.6% of females). Significant differences were found between males and females for typical weekly drinking with males drinking significantly more than females ($m = 7.82$ vs 4.99 drinks a week, respectively). Lastly, of participants with spouses or partners, 80.7% reported that their spouse/partner consumed alcohol (83.3% of males, 78.8% of females). No differences were found between males and females for psychological factor items (i.e., PS, PAOEs, IDNs, and DTCs) as seen in Table 1.

Table 1. Outlier Adjusted Ranges, Means, t-values, and Asymmetric Bootstrapped Confidence Intervals for Key Analytic Variables.

Variable	Range	Overall	Females	Males	t-value	Bootstrapped 95% C.I.
Drinking Behavior						
Typical Weekly Drinking	0 to 58	5.774 (0.483)	4.992 (0.447)	7.815 (1.287)	2.823*	0.269 to 5.621
Heavy Episodic Drinking	0 to 3	0.261 (0.057)	0.230 (0.062)	0.330 (0.131)	0.105	-0.156 to 0.400
Perceived Stress						
Felt unable to control important things in Life	0 to 3	0.814 (0.076)	0.770 (0.095)	0.930 (0.130)	0.157	-0.159 to 0.474
Felt confident in ability to handle personal Problems	0 to 2	0.303 (0.050)	0.299 (0.059)	0.307 (0.102)	0.008	-0.209 to 0.239
Felt things were going your way	0 to 3	0.772 (0.065)	0.769 (0.072)	0.778 (0.145)	0.009	-0.287 to 0.331
Felt difficulties were piling up so high you could not overcome them	0 to 2	0.539 (0.060)	0.548 (0.073)	0.512 (0.111)	-0.036	-0.285 to 0.234
Positive Alcohol Outcome Expectancies						
I am more accepted socially	0 to 3	1.064 (0.086)	1.100 (0.107)	0.96 (0.146)	-0.139	-0.499 to 0.216
I am more outgoing	0 to 3	1.533 (0.082)	1.55 (0.098)	1.48 (0.163)	-0.069	-0.449 to 0.285
I have a good time	0 to 3	1.705 (0.074)	1.710 (0.088)	1.690 (0.155)	-0.017	-0.364 to 0.317
It is easier for me to socialize	0 to 3	1.402 (0.080)	1.440 (0.101)	1.300 (0.149)	-0.144	-0.487 to 0.188
I feel a part of the group	0 to 3	1.345 (0.081)	1.300 (0.100)	1.440 (0.145)	0.140	-0.207 to 0.486
I am able to take my mind off my problems	0 to 3	1.075 (0.091)	1.04 (0.110)	1.150 (0.166)	0.104	-0.265 to 0.487
I enjoy the buzz	0 to 3	1.043 (0.092)	1.010 (0.116)	1.110 (0.163)	0.096	-0.304 to 0.484
I am less shy	0 to 3	1.230 (0.092)	1.250 (0.110)	1.190 (0.169)	-0.061	-0.468 to 0.323
I am more energetic	0 to 4	0.764 (0.067)	0.740 (0.087)	0.810 (0.097)	0.075	-0.191 to 0.345
I feel relaxed	0 to 3	1.792 (0.067)	1.800 (0.087)	1.780 (0.111)	-0.019	-0.291 to 0.257
I feel less sexually inhibited	0 to 3	0.874 (0.081)	0.81 (0.097)	1.040 (0.146)	0.225	-0.105 to 0.569
Injunctive Drinking Norms						
Typical Adult Aged 65 and Older	-3 to 3	-0.312 (0.069)	-0.268 (0.069)	-0.421 (0.188)	-0.147	-0.540 to 0.206
Typical Same-Sex Adult Aged 65 and Older	-3 to 3	-0.296 (0.090)	-0.366 (0.102)	-0.115 (0.217)	0.241	-0.185 to 0.715

Friends	-3 to 3	-0.225 (0.085)	-0.214 (0.105)	-0.263 (0.172)	-0.047	-0.439 to 0.338
Spouse/Partner	-3 to 3	-0.378 (0.082)	-0.318 (0.154)	-0.457 (0.270)	-0.096	-0.562 to 0.382
Drinking to Cope Motives						
To forget your worries	0 to 4	0.151 (0.040)	0.119 (0.044)	0.231 (0.101)	0.107	0.080 to 0.235
Because it helps when you feel depressed or nervous	0 to 4	0.202 (0.046)	0.204 (0.058)	0.192 (0.079)	-0.011	0.118 to 0.297
To cheer up when in a bad mood	0 to 3	0.323 (0.050)	0.326 (0.062)	0.308 (0.108)	-0.018	0.229 to 0.427
Because you feel more self-confident and sure of yourself	0 to 3	0.210 (0.048)	0.188 (0.061)	0.269 (0.089)	0.077	0.122 to 0.310
To forget your problems	0 to 4	0.248 (0.062)	0.249 (0.084)	0.248 (0.084)	-0.001	0.138 to 0.378

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$

Aim Analyses

Summary of support hypotheses can be found at the end of the results (Table 11). Results for each aim will be discussed in turn.

Aim 1: Examine the associations between psychological factors and risky drinking behaviors (HD and HED)

Perceived Stress and Risky Drinking (Model 1a). This model regressed HD and HED onto the four PSS items, controlling for covariates (Table 2). Feeling unable to control important things in life was marginally significantly associated with HED but not HD, such that those reporting feeling more unable to control important things reported less HED, $b = -0.09$, $SE = 0.05$, $p = .06$, 95% CI [-0.20, 0.02]. Both feeling confident in one's ability to handle personal problems and feeling things were going one's way were not significantly associated with HD nor HED. Feeling that difficulties were piling up so high they could not be overcome was significantly associated with HED but not HD; such that those reporting more feeling difficulties were piling up as to not be overcome reported more HED, $b = 0.21$, $SE = 0.08$, 95% CI [0.06, 0.37], $p = .01$.

Table 2. Bootstrapped Results for Model 1a: Perceived Stress and Risky Drinking

Variables	Heavy Drinking		Heavy Episodic Drinking	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors				
Felt unable to control important things in life	-0.066 (0.054)	-0.170 to 0.047	-0.094† (0.048)	-0.195 to 0.015
Felt confident in ability to handle personal problems	0.072 (0.092)	-0.116 to 0.251	-0.087 (0.092)	-0.145 to 0.111
Felt things were going your way	-0.136 (0.079)	-0.286 to 0.034	-0.074 (0.079)	-0.222 to 0.035
Felt difficulties were piling up so high you could not overcome them	0.070 (0.062)	-0.067 to 0.209	0.209** (0.077)	0.063 to 0.367
Covariates				
Retirement Status	-0.373* (0.182)	-0.679 to 0.000	0.004 (0.160)	-0.323 to 0.293
Educational Level	0.081* (0.040)	0.009 to 0.165	0.074† (0.041)	-0.002 to 0.164
Number of Chronic Health Conditions	-0.123 (0.070)	-0.257 to 0.027	-0.053 (0.069)	-0.181 to 0.089

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$

Positive Alcohol Outcome Expectancies and Risky Drinking (Model 1b). This model regressed HD and HED onto the 11 PAOE items (Table 3). Only feeling more energetic when drinking alcohol was positively associated with HD, $b = 0.19$, $SE = 0.08$, 95% CI [0.01, 0.33], $p = .04$. This suggests that the higher the expectation to feel more energetic when drinking was related to more HD. Conversely, being more accepted socially, being more outgoing, having a good time, it being easier to socialize, feeling a part of the group, being able to take one's mind off their problems, enjoying the buzz, being less shy, feeling more relaxed, and feeling less sexually inhibited when drinking were not associated with HD.

Contrary to the hypothesis that PAOEs would be positively associated with HED, being more accepted socially ($b = -0.15$, $SE = 0.06$, 95% CI [-0.27, 0.04], $p = .01$) and being able to

take one's mind off their problems ($b = -0.13$, $SE = 0.07$, 95% CI $[-0.18, -0.003]$, $p = .04$) were both negatively associated with HED. This finding suggests that higher expectations to be more socially accepted or to be able to take one's mind off their problems when drinking was related to less HED. Conversely, enjoying the buzz when drinking was positively associated with HED, suggesting that higher expectations that one will enjoy the buzz that comes with drinking is related to more HED, $b = 0.16$, $SE = 0.06$, 95% CI $[0.11, 0.48]$, $p = .003$. Being more outgoing, having a good time, it being easier to socialize, feeling a part of the group, being less shy, feeling more energetic, feeling more relaxed, and feeling less sexually inhibited when drinking were not associated with HED.

Table 3. Bootstrapped Results for Model 1b: Positive Alcohol Outcome Expectancies and Risky Drinking

Variables	Heavy Drinking		Heavy Episodic Drinking	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors				
I am more accepted socially	-0.108 (0.063)	-0.223 to 0.025	-0.149** (0.061)	-0.273 to -0.038
I am more outgoing	-0.049 (0.096)	-0.224 to 0.152	-0.115 (0.079)	-0.273 to 0.038
I have a good time	0.120 (0.084)	-0.028 to 0.297	0.118 (0.077)	-0.026 to 0.280
It is easier for me to socialize	0.007 (0.119)	-0.217 to 0.247	0.115 (0.105)	-0.078 to 0.338
I feel a part of the group	0.011 (0.101)	-0.215 to 0.167	0.106 (0.101)	-0.054 to 0.268
I am able to take my mind off my problems	-0.071 (0.060)	-0.178 to 0.051	-0.127* (0.069)	-0.276 to -0.003
I enjoy the buzz	0.064 (0.062)	-0.055 to 0.191	0.159** (0.058)	0.112 to 0.483
I am less shy	0.000 (0.079)	-0.156 to 0.148	-0.043 (0.072)	-0.177 to 0.103
I am more energetic	0.191* (0.084)	0.006 to 0.333	0.052 (0.089)	-0.137 to 0.212
I feel relaxed	0.017 (0.067)	-0.117 to 0.146	-0.003 (0.053)	-0.096 to 0.112
I feel less sexually inhibited	-0.113 (0.061)	-0.227 to 0.016	-0.047 (0.065)	-0.172 to 0.078
Covariates				
Retirement Status	-0.341* (0.182)	-0.772 to -0.006	0.053 (0.164)	-0.278 to 0.351
Educational Level	0.053 (0.040)	-0.022 to 0.136	0.063 (0.038)	-0.013 to 0.141
Number of Chronic Health Conditions	-0.102 (0.074)	-0.232 to 0.059	-0.038 (0.064)	-0.165 to 0.090

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$

Injunctive Drinking Norms and Risky Drinking (Model 1c). Perceived approval by friends of drinking behaviors (i.e., drinking alcohol every weekend and drinking daily) was

positively associated significant with HD, $b = 0.19$, $SE = 0.08$, 95% CI [0.001, 0.32], $p = .05$ (Table 4). This finding suggests that the more individuals think their friends would approve of drinking behaviors the more HD they do. Perceived approval by the typical adult aged 65 and older, typical same-sex adult aged 65 and older, and spouse/partner referents were not associated with HD. Similarly, perceived approval of drinking behaviors by friends was marginally positively associated with HED, $b = 0.19$, $SE = 0.09$, 95% CI [-0.004, 0.37], $p = .06$. Again, this suggests that the more individuals think their friends would approve of drinking behaviors the more HED they engage in. Perceived approval by the typical adult aged 65 and older, typical same-sex adult aged 65 and older, and spouse/partner referents were not associated with HED.

Table 4. Bootstrapped Results for Model 1c: Injunctive Drinking Norms and Risky Drinking

Variables	Heavy Drinking		Heavy Episodic Drinking	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors				
Typical Adult Aged 65 and Older	-0.120 (0.086)	-0.268 to 0.074	-0.038 (0.106)	-0.231 to 0.199
Typical Same-Sex Adult Aged 65 and Older	-0.070 (0.070)	-0.198 to 0.091	-0.102 (0.083)	-0.260 to 0.073
Friends	0.192* (0.080)	0.001 to 0.320	0.189† (0.091)	-0.004 to 0.369
Spouse/Partner	0.102 (0.055)	-0.022 to 0.203	-0.017 (0.057)	-0.162 to 0.074
Covariates				
Retirement Status	-0.339† (0.174)	-0.679 to 0.009	-0.011 (0.157)	-0.335 to 0.283
Educational Level	0.069† (0.038)	-0.006 to 0.145	0.057 (0.039)	-0.013 to 0.138
Number of Chronic Health Conditions	-0.111 (0.062)	-0.229 to 0.014	-0.001 (0.082)	-0.169 to 0.154

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$

Drinking to Cope Motives and Risky Drinking. No DTCs were associated with HD.

Regarding HED, drinking because it helps when feeling depressed or nervous was positively associated with HED, $b = 0.28$, $SE = 0.17$, 95% CI [0.02, 0.69], $p = .04$ (Table 5). This finding suggests that stronger endorsement of drinking because it helps when feeling depressed or nervous is related to more HED. Conversely, drinking to forget worries, to cheer up when in a bad mood, because drinking makes one feel more self-confident and sure of oneself, as well as drinking to forget one's problems were not associated with HED.

Table 5. Bootstrapped Results for Model 1d: Drinking to Cope Motives and Risky Drinking

Variables	Heavy Drinking		Heavy Episodic Drinking	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors				
To forget your worries	0.108 (0.162)	-0.242 to 0.362	0.145 (0.172)	-0.178 to 0.391
Because it helps when you feel depressed or nervous	0.203 (0.178)	-0.111 to 0.594	0.279* (0.172)	0.018 to 0.686
To cheer up when in a bad mood	0.163 (0.117)	-0.051 to 0.403	0.072 (0.101)	-0.131 to 0.265
Because you feel more self-confident and sure of yourself	-0.059 (0.094)	-0.251 to 0.130	-0.079 (0.086)	-0.253 to 0.099
To forget your problems	-0.078 (0.110)	-0.252 to 0.126	-0.106 (0.130)	-0.305 to 0.043
Covariates				
Retirement Status	-0.304† (0.160)	-0.625 to 0.009	0.046 (0.042)	-0.039 to 0.126
Educational Level	0.069 (0.037)	-0.008 to 0.137	0.056 (0.041)	-0.028 to 0.132
Number of Chronic Health Conditions	-0.120* (0.063)	-0.244 to 0.002	-0.050 (0.063)	-0.172 to 0.078

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$.

Aim 2: Examine whether the associations between psychological factors and risky drinking behaviors (HD and HED) differed by sex

Sex Differences in Perceived Stress and Risky Drinking (Model 2a). Overall, comparison of the freely estimated and constrained models revealed no significant differences

between males and females in the overall models, $\chi^2_{\text{diff}}(14) = 16.26, p = .30$ (Table 6). However, for males ($b = -0.43, SE = 0.16, 95\% \text{ CI } [-0.79, -0.16], p = .01$) but not females, feeling unable to control important things in life was significantly but negatively associated with HD. There was a difference in slopes between males and females for feeling unable to control important things in life and HD, $t = 3.03, p = .003$ (see Figure 3). This suggests that the higher perceived lack of control of important things in life was related to less HD in males and that this relationship was significantly stronger for males as compared to females. There were no sex differences in strengths of the associations between feeling confident in one's ability to handle personal problems, feeling things were going one's way, and feeling that difficulties were piling up so high they couldn't be overcome and HD.

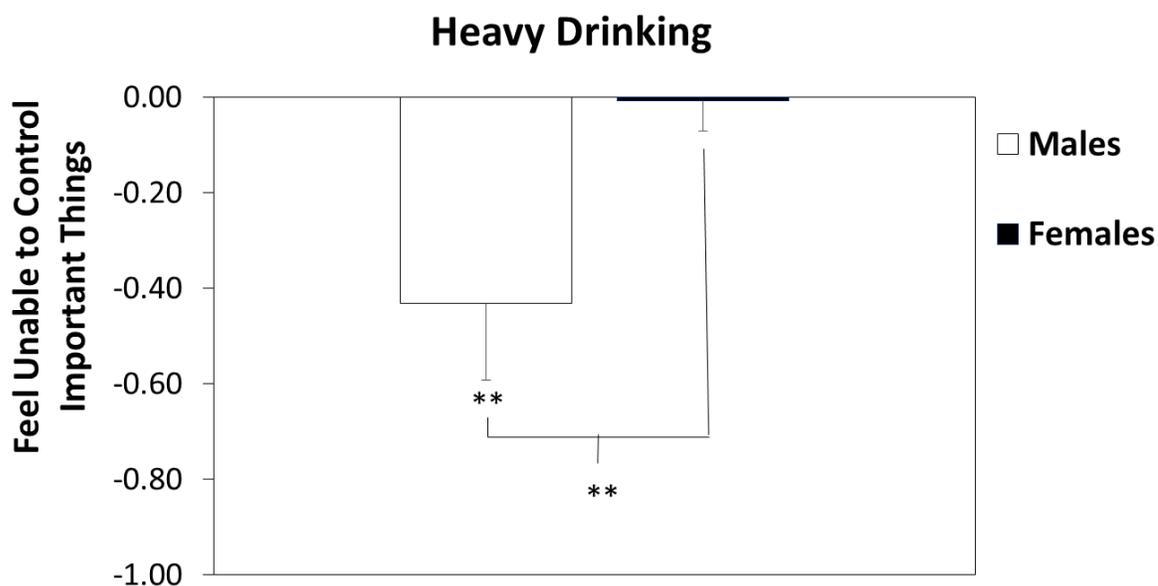


Figure 3. Sex differences in the relationship between feeling unable to control important things in life and HD. *Note:* * $p \leq .05$; ** $p \leq .01$

Regarding HED, for females ($b = 0.21, SE = 0.10, 95\% \text{ CI } [0.02, 0.40], p = .03$) but not for males, feeling that difficulties were piling up so high they couldn't overcome them was

positively associated with being HED; however, there were no significant differences in slopes between males and females. There were no sex differences in strengths of the associations between feeling unable to control important things in life, feeling confident in one's ability to handle personal problems, and feeling things were going one's way and HED.

Table 6. Bootstrapped Results for Unconstrained Model 2a: Sex Differences in Perceived Stress and Risky Drinking

Variables	Heavy Drinking				Heavy Episodic Drinking			
	Females		Males		Females		Males	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors								
Felt unable to control important things in life	-0.007 (0.063)	-0.122 to 0.134	-0.431** (0.160)	-0.787 to -0.158	-0.108 (0.062)	-0.229 to 0.014	-0.034 (0.206)	-0.432 to 0.417
Felt confident in ability to handle personal problems	0.113 (0.115)	-0.156 to 0.312	-0.023 (0.283)	-0.542 to 0.573	-0.004 (0.119)	-0.243 to 0.235	-0.267 (0.258)	-0.900 to 0.123
Felt things were going your Way	-0.141 (0.105)	-0.335 to 0.088	0.014 (0.201)	-0.300 to 0.489	-0.054 (0.097)	-0.237 to 0.149	-0.126 (0.229)	-0.572 to 0.332
Felt difficulties were piling up so high you could not overcome them	0.103 (0.095)	-0.088 to 0.292	0.012 (0.217)	-0.385 to 0.487	0.212* (0.099)	0.023 to 0.400	0.155 (0.204)	-0.127 to 0.659
Covariates								
Retirement Status	-0.419† (0.234)	-0.857 to 0.056	-0.326 (2.733)	-11.232 to 0.846	0.081 (0.183)	-0.336 to 0.359	-0.205 (1.347)	-1.455 to 0.760
Educational Level	0.081 (0.055)	-0.028 to 0.191	0.196† (0.172)	-0.024 to 0.738	0.088 (0.061)	-0.032 to 0.211	0.065 (0.150)	-0.172 to 0.434
Number of Chronic Health Conditions	-0.107 (0.116)	-0.338 to 0.109	-0.154 (0.196)	-0.501 to 0.262	-0.022 (0.108)	-0.234 to 0.187	-0.123 (0.189)	-0.437 to 0.334

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$; Unconstrained model vs Constrained, $\chi^2(14) = 16.261$, $p = .298$.

Sex Differences in Positive Alcohol Outcome Expectancies and Risky Drinking (Model 2b). Comparison of the freely estimated and constrained models revealed no significant differences between males and females in the overall models, $\chi^2_{\text{diff}}(28) = 37.62, p = .11$ (Table 7). For females ($b = -0.12, SE = 0.07, 95\% \text{ CI } [-0.25, 0.02], p = .07$), but not for males, there was a negative association between expecting to be more accepted socially when drinking and HD. This suggests that the more females expect to be socially accepted when drinking the less they engage in HD. There were no sex differences in strengths of the associations for any of the associations between PAOEs and HD.

Concerning HED, there was also a negative association, for females, between expecting to be more accepted socially when drinking and HED, $b = -0.21, SE = 0.07, 95\% \text{ CI } [-0.35, -0.07], p = .01$. Again, suggesting that the higher the expectation to be more socially accepted when drinking, the less HED females engage in; however, there were no significant differences in slopes between males and females for this relationship. There were several PAOEs that were not significantly associated with HD for neither males nor females: expecting to feel more outgoing, to have a good time, expecting drinking to make it easier to socialize, expecting to feel a part of the group, to take their mind off their problems, expecting to enjoy the buzz associated with drinking, to be less shy, to be more energetic, to feel relaxed, and expecting to feel less sexually inhibited.

Lastly, for males only, expecting to enjoy the buzz as a result of drinking was positively associated with HED, $b = 0.59, SE = 0.35, 95\% \text{ CI } [-0.01, 1.30], p = .05$. This finding suggests that the higher the expectation for enjoying the buzz associated with drinking alcohol, the more HED males engage in. Further, there was a significant difference in slopes for expecting to enjoy the buzz when drinking between males and females, $t = 2.14, p = .04$, suggesting that the

strength of the association was significantly stronger for males than females (see Figure 4).

There were several PAOEs that were not significantly associated with HED for both males and females: expecting to feel more outgoing, to have a good time, expecting drinking to make it easier to socialize, expecting to feel a part of the group, to take their mind off their problems, to be less shy, to be more energetic, to feel relaxed, and expecting to feel less sexually inhibited.

There were no sex differences in strengths of these associations.

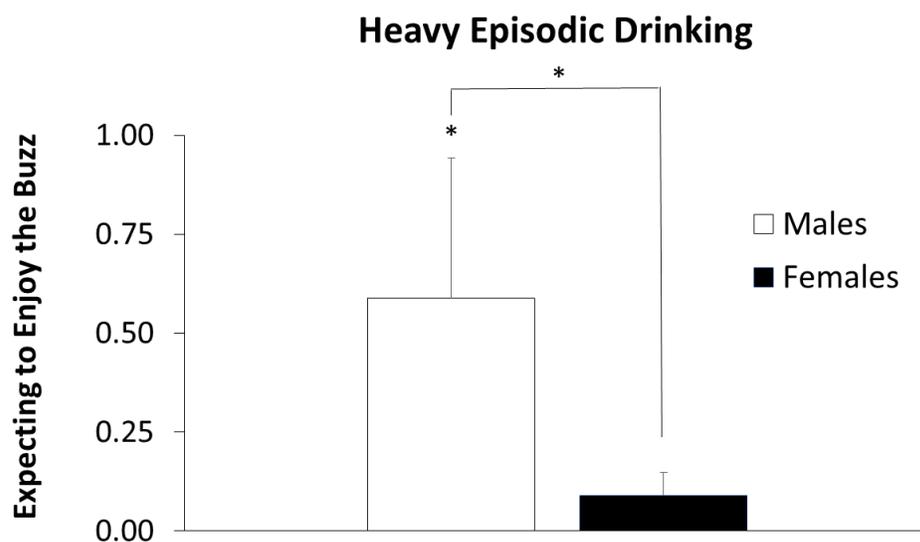


Figure 4. Sex differences in the relationship between expecting to enjoy the buzz associated with drinking and HED. *Note:* * $p \leq .05$; ** $p \leq .01$.

Table 7. Bootstrapped Results of Unconstrained Model 2b: Sex Differences in Positive Alcohol Outcome Expectancies and Risky Drinking

Variables	Heavy Drinking				Heavy Episodic Drinking			
	Females		Males		Females		Males	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors								
I am more accepted socially	-0.117† (0.065)	-0.249 to 0.015	0.432 (0.730)	-0.335 to 0.586	-0.212** (0.071)	-0.350 to -0.067	-0.566 (0.543)	-1.514 to 0.544
I am more outgoing	-0.046 (0.119)	-0.264 to 0.214	-0.121 (0.705)	-0.588 to 0.495	-0.029 (0.110)	-0.256 to 0.183	-0.130 (0.529)	-1.090 to 0.984
I have a good time	0.090 (0.083)	-0.078 to 0.254	0.142 (0.535)	-0.285 to 0.573	0.139 (0.086)	-0.024 to 0.318	0.075 (0.391)	-0.530 to 1.070
It is easier for me to socialize	0.040 (0.145)	-0.225 to 0.361	-0.359 (0.883)	-0.710 to 0.513	0.027 (0.145)	-0.213 to 0.354	0.625 (0.633)	-0.747 to 1.749
I feel a part of the group	0.002 (0.109)	-0.238 to 0.200	0.009 (0.715)	-0.451 to 0.614	0.135 (0.095)	-0.056 to 0.333	0.031 (0.476)	-1.047 to 1.849
I am able to take my mind off my problems	-0.063 (0.064)	-0.173 to 0.082	0.013 (0.560)	-1.066 to 1.141	-0.122 (0.073)	-0.271 to 0.015	-0.292 (0.451)	-1.082 to 0.607
I enjoy the buzz	0.081 (0.065)	-0.025 to 0.230	-0.221 (0.434)	-1.119 to 0.601	0.090 (0.058)	-0.017 to 0.215	0.588* (0.354)	-0.010 to 1.296
I am less shy	0.007 (0.092)	-0.198 to 0.160	-0.056 (0.556)	-0.996 to 1.120	-0.055 (0.084)	-0.234 to 0.109	0.072 (0.401)	-0.562 to 1.092
I am more energetic	0.201 (0.099)	-0.026 to 0.369	0.340 (0.696)	-1.011 to 1.841	0.118 (0.098)	-0.094 to 0.293	-0.340 (0.489)	-1.361 to 0.572
I feel relaxed	0.005 (0.069)	-0.135 to 0.128	0.142 (0.929)	-1.699 to 1.855	0.058 (0.060)	-0.059 to 0.184	-0.178 (0.686)	-1.281 to 1.116
I feel less sexually inhibited	-0.100 (0.070)	-0.223 to 0.051	0.187 (0.383)	-0.597 to 0.776	-0.103 (0.071)	-0.249 to 0.027	0.187 (0.410)	-0.600 to 0.809
Covariates								
Retirement Status	-0.333† (0.218)	-0.800 to 0.054	0.077 (2.378)	-2.562 to 2.427	0.246 (0.183)	-0.129 to 0.586	-0.704 (2.139)	-2.776 to 0.913
Educational Level	0.031 (0.048)	-0.071 to 0.124	0.017 (0.439)	-0.966 to 0.780	0.053 (0.048)	-0.044 to 0.1148	0.056 (0.331)	-0.683 to 0.603

Number of Chronic Health Conditions	-0.075 (0.104)	-.0277 to 0.134	-0.302 (0.492)	-1.331 to 0.646	0.006 (.088)	-0.163 to 0.176	-0.048 (.381)	-0.704 to 0.823
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Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$; Unconstrained model vs Constrained, $\chi^2(28) = 37.622$, $p = .106$

Sex Differences in Injunctive Drinking Norms and Risky Drinking (Model 2c).

Comparison of the freely estimated and constrained models revealed no significant differences between males and females in the overall models, $\chi^2_{\text{diff}}(14) = 16.41, p = .29$ (Table 8). However, for females only, perceived approval by friends of drinking behaviors (i.e., drinking alcohol every weekend and drinking daily) was positively associated with HD, $b = 0.49, SE = 0.13, 95\% \text{ CI } [0.14, 0.66], p = .01$. Furthermore, there was a significant difference in slopes for this relationship between males and females. These findings suggest that, for females, more perceived approval by friends of drinking behaviors is related to more HD ; however, the strength of that association was stronger for males, $t = 3.47, p = .001$ (see Figure 5). Perceived approval by the typical adult aged 65 and older, the typical same-sex adult aged 65 and older, and perceived approval by a spouse or partner were not significantly associated with HD for either males or females.

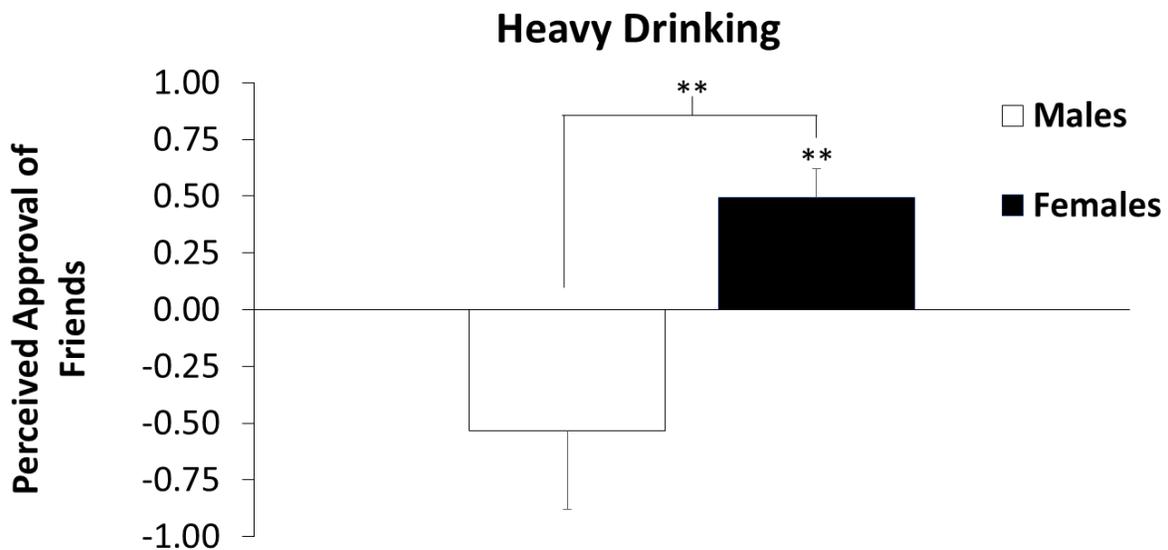


Figure 5. Sex differences in the relationship between perceived approval by friends of drinking daily and every weekend and HD. *Note:* * $p \leq .05$; ** $p \leq .01$.

Similarly, perceived approval by friends of drinking behaviors was marginally positively

associated with HED for females but not males, $b = 0.38$, $SE = 0.17$, 95% CI $[-0.04, 0.61]$, $p = .07$. This suggests that more perceived approval by friends of drinking behaviors is related to more HED for females but there were no significant sex differences for the strength of this association. The association between perceived approval of drinking behaviors by the typical adult aged 65 and older, the typical same-sex adult aged 65 and older, and a spouse or partner were not significantly associated with HED for males nor female

Table 8. Bootstrapped Results of Unconstrained Model 2c: Sex Differences in Injunctive Drinking Norms and Risky Drinking

Variables	Heavy Drinking				Heavy Episodic Drinking			
	Females		Males		Females		Males	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors								
Typical Adult Aged 65 and Older	-0.178 (0.162)	-0.464 to 0.154	0.449 (0.322)	-0.443 to 0.721	-0.216 (0.173)	-0.496 to 0.182	0.432 (0.344)	-0.441 to 0.744
Typical Same-Sex Adult Aged 65 and Older	-0.156 (0.145)	-0.416 to 0.200	0.027 (0.280)	-0.600 to 0.505	-0.088 (0.175)	-0.438 to 0.328	-0.230 (0.297)	-0.635 to 0.497
Friends	0.494** (0.128)	0.143 to 0.656	-0.532 (0.349)	-0.748 to 0.512	0.378† (0.166)	-0.043 to 0.610	-0.033 (0.417)	-0.612 to 0.743
Spouse/Partner	0.006 (0.067)	-0.138 to 0.129	0.411 (0.234)	-0.072 to 0.782	-0.040 (0.067)	-0.188 to 0.085	-0.177 (0.234)	-0.652 to 0.251
Covariates								
Retirement Status	-0.295* (0.127)	-0.537 to -0.020	0.117 (0.193)	-0.450 to 0.366	0.031 (0.106)	-0.201 to 0.207	0.022 (0.261)	-0.494 to 0.366
Educational Level	0.058 (0.085)	-0.117 to 0.218	0.146 (0.121)	-0.053 to 0.468	0.150 (0.093)	-0.034 to 0.332	-0.053 (0.132)	-0.317 to 0.204
Number of Chronic Health Conditions	-0.140 (0.113)	-0.349 to 0.090	-0.148 (0.130)	-0.375 to 0.156	0.097 (0.163)	-0.235 to 0.397	-0.228 (0.148)	-0.460 to 0.141

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$; Unconstrained model vs Constrained, $\chi^2(14) = 16.412$, $p = .289$

Sex Differences in Drinking to Cope Motives and Risky Drinking (Model 2d).

Comparison of the freely estimated and constrained models revealed no significant differences between males and females in the overall models, $\chi^2_{\text{diff}}(16) = 11.73, p = .76$ (Table 9). DTCs were not associated with HD for males or females. There were no sex differences in strengths of the associations between DTCs and HD.

However, for females ($b = 0.34, SE = 0.19, 95\% CI [0.04, 0.82], p = .02$) but not males, endorsing drinking because it helps when feeling depressed or nervous was positively associated with HED. That is, the more females endorsed drinking because it helps when feeling depressed or nervous drinking the more HED they did (Table 9). There were no sex differences in strengths of this relationship. Additionally, endorsement of drinking to feel more self-confident and sure of oneself was negatively associated with HED for females only, $b = -0.13, SE = 0.10, 95\% CI [-0.38, -0.01], p = .03$. This finding suggests that more endorsement of drinking because it helps when feeling depressed or nervous was related to less HED. There were also no sex differences in strengths of this relationship. The following DTCs were not associated with HED for males nor females: drinking to forget one's worries, drinking to cheer up in a bad mood, and drinking to forget one's problems. There were also no significant differences in strengths of these associations between males and females.

Table 9. Bootstrapped Results of Unconstrained Model 2d: Sex Differences in Drinking to Cope Motives and Risky Drinking

Variables	Heavy Drinking				Heavy Episodic Drinking			
	Females		Males		Females		Males	
	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.	Estimate (S.E.)	Bootstrapped 95% C.I.
Predictors								
To forget your worries	0.163 (0.226)	-0.244 to 0.650	-0.054 (3.121)	-1.598 to 8.258	0.009 (0.220)	-0.443 to 0.359	1.032 (1.986)	-0.279 to 5.564
Because it helps when you feel depressed or nervous	0.158 (0.213)	-0.142 to 0.692	0.242 (4.690)	-8.133 to 1.800	0.344* (0.193)	0.042 to 0.817	-0.512 (3.474)	-4.595 to 1.533
To cheer up when in a bad mood	0.158 (0.134)	-0.094 to 0.438	0.455 (2.582)	-4.435 to 1.312	0.033 (0.112)	-0.185 to 0.243	0.369 (1.620)	-1.822 to 1.345
Because you feel more self-confident and sure of yourself	-0.024 (0.105)	-0.225 to 0.200	-0.529 (3.924)	1.558 to 5.630	-0.130* (0.096)	-0.379 to - 0.013	0.187 (2.959)	-0.830 to 2.922
To forget your problems	-0.072 (0.126)	-0.304 to 0.191	-0.095 (2.606)	-6.039 to 0.998	-0.084 (0.149)	-0.287 to 0.182	-0.779 (1.623)	-3.594 to 0.142
Covariates								
Retirement Status	-0.346† (0.187)	-0.714 to 0.015	-0.093 (2.784)	-9.070 to 0.674	0.126 (0.135)	-0.138 to 0.386	0.153 (1.671)	-1.681 to 2.017
Educational Level	0.050 (0.041)	-0.035 to 0.127	0.106 (0.152)	-0.114 to 0.523	0.047 (0.055)	-0.072 to 0.151	-0.059 (0.142)	-0.343 to 0.265
Number of Chronic Health Conditions	-0.114 (0.090)	-0.294 to 0.058	-0.190 (0.350)	-0.567 to 0.101	-0.025 (0.093)	-0.198 to 0.161	-0.191 (0.190)	-0.494 to 0.216

Note: * $p \leq .05$; ** $p \leq .01$; † $.05 > p \leq .07$; Unconstrained model vs Constrained, $\chi^2(16) = 11.726, p = .763$

Exploratory Analyses

Although, positive associations between perceived stress, positive alcohol outcome expectancies, and injunctive norms and drinking to cope motives have been found, there is little work examining these relationships in older adults, particularly sex differences (Carrigan et al., 2009; Peirce et al., 1996; Rice & Van Arsdale, 2010). Therefore, the next set of analyses explored these associations and sex differences in these relationships.

Overall Associations

Perceived Stress and Drinking to Cope Motives (Model E.1a). Analyses revealed that PS was not associated with drinking to forget one's worries, because it helped when feeling depressed or nervous, to cheer up when in bad mood, or to forget about one's problems. However, two PS items emerged as significantly associated with drinking because it makes one feel more self-confident and sure of oneself. First, feeling confident in one's ability to handle personal problems was positively associated with drinking to feel more self-confident and sure of oneself, $b = 0.39$, $S.E. = 0.14$, $95\% \text{ CI } [0.06, 0.62]$, $p = .01$. This suggests that feeling more confident in one's ability to handle personal problems is related to also more highly endorsing drinking to feel more self-confident and sure of oneself. Secondly, feeling that things were going one's way was *negatively* associated with drinking to feel more self-confident and sure of oneself, $b = -0.16$, $S.E. = 0.08$, $95\% \text{ CI } [-0.34, -0.02]$, $p = .02$. This suggests that higher feelings that things were going one's way was related to less endorsement of drinking to feel more self-confident and sure of oneself.

Positive Alcohol Outcome Expectancies and Drinking to Cope Motives (Model E.1b).

Several PAOES emerged as significantly associated with DTCs. Analyses revealed three PAOEs were positively associated with drinking to forget one's worries: expecting it to be easier to

socialize ($b = 0.18$, $S.E. = 0.10$, $95\% \text{ CI } [0.01, 0.40]$, $p = .03$), expecting to enjoy the buzz from drinking ($b = 0.15$, $S.E. = 0.07$, $95\% \text{ CI } [0.01, 0.30]$, $p = .03$), and feeling relaxed from drinking, $b = 0.30$, $S.E. = 0.11$, $95\% \text{ CI } [0.02, 0.26]$, $p = .02$. These findings suggest that higher expectations of it being easier to socialize, enjoying the buzz of alcohol, and feeling relaxed from drinking are related to higher endorsement of drinking to forget one's worries.

With regards to drinking because it helps when feeling depressed or nervous, expecting drinking to make it easier to socialize was positively associated with this DTC, $b = 0.23$, $S.E. = 0.10$, $95\% \text{ CI } [0.05, 0.43]$, $p = .01$. This suggests that expecting drinking alcohol to make it easier to socialize was related to higher endorsement of drinking because it helps when feeling depressed or nervous. No PAOES were associated with drinking to cheer up when in a bad mood; however, expecting drinking to make one feel less shy was positively associated with drinking to feel more self-confident and sure of oneself, $b = 0.11$, $S.E. = 0.07$, $95\% \text{ CI } [-0.001, 0.26]$, $p = .05$. This suggests that higher expectations that drinking alcohol will make one feel less shy is related to higher endorsement of drinking to feel more self-confident and sure of oneself. Lastly, two PAOEs were significantly associated with drinking to forget one's problems: expecting to feel a part of the group ($b = -0.40$, $S.E. = 0.19$, $95\% \text{ CI } [-0.76, -0.03]$, $p = .03$) and expecting to feel more accepted socially, $b = 0.20$, $S.E. = 0.07$, $95\% \text{ CI } [0.07, 0.33]$, $p = .01$. These findings suggest that higher expectations of feeling a part of the group when drinking was related to less endorsement of drinking to forget one's problems; conversely, higher expectations to feel more socially accepted was related to higher endorsement of drinking to forget one's problems.

Injunctive Drinking Norms and Drinking to Cope Motives (Model E.1c). For the final exploratory analyses of the overall associations between IDNs and DTCs, perceived approval of

drinking behaviors (i.e., drinking daily and drinking every weekend) by the typical adult aged 65 and older and spouse/partner reference groups were not significantly associated with DTCs. However, perceived approval of drinking behaviors by friends was marginally positively associated with drinking because it helps when feeling depressed or nervous, $b = 0.15$, S.E. = 0.09, 95% CI [-0.01, 0.33], $p = .06$. Conversely, perceived approval by a typical *same-sex* adult aged 65 and older was negatively associated with both drinking to cheer up when in a bad mood ($b = -0.30$, S.E. = 0.15, 95% CI [-0.67, -0.06], $p = .02$) and drinking to feel more self-confident and sure of oneself, $b = -0.23$, S.E. = 0.12, 95% CI [-0.51, -0.03], $p = .03$. These findings suggest that higher perceived approval by a typical same-sex adult aged 65 and older is related to less endorsement of drinking to cheer up when in a bad mood and drinking to feel more self-confident and sure of oneself. Similarly, perceived approval of drinking behaviors by friends was positively associated with drinking to cheer up when in a bad mood, $b = 0.29$, S.E. = 0.12, 95% CI [0.07, 0.58], $p = .01$. Both of these findings suggest that higher perceived approval from friends regarding drinking daily and drinking every weekend is related to higher endorsement of drinking because it helps when feeling depressed or nervous and drinking to cheer up when in a bad mood.

Sex Differences

Comparison of the freely estimated and constrained models revealed no significant differences between males and females in any of the models.

Sex Differences in Perceived Stress and Drinking to Cope Motives (Model E.2a).

Multiple group analyses revealed that PS was not associated with drinking to forget one's worries, to cheer up when in a bad mood, nor drinking to forget one's problems for males or females, $\chi^2_{\text{diff}}(19) = 19.27$, $p = .44$. There were no sex differences in strengths of this

relationship as determined by testing differences in slopes.

However, there were positive associations for both males and females for drinking when feeling depressed or nervous. For females, feeling confident in one's ability to handle personal problems was marginally positively associated with drinking when feeling depressed or nervous ($b = 0.30$, $S.E. = 0.14$, $95\% \text{ CI } [-0.01, 0.57]$, $p = .06$); while for males, feeling difficulties were piling up so high they could not be overcome was positively associated with drinking when feeling depressed or nervous, $b = 0.46$, $S.E. = 0.04$, $95\% \text{ CI } [0.04, 0.72]$, $p = .03$. These findings suggest that females who reported feeling more confident in ability to handle personal problems also endorsed more drinking to cope when feeling depressed or nervous. They also suggest the more males felt difficulties were piling up so high as to be unable to overcome was related to more endorsement of drinking because it helps when feeling depressed or nervous. For this relationship, there were significant differences in slopes such that the association was stronger for males than females, $t = 2.04$, $p = .04$. There were no significant sex differences for the strengths of the associations between drinking because it helps when you feel depressed or nervous and feeling unable to control important things, feeling confident in one's ability to handle personal problems, nor feeling things were going one's way.

While PS wasn't significantly associated with drinking to cheer up when in a bad mood for males nor females, feeling confident in one's ability to handle personal problems was marginally positively associated with drinking in order to feel more self-confident and sure of oneself for females only ($b = 0.30$, $S.E. = 0.14$, $95\% \text{ CI } [-0.01, 0.57]$, $p = .06$). However, there were no sex differences in strengths of the relationship between PS and drinking to feel more self-confident and sure of oneself. Lastly, PS was not significantly associated with drinking to forget one's problems for males nor females.

Sex Differences in Positive Alcohol Outcome Expectancies and Drinking to Cope

Motives (Model E.2b). Multiple group analyses revealed that two PAOEs were significantly related to drinking to forget one's worries for females but not males. Expecting to enjoy the buzz from drinking ($b = 0.12$, S.E. = 0.11, 95% CI [0.06, 0.51], $p = .02$) and expecting to feel relaxed from drinking ($b = 0.09$, S.E. = 0.10, 95% CI [-0.001, 0.23], $p = .05$) were positively associated with drinking to forget one's worries. This suggests that, for females, higher expectations of enjoying the buzz and expecting to feel relaxed from drinking were related to higher endorsement of drinking to forget their worries. For males, there were no PAOEs significantly associated with drinking to forget one's worries. There were also no significant sex differences in strengths for the associations between PAOEs and drinking to forget one's worries.

For females only, no PAOEs were associated with drinking because it helps when feeling depressed or nervous; conversely, for males, expecting to feel a part of the group was marginally negatively associated with drinking because it helps when feeling depressed or nervous, $b = -0.60$, S.E. = 0.20, 95% CI [-0.76, 0.02], $p = .06$. This suggests that, for males, higher expectations of feeling a part of the group when drinking is related to lower endorsement of drinking because it helps when feeling depressed or nervous. There were no sex differences in the strength of the associations between PAOEs and drinking because it helps when feeling depressed or nervous.

No PAOEs were significantly associated with drinking to cheer up when in a bad mood for males nor females. However, for females but not males, expecting to feel less shy when drinking was positively associated with drinking to feel more self-confident and sure of oneself, $b = 0.14$, S.E. = 0.08, 95% CI [0.00, 0.34], $p = .05$. This finding suggests that, for females, higher expectations of feeling less shy when drinking are related to higher endorsement of

drinking to feel more self-confident and sure of their self. There were also no significant differences in strengths of this association by sex. There were also no PAOEs associated with drinking to feel more self-confident and sure of oneself for males.

For females only, expecting to feel a part of the group when drinking was negatively associated with drinking to forget one's problems, $b = -0.48$, $S.E. = 0.23$, $95\% \text{ CI } [-0.92, -0.05]$, $p = .02$). This suggests that, for females, higher expectations of feeling a part of the group was related to lower endorsement of drinking to forget their problems. There were, however, no significant differences in strengths of the association between males and females. Additionally, expecting to feel relaxed from drinking was marginally positively associated with drinking to forget one's problems for females, $b = 0.16$, $S.E. = 0.08$, $95\% \text{ CI } [-0.02, 0.32]$, $p = .07$. This finding suggests that higher expectations of feeling relaxed from drinking are related to higher endorsement of drinking to forget one's problems for females only. There were also no significant sex differences in strengths of the associations between PAOEs and drinking to forget one's problems. For males, no PAOEs were significantly associated with drinking to forget one's problems.

Sex Differences in Injunctive Drinking Norms and Drinking to Cope Motives (Model E.2c). Multiple group analyses revealed IDNs were not associated with drinking to forget one's worries for males or females. Similarly, there were no associations between IDNs and drinking because it helps when feeling depressed or nervous for neither males nor females.

When considering drinking to cheer up when in a bad mood, IDNs emerged as significant only for females. Specifically, perceived approval of drinking behaviors by friends was positively associated with drinking to cheer up when in a bad mood for females, $b = 0.32$, $S.E. = 0.14$, $95\% \text{ CI } [0.10, 0.68]$, $p = .014$. This suggests that, for females, higher perceived approval of

drinking behaviors by friends is related to higher endorsement of drinking to cheer up when in a bad mood. There were significant differences in strengths of this association between males and females ($t = 2.70, p = .01$) suggesting that the relationship was stronger for males than females. Lastly, IDNs were not associated with drinking because it makes one feel more self-confident and sure of oneself nor drinking to forget one's problems for males or females.

Table 10. Summary of Support for Hypotheses

Hypothesis	Result
1a.	
Perceived stress will be positively associated with risky drinking.	Partially supported. (Table 3)
1b.	
Positive alcohol outcome expectancies will be positively associated with risky drinking.	Partially supported. (Table 4)
1c.	
Injunctive drinking norms will be positively associated with risky drinking.	Partially supported. (Table 5)
1d.	
Drinking to cope motives will be positively associated with risky drinking.	Partially supported (Table 6)
2a.	
The strength of the positive association between perceived stress and risky drinking would be stronger for males than females.	Not supported.
2b.	
The strength of the positive association between positive alcohol outcome expectancies and risky drinking would be stronger for males than females.	Partially supported. (Table 8)
2c.	
The strength of the positive association between injunctive drinking norms and risky drinking would be stronger for males than females.	Not supported.
2d.	
The strength of the positive association between drinking to cope and risky drinking would be stronger for males than females.	Not supported.

CHAPTER 5: DISCUSSION

The current study sought to systematically examine whether four theoretically-based psychological factors (i.e., perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope) were related to risky drinking behaviors (i.e., heavy drinking and heavy episodic drinking) in older adults. For Aim 1, it was expected that perceived stress (PS), positive alcohol outcome expectancies (PAOEs), injunctive drinking norms (IDNs), and drinking to cope motives (DTCs) would increase heavy drinking (HD) and heavy episodic drinking (HED). Aim 2 examined sex differences with the expectation that the relationships of PS, PAOEs, IDNs, and DTCs to HD and HED would be stronger for males as compared to females. Lastly, additional analyses sought to explore the relationships of PS, PAOEs, and IDNs to DTCs. The present study is among the first to individually examine whether facets of PS, PAOEs, IDNs, and DTCs are associated with risky drinking behaviors in older adults and to examine whether these relationships differ by sex.

Tables 11a and 11b provide summaries of original hypotheses and findings by aim. Toward the end, the discussion is organized to present findings that 1) supported what was expected and 2) did not support what was expected. Lastly, Table 12 provides a summary of exploratory findings and sex differences found in the associations. Findings will then be collectively discussed in terms of their implications for risky drinking in older adults and how future work might build upon the limitations from the current study.

Aim 1: Examining the associations between PS, PAOEs, IDNs, DTCs and risky drinking behaviors

Table 11a. Summary of support for Aim 1 hypotheses.

Hypotheses	Results
1a. PS will be positively associated with risky drinking.	Partially supported— feeling like difficulties were piling up so high they could not be overcome was positively associated with HED only.
1b. PAOEs will be positively associated with risky drinking.	Partially supported— only expecting to be more energetic was positively associated with HD only; expecting to enjoy the buzz and was positively associated with HED only.
1c. IDNs will be positively associated with risky drinking.	Partially supported— only perceived approval by friends was positively associated with HD and HED.
1d. DTCs will be positively associated with risky drinking.	Partially supported— drinking when feeling depressed or nervous was positively associated with HED only.

Supported Findings. Different facets of the psychological factors were related to the two risky drinking behaviors (i.e., HD and HED) assessed. This suggests different goals may be associated with engaging in HD as compared to HED.

Findings partially supported the hypothesis that PS would be positively associated with risky drinking behavior. Specifically, only higher levels of feeling that difficulties were piling up so high they could not be overcome was found to be increase HED but not HD. This is somewhat consistent with a larger body of epidemiologic literature highlighting the association stress and stressful events on overall alcohol consumption (Keyes, Hatzenbuehler, and Hasin, 2012). A possible explanation may be that, while older adults tend to report fewer overload stressors (i.e., having to meet many demands) and generally display greater impulse control, when faced with many overload stressors (i.e., difficulties piling up so high they cannot be overcome) they might be more likely to infrequently engage in impulsive and risky behaviors such as HED as opposed to habitual HD (Almeida, Piazza, Stawski, & Klein, 2011).

Findings partially supported the hypothesis that PAOEs would be positively associated

with risky drinking behaviors. Higher expectations to feel more energetic from drinking alcohol was associated with more HD; similarly, higher expectations of enjoying the buzz from drinking with associated with more HED. These findings are consistent with literature in which medicinal purposes are often cited as a reason for alcohol use and abuse by older adults, such as to manage pain (Immonen, Valvanne, & Pitkälä, 2011; Kuerbis, Sacco, Blazer, & Moore, 2014; Satre, 2015). Thus, health of the consumer may be a potential reason for consuming alcohol to alleviate negative physical states such as to reduce fatigue or pain associated with health conditions.

Novel to the study of risky drinking in older adults was the assessment of IDNs. Findings partially supported the hypothesis that higher perceived approval of drinking behaviors (i.e., drinking daily and drinking every weekend) would be associated with more risky drinking. Specifically, only higher perceived approval of friends was associated with more HD and HED. This is consistent with previous studies focusing on younger adult and adolescent populations demonstrating that individuals' engagement in risky drinking is more affected by local norms referents (e.g., people who share friendship) than by global norms referents (people who share a gender; Blanton, Köblitz, & McCaul, 2008; Neighbors et al., 2008).

Another novel aspect of the current study is the examination of DTCs in an older sample. This is the first study to examine how individual drinking to cope motives are associated with HD and HED in a sample of adults aged 65 and older. Findings partially supported the hypothesis that higher endorsement of DTCs would be associated with more risky drinking. Only higher endorsement of drinking because it helps when feeling depressed or nervous was associated with more HED. This finding is partly consistent with evidence suggesting that self-medication is a common behavior among individuals experiencing depressive or anxiety symptoms (Canham & Mauro, 2017). Examinations of US nationally representative samples

have found that people with depression were more likely to engage in drinking to cope (Bolton, Cox, Clara, & Sareen, 2006). Menary, Kushner, Maurer, and Thuras (2011) examined the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) and found that in a nationally representative of US adults 18 to 98 years of age, 20.3% of people with an anxiety disorder also reported drinking to manage their symptoms. With other studies obtaining similar findings demonstrating higher prevalence of self-medication among those with generalized anxiety disorder in other nationally representative samples (Bolton, Cox, Clara, & Sareen, 2006).

Unsupported Findings. Unlike as hypothesized for PS to be positively associated with risky drinking, higher levels of feeling unable to control important things in life was related to less HED. This is inconsistent with literature suggesting that controllability of stressors an important factor in an individual's use of maladaptive coping strategies, such as alcohol use and abuse (Taylor et al., 1992). It may be that various characteristics of stressor (e.g., chronicity) may affect risky drinking behaviors in distinct ways. For example, one possible explanation may be that chronic stressors negate these behaviors through the “dampening” effects of long-term or repetitive negative affective states over time (Almeida et al., 2011). A second possibility is that the focus on global perceived stress as opposed to any explicit stressors that may have been experienced over the past month may have washed out effects. Older adults tend to report fewer overall stressors and less stressor overload, or having to meet numerous demands, and display greater impulse control when dealing with stressors (Almeida, Piazza, Stawski, & Klein, 2011). Additionally, the lack of focus on stressors particularly pertinent to aging and later life may have washed out effects. Studies of late-life adults have found more interpersonal stressors to be related to increased alcohol consumption while more health stressors and events are associated with reduced alcohol consumption in later life (Moos, Brennan, Schutte, & Moos, 2005; Moos et

al., 2010; Schutte, Brennan, & Moos, 1998). Although the present study did not assess social support, other research has found that complications may arise when stressors are paired with low levels of social support or few available social resources in times of stress (Timko, Finney, & Moos, 2005). For example, one could imagine that when faced with an overload of stressors (e.g., familial conflict and health-related stress) but having little social support, older adults may be more likely to engage in impulsive and risky behaviors such as such as HED. Another explanation for the discrepancy in findings may due to the low internal consistency of the PSS-4 within this sample which may have caused unreliable estimates.

Concerning the hypothesis that PAOEs would be positively associated with risky drinking, two expectancies were found to be negatively associated with HED. Higher expectations of being more accepted socially and higher expectations of being able to take one's mind off their problems when drinking were related to lower HED. There is some evidence to support the former finding such that endorsement of social enhancement expectancies with lessens with age (Nicolai, Moshagen, & Demmel, 2012). Higher expectations of social enhancement have been found to be associated with more HED in adults aged 18 to 24 years old but not adults 45 to 64 years old (Pabst, Krause, Piontek, Mueller, & Demmel, 2014). Furthermore, some research has found that the influence of both positive and negative alcohol outcome expectancies on alcohol use may decline with age and seem to focus less on expectations of social and sexual enhancement but more on expectations of tension reduction and impairment (Nicolai, Moshagen, & Demmel, 2012). However, this is still somewhat contrary to the findings of the current study which found that higher expectations of tension reduction (i.e., being able to take one's mind of their problems) was associated with less HED. It may be that individual differences (e.g., state or trait positive and negative affect) that were not considered

might influence endorsement of specific PAOEs differences and, thus, their relationships with risky drinking behaviors.

Of the IDNs, the typical adult aged 65 and older, the typical same-sex adult aged 65 and older, and spouse/partner reference groups were not associated with risky drinking. In literature focusing on alcohol use in college students, it has been suggested that risky drinking is more highly affected by close referents (e.g., parents, people who share a peer group) as compared to more general referents (e.g., people who share an age group; Blanton, Köblitz, & McCaul, 2008; Neighbors et al., 2008). However, unlike in younger populations, perceived spousal or partner approval of drinking behaviors was not a significant factor in risky drinking for the present sample.

A possible explanation may be that some reference groups might be represented by multiple people (i.e., friends) as compared to those groups representing individuals (e.g., typical older adult, romantic partner) resulting in weaker effects for the latter on risky drinking behaviors (Dunleavy, 2008). The reference groups also were not necessarily equivalent or mutually exclusive. For example, a spouse or partner may have been used as the typical adult 65 and older referent in addition to the spouse/partner referent and, therefore, counted twice. Another possibility is based on literature of mid-life adults' alcohol use that suggests romantic couples tend to engage in similar drinking behaviors (Windle & Windle, 2014). That is, couples are more likely to both drink or not drink, consume alcohol in similar frequencies and quantities, and engage in risky drinking (i.e., heavy drinking and heavy episodic drinking) at comparable rates. It may be that individuals do not view their partners as approving or disapproving of drinking every day or every weekend per se but more so contributing to the occurrence of the behaviors. Future research should not only examine the concordance of drinking behaviors but

also expand on the types of drinking behaviors that may be more salient within the context of romantic relationships in later life.

Aim 2: Examining sex differences in the associations between PAOEs, IDNs, DTCs and risky drinking behaviors

Table 11b. Summary of support for Aim 2 hypotheses.

Hypotheses	Results
2a. The strength of the positive association between perceived stress and risky drinking would be stronger for males than females.	Not supported.
2b. The strength of the positive association between positive alcohol outcome expectancies and risky drinking would be stronger for males than females.	Partially supported— only the association between expecting to enjoy the buzz from drinking and HED was stronger for males than females.
2c. The strength of the positive association between injunctive drinking norms and risky drinking would be stronger for males than females.	Not supported.
2d. The strength of the positive association between drinking to cope and risky drinking would be stronger for males than females.	Not supported.

Supported Findings. Findings partially supported the hypothesis that the strength of the positive association between PAOEs and risky drinking would be stronger for males than females. Specifically, the relationship between higher expectations of enjoying the buzz from drinking and HED was stronger for males than females. This is consistent with studies that have reported sex differences in the role of PAOEs on drinking. Such studies have found that in samples of community-dwelling adults 18 to 59 years of age, males tend to report overall stronger expectancies than females (Armeli, Carney, Tennen, Affleck, & O’Neil, 2000; Nicolai, Moshagen, & Demmel, 2012).

Unsupported Findings. While there were significant sex differences in the strength of the associations between feeling unable to control important things in life and HD, these associations were negative for both males and females. Furthermore, more feelings difficulties were piling up so high they couldn’t be overcome was also significantly related to more HED males but not females. There was a significant association between more feeling difficulties

piling up stressors so high they could not be overcome and HED for females but not males; however, there were no significant differences in the strengths of the associations. The lack of differences between males and females could indicate differences in sample size (27 males, 70 females). Another explanation may be the low internal consistency of the PSS within this sample. Use of a more psychometrically sound measure of PS with more comparable sample sizes may account for these discrepancies.

Only 2 of the 11 PAOEs emerged as significantly associated with risky drinking: expecting to enjoy the buzz (as discussed under support findings) and expecting to be more accepted. However, in the present sample, females who had higher expectations of being more socially accepted when drinking engaged in significantly less HD and HED. There is some evidence that males may be more likely to drink before a socially stressful task as compared to females (Battista, Stewart, & Ham, 2010). This may be particularly true for older females who may avoid HED who may expect their consumption or intoxication levels to be socially evaluated based on gender norms. Inclusion of individual differences such as attitudes toward gender norms or roles may influence the PAOEs and their relationship with risky drinking differently for males and females.

While there was a significant sex difference in the strengths of associations between IDNs (i.e., perceived approval of drinking behaviors by friends) and risky drinking, the association was negative for males. Findings revealed that higher perceived approval of friends was related to more HD and HED, for females but not males. Studies have also found a greater self-other discrepancy in females' perception of others' approval of drinking than for males. One explanation may be that females perceive norms to be more illustrative of males' drinking behavior than their own (Bosari & Carey, 2003). With this in mind, future research should

examine more distinct (e.g., same- vs. other-sex friends) and age-salient referents (e.g., children, grandchildren, caregivers, medical providers) to better understand the role of IDNs in risky drinking in older populations.

Lastly, there were no sex differences in the strengths of the positive, nor negative, associations between DTCs and risky drinking. There was, however, an association between higher endorsement of drinking because it helps when feeling depressed or nervous for females but not males. This finding is somewhat consistent with studies on college student. One such study used experience sampling to examine gender differences in coping motives and drinking immediacy in response to daily sadness in a sample of 85 college students over 28 days (Hussong, 2007). They found that college women that endorsed more drinking to cope were more likely to more drink following elevated sadness. Conversely, for females in the present sample, higher endorsement of drinking to feel more self-confident and sure of oneself was associated less HED only. There is mixed evidence on whether individuals choose to more alcohol when anticipating or engaging in a social anxiety-provoking task, but this may be due to gender or sex differences (Battista, Stewart, & Ham, 2010). Future work examining risky drinking in older adults should examine specific contexts and consistency of application of DTCs (situational vs. dispositional) to elucidate the interactions between types of drinking behavior (i.e., HD vs. HED) and drinking to cope behaviors.

Exploratory Findings: Exploring whether PS, PAOEs, and IDNs are associated with DTCs

Table 12. Summary of exploratory findings

Association Explored	Findings	Sex Differences
E.1a. Is there an association between PS and DTCs?	<p><i>PS associated with drinking to feel more self-confident and sure of oneself:</i></p> <ul style="list-style-type: none"> • Feeling confident in one's ability to handle personal problems (+) • Feeling that things were going one's way (-) 	Yes
E.1b. Is there an association between PAOEs and DTCs?	<p><i>PAOEs associated with drinking to forget one's worries:</i></p> <ul style="list-style-type: none"> • Expecting it to be easier to socialize (+) • Expecting to enjoy the buzz from drinking (+) • Expecting to feel relaxed from drinking (+) <p>—<i>with drinking when feeling depressed or nervous:</i></p> <ul style="list-style-type: none"> • Expecting it to be easier to socialize (+) <p>—<i>with drinking to feel more self-confident and sure of oneself:</i></p> <ul style="list-style-type: none"> • Expecting drinking to make one feel less shy (+) <p>—<i>with drinking to forget one's problems:</i></p> <ul style="list-style-type: none"> • Expecting to feel more a part of the group (-) • Expecting to feel more socially accepted (+) 	No
E.1c. Is there an association between IDNs and DTCs?	<p><i>Reference groups associated with drinking because it helps when feeling depressed or nervous</i></p> <ul style="list-style-type: none"> • Friends (+) <p>—<i>with drinking to cheer up when in a bad mood:</i></p> <ul style="list-style-type: none"> • Typical same-sex adult aged 65 and older (-) • Friends (+) <p>—<i>with drinking to feel more self-confident and sure of oneself:</i></p> <ul style="list-style-type: none"> • Typical same-sex adult aged 65 and older (-) 	Yes

Note. (+) denotes a positive association; (-) denotes a negative association.

Given the dearth of literature examining the relationships between PS, PAOEs, IDNs, and DTCs, particularly in older adults, additional analyses were conducted to explore these associations (Carrigan et al., 2009; Peirce et al., 1996).

Overall Associations. Regarding PS, feeling confident in one's ability to handle personal

and feeling that things were going one's way were both positively and negatively associated with drinking to feel more self-confident and sure of oneself, respectively. That is feeling more confident in one's ability to handle personal problems was related to higher endorsement of drinking to feel more self-confident and sure of oneself. Conversely, higher feelings that things were going one's way was related to less endorsement of drinking to feel more self-confident and sure of oneself. This is inconsistent with evidence demonstrating that in older adults greater perceived personal control is related to reduced physiological (e.g., reduced cortisol secretion) and emotional reactivity to stressors, while lower perceived control has been linked to the opposite (Lachman, Neupert, & Agrigoroaei, 2011). It is unclear as to why feeling confident in one's abilities to handle problems would be related to higher endorsement of drinking to feel more self-confident and sure of oneself. One explanation may be that there are intraindividual variability in perceived control beliefs as they relate to stress (Lachman, Neupert, & Agrigoroaei, 2011). Another possible reason for the discrepancy in the current study is that the low internal consistency of the PSS items within this sample may have affected its findings. Future work should examine PS using more psychometrically sound measures to clarify these associations.

This study is novel in that it is the first to examine the relationship between alcohol outcome expectancies, specifically PAOEs, and DTCs in an older sample. Three PAOEs emerged as associated with drinking to forget one's worries. Higher expectations that it will be easier to socialize when drinking; higher expectations to enjoy the buzz from drinking; and higher expectations of feeling relaxed from drinking were related to higher endorsement of drinking to forget one's worries. This is consistent with the Stressor-Vulnerability Model of Alcohol Consumption which posits that individuals with stronger beliefs concerning alcohol's positive outcomes (e.g., tension reduction) is a significant independent contributor to the

prediction of drinking to cope motives (Cooper et al., 1988). There is evidence in studies of younger populations that have demonstrated positive alcohol outcome expectancies may be positively associated with drinking to cope motives (Carrigan et al., 2009; Peirce et al., 1996; Rice & Van Arsdale, 2010).

Additionally, only expecting it to be easier to socialize was associated with drinking when feeling depressed or nervous. That is, higher expectations of it being easier to socialize were associated with higher endorsement of drinking when feeling depressed or nervous. Higher expectations of drinking to make one feel less shy was only one significantly related to higher endorsement of drinking to feel more self-confident and sure of oneself. Lower expectations of drinking to make one feel more a part of the group was associated with higher endorsement of drinking to forget one's problems; while higher expectations to be more socially accepted were related with higher endorsement of drinking to forget one's problems. These findings suggest that while social enhancement expectancies may not be particularly salient for older adults regarding actual drinking behaviors, these expectancies may influence motives or intentions to drink to cope.

Lastly, only the typical same-sex adult aged 65 and older and the friends reference groups were associated with DTCs. Specifically, higher perceived approval by friends of drinking behaviors (i.e., drinking daily and drinking every weekend) was related to both higher endorsement of drinking because it helps when feeling depressed or nervous and drinking to cheer up when in a bad mood. Conversely, higher perceived approval by the typical same-sex adult aged 65 and older was related to lower endorsement of drinking to cheer up when in a bad mood and drinking to feel more self-confident and sure of oneself. While there is no previous work examining IDNs within the context of DTCs in older adults, it may be that if drinking to

cope with negative affect is accepted or encouraged within a social network, individuals may be more likely to also approve of and engage in drinking to regulate emotions. Future work should examine a broader array of referents (e.g., acquaintances vs. close friends, the typical adult aged 65 and older in the community or neighbor) to better understand these relationships.

Sex Differences. Additional analyses exploring whether there were sex differences in the associations between PS, PAOEs, IDNs, and DTCs. Further exploration of the association between PS and DTCs revealed that there were sex differences in strengths of this associations between PS and DTCs. Firstly, the association between feeling difficulties were piling up so high as to be unable to overcome and drinking because it helps when feeling depressed or nervous was stronger for males than females. Further, for males only, higher reported feeling difficulties piling up so high they didn't feel that they could overcome was related to higher endorsement of drinking because it helps when feeling depressed or nervous. Among females, reporting feeling more confident in their ability to handle personal problems was related to higher endorsement drinking because it helps when feeling depressed or nervous. drinking to cope when feeling depressed or nervous. Lastly, concerning PS, feeling more confident in one's ability to handle personal problems was related to higher endorsement of drinking in order to feel more self-confident and sure of oneself for females only.

These findings may be explained by The Transactional Model of Stress and Coping, which suggests that the impact of stressful experiences is influenced by the person's primary (evaluation of potential harms or threats) and secondary appraisals (evaluation of ability to alter situation and utilize coping resources) of stressors (Lazarus & Cohen, 1977; Cohen, 1984). There is evidence suggesting that when a stressor is perceived as highly uncontrollable and threatening, an individual may be more likely to use avoidant coping strategies (Taylor et al., 1992). Thus, for

older males who are more reactive to stressors (e.g., financial/legal problems, workplace problems) and more likely to drink to cope than females, controllability of stressors may be particularly salient in regulating negative affect (Canham & Mauro, 2017).

Conversely, females who feel they have a handle on personal stressors may use alcohol to enhance feelings of being sure of themselves and their confidence or make their mood congruent with their perception of having stressors under control. However, there is a dearth of literature exploring mood congruence and drinking to cope. Additional work should include examination of stressor characteristics (e.g., chronic vs. acute, controllability, interpersonal vs. financial or legal problems) and use of alcohol to not just regulate negative emotion but for achieving mood congruence when examining drinking to cope motives in older adults.

This study is novel in that it is the first to examine PAOEs within the context of DTCs in older adult males and females. There were no sex differences in the strengths of the associations between PAOEs and DTCs; however, for females, higher expectancies of enjoying the buzz or feeling relaxed when drinking were related to higher endorsement of drinking to forget their worries. In the current study, females who had higher expectations of feeling less shy when drinking also reported more drinking to feel more self-confident and sure of themselves. For males, higher expectations of feeling a part of the group when drinking was related to lower endorsement of drinking because it helps when feeling depressed or nervous.

Higher expectations of feeling less shy when drinking was related to drinking to feel more self-confident and sure of oneself for females only. Lastly, higher expectations to feel relaxed from drinking was associated with higher endorsement of drinking to forget one's problems.

Literature suggests that males are more reactive in drinking in response to social influences (e.g., peer drinking) and stressors (drinking to reduce tension; e.g., Lemke, Schutte, Brennan, & Moos, 2008); however, that was not found in the current study. This discrepancy might be partly explained by evidence demonstrating higher rates of diagnosed and self-reported social anxiety found in females across the lifespan (Asher, Asnaani, & Aderka, 2017). Females with social anxiety disorder report greater fear for both participating in social interactions (e.g., with authority figures, expressing disagreement or disapproval, having a party) and in situations where they are being observed (e.g., giving a talk or presenting in front of an audience or group, entering a room when others are already seated, being the center of attention; Asher, Asnaani, & Aderka, 2017). The lack of relationship between expectations of feeling more relaxed or buzzed for males suggest that the for older females, the physical aspects of tension-reduction induced by alcohol (e.g., sedative effects) may be especially important as compared to emotion regulation.

The present study is also novel because there is no other work examining the association between injunctive drinking norms and drinking to cope motives in adults aged 65 and older. Findings indicated sex differences in the association perceived approval of drinking behaviors (i.e., drinking daily and every weekend) by friends and drinking to cheer up when in a bad mood with the association being stronger for males. However, only for females, higher perceived approval by friends was significantly related to higher endorsement of drinking to cheer up when in a bad mood. While there is no previous work demonstrating sex differences in perceived approval of friends about drinking and drinking to cheer up, it may be that social norms (i.e., drinking to feel accepted or to avoid rejection) might clarify the relationship between depressive symptoms and drinking to cope motives in college students (Foster et al., 2014). Furthermore, older females may care more about how their drinking is perceived by their friends or have a

more accurate sense of their friends' approval of drinking as compared to more distal referents (e.g., the typical older adult); therefore, drinking to cope may be considered the norm for their social group. Future work should consider dyadic or social network components including individuals' closest friends or other possible proximal referents (e.g., adult children) to better understand how IDNs may influence drinking to cope, both situational and dispositional.

Implications

This is the first study to begin exploring aspects of perceived stress, positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope in the context of risky drinking in adult aged 65 and older. In this cross-sectional study, varying facets of these factors were differentially associated with HD and HED overall, with sex differences within many of those relationships. Sex differences in these relationships suggest that particular aspects of perceived stress, positive alcohol outcome expectancies, and injunctive drinking norms may be differently salient for older males and females in terms not only risky drinking but drinking to cope.

The present study has implications more broadly for future research, and , potentially, for the development and implementation of prevention and intervention programs. Most literature on the relationship between psychological risk factors (i.e., stress, alcohol outcome expectancies, drinking norms, drinking to cope) and risky drinking has focused on populations younger than age 65. However, there is a dearth of literature examining how or if these relationships are also predictive of risky drinking behaviors (i.e., HD and HED) in older adults. Despite the increased consequences of alcohol use in this population, much of the existing research on risky drinking focuses on *if* older males and females are engaging in these behaviors, leaving the *whys* (e.g., to

feel less shy or manage negative affect) and *hows* (e.g., only engaging in risky drinking when friends encourage drinking to cope) largely unexplored.

A better understanding would allow for improvement and development of older-adult specific clinical assessments of alcohol abuse; creation and validation of more reliable measures perceived stress; and development of measures of drinking norms, alcohol outcome expectancies, and drinking to cope motives. In turn, providing the tools necessary to address the increased issues expected with the “silver tsunami” including alcohol-medication interactions (e.g., opioid use with alcohol) in the form of prevention and intervention efforts; to explore the relationships between drinking and potential comorbid conditions (e.g., anxiety, arthritis); and to begin to elucidate the complex interplay of alcohol use, stress, and aging, both psychologically and physiologically.

Limitations & Future Directions

Although the current study has strengths, it is not without limitations. First, the study was cross-sectional in design; thus, causal inference cannot be drawn. It is likely that bidirectional pathways exist between some of the variables assessed (e.g., perceived stress and risky drinking behaviors) or that a related third variable could be influencing the observed relationships. One example is use of protective behavior strategies that might affect quantity and frequency of risky drinking, such as not drinking alone or adding ice to their drinks. In fact, Linden and colleagues (2014) found in a sample of college students that higher endorsement of drinking to cope with negative emotions was associated with less frequent use of strategies to avoid alcohol consumption. Inclusion of assessments of types of protective behaviors use and the frequency of use may help clarify these relationships within older populations as well.

More intensive longitudinal data would allow the researcher to examine the dynamic

processes of inter- and intra-individual shifts and differences in stress, alcohol outcome expectancies, drinking norms, drinking motives, and risky drinking. Additional research would allow for assessment of the frequency and contexts in which older adults use alcohol to enhance physical states and influences of their endorsement of this particular expectancy. Also, while the current study controlled for older adults' health via number of chronic health conditions, symptoms can vary from day to day. Future research should examine utilize methods that assess symptoms of common health concerns in older populations (i.e., pain or fatigue) in the moment, either through daily diaries or ecological momentary assessments (EMA), and examine how these symptoms affect using alcohol to enhance or augment physical state.

Secondly, the present study did not distinguish between biological sex and gender identity. Given the lack of differentiation between these factors, it is impossible to know conclusively that the differences found in this sample are indeed due to biological sex (e.g., physiological response to stress) or gender identity (e.g., societal norms of drinking behavior of men as compared to women). Future research to clarify how gender identity plays a role in these multifaceted dynamics might allow for better understanding of risk factors for heavy and heavy episodic drinking across these groups. Future work should also expand outside of cisgender individuals to include other gender identities (e.g., agender and genderfluid) to more accurately capture these similarities and differences.

Another limitation is that the validity of the measure of perceived stress was poor which can make estimates and, thus, results unreliable. Future work should address this issue using more reliable assessments of perceived stress (e.g., the 14-item PSS) to better understand how it relates to risky drinking and drinking to cope motives.

Another limitation is that alcohol use and perceived were assessed over the past month, therefore are both subject to recall bias. Another limiting factor for the current analyses are that all measures of alcohol use were self-reported, which may result into underestimation of risky drinking due to bias from social desirability. This may be addressed in future research by using more intensive and comprehensive assessments of drinking behaviors and stress, to allow for proximal assessments (e.g., data collected daily or moment to moment). Utilization of more objective measures of alcohol use and stress (e.g., transdermal alcohol sensors, biomarkers of stress) would also help address these limitations.

An additional limitation is due to limited time and budget constraints resulting in utilization of convenience sampling; therefore, participants in the current study were not randomly selected to participate. This leads to sampling bias. The participants of the current sample were relatively homogenous in terms of race and ethnicity (96.9% non-Hispanic White). However, it has been shown in the nationally representative NESARC that among adults, including older populations, Native Americans, African Americans, and Latinos have lower rates of drinking as compared to non-Hispanic Whites (Sacco, Bucholz, & Spitznagel, 2009). The participants of the current study were also highly educated (80.2% college educated or higher), while nationally representative older adult samples show college or higher levels of education at approximately 51% (Sacco, Bucholz, & Spitznagel, 2009).

Lastly, individuals who participated may inherently possess characteristics different from those who did not participate (e.g., more private about their drinking behaviors). Lastly, the sample size, and thus, power with which to test possible indirect effects of psychological factors with more complex analyses (i.e., structural equation modeling) was not possible. These issues limit generalizability of results, warranting replication of these findings using random sampling

techniques and nationally representative samples to obtain results that are more reflective of the US population.

Conclusions

In sum, the current study was the first to examine not only facets of perceived stress, but of positive alcohol outcome expectancies, injunctive drinking norms, and drinking to cope motives as they relate to risky drinking behaviors in older males and females. Together, these findings indicate that salience of psychological factors may vary for HD as compared to HED. Furthermore, sex may be an important factor in these relationships. Future research using larger samples and more detailed, intensive data on stress, alcohol outcome expectancies, injunctive drinking norms, and coping would benefit better understanding their relationship to alcohol use and abuse in older adults.

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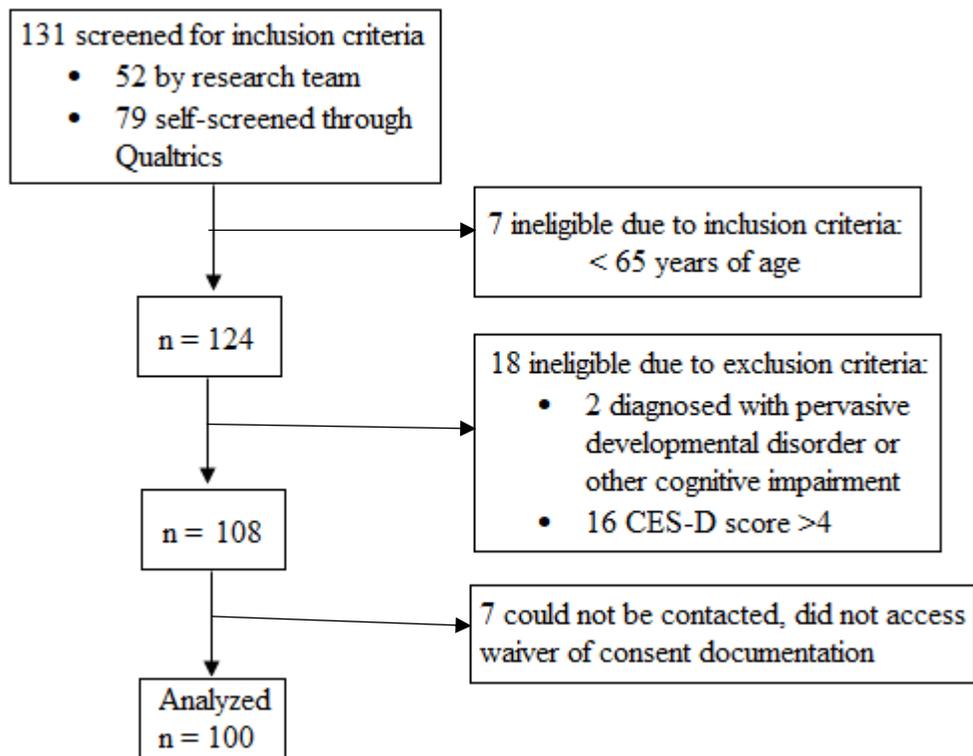
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APPENDIX A

Sampling Flowchart



APPENDIX B

Study Advertisement

**PennState****SEEKING OLDER RESEARCH
VOLUNTEERS**

*Opportunity to earn \$25 and learn about your feelings and beliefs
related to drinking alcohol*

To be eligible, you must:

- 1) be aged 65 or older
- 2) must have consumed alcohol within the past month (30 days)

*Participation includes series of questionnaires that will take up to
45 minutes to complete. For more information, email us at
BBHPAUS@gmail.com, or call (814)-769-9043*

APPENDIX C

Screening Questions

Email version

Hello,

Thank you for your interest in our study. The study that you are contacting us about is affiliated with Dr. Wray in the Biobehavioral Department at Penn State University. The study is investigating how stress, beliefs and perceptions about alcohol use, and reasons for alcohol use are related to drinking in adults aged 65 and older. Please complete the screening questions to determine your eligibility. You have two options to participate:

1. You can complete the screening questions online as well as the study via the following link you can complete at your convenience: [BBH PAUS Screen](#).
2. Alternatively, you can complete the screening questions below or the attached word document and I will get back to you regarding your eligibility and scheduling an in-person completion of the study or sending you the link to complete at your own leisure.

How old are you?

What is your phone number?

Is this email address a good one to contact you at in the future?

Yes

No

The following questions will determine whether you are eligible for this study. Please answer them with a “Yes” or “No” response.

- 1) Do you fluently speak English?
- 2) Have you consumed alcohol in the past month or 30 days?
- 3) Have you ever been diagnosed with a pervasive developmental disorder or other cognitive impairment?
- 4) *Over the past week, have you...*
 - ...felt depressed?
 - ...felt that everything was an effort?
 - ...felt that your sleep was restless?
 - ...felt happy?
 - ...felt lonely?
 - ...enjoyed life?

...felt sad?
...felt that you couldn't get going?

Where did you learn about this study? Flyer location/Friend?

Would you like for us to keep your contact information (email and phone number) on file to contact you if a future study in the Wray lab would be more suitable for you?

You will be contacted shortly once eligibility is determined.

Qualtrics Version

Start of Block: Block 1

Q12 Where did you learn about this study? Flyer, friend?

Q13 Would you like for us to keep your contact information (email and phone number) on file to contact you in the future if a study would be more suitable for you?

Yes (1)

No (2)

Q16 Would you be interested in joining Research PALS, a list of individuals who are interested in participating in research studies at Penn State?

Yes (1)

No (2)

End of Block: Block 1

Start of Block: Screen



Q1 How old are you?

Q2 Do you fluently speak English?

Yes (1)

No (2)

Q3 Have you consumed alcohol in the past month or 30 days?

Yes (1)

No (2)

Q4 Have you ever been diagnosed with a pervasive developmental disorder or other cognitive impairment?

Yes (1)

No (2)

End of Block: Screen

Start of Block: Contact info



Q19 What is your phone number?



Q20 What is your email address?

End of Block: Contact info

Start of Block: Screen 2

Q12 Over the past week, have you...		
	Yes (1)	No (2)
Felt depressed? (1)	<input type="radio"/>	<input type="radio"/>
Felt that everything was an effort? (2)	<input type="radio"/>	<input type="radio"/>
Felt that your sleep was restless? (3)	<input type="radio"/>	<input type="radio"/>
Felt happy? (4)	<input type="radio"/>	<input type="radio"/>
Felt lonely? (5)	<input type="radio"/>	<input type="radio"/>
Enjoyed life? (6)	<input type="radio"/>	<input type="radio"/>
Felt sad? (7)	<input type="radio"/>	<input type="radio"/>
Felt that you couldn't get going? (8)	<input type="radio"/>	<input type="radio"/>

Qualtrics skip logic diagram

Block: Block 1 (3 Questions)**Branch: New Branch**

If

If Would you like for us to keep your contact information (email and phone number) on file to contac...

No Is Selected

And Would you be interested in joining Research PALS, a list of individuals who are interested in par...

No Is Selected

Block: Screen (4 Questions)**Branch: New Branch**

If

If Would you like for us to keep your contact information (email and phone number) on file to contac...

Yes Is Selected

Or Would you be interested in joining Research PALS, a list of individuals who are interested in par...

Yes Is Selected

Block: Contact info (2 Questions)**Block: Screen (4 Questions)****Branch: New Branch**

If

If How old are you? Text Response Is Less Than 65

Or Do you fluently speak English? No Is Selected

Or Have you consumed alcohol in the past month or 30 days? No Is Selected

Or Have you ever been diagnosed with a pervasive developmental disorder or other cognitive impairment? Yes Is Selected

EndSurvey:**Standard: Screen 2 (1 Question)****Branch: New Branch**

If

If Over the past week, have you... - Yes Is Less Than or Equal to 4

EndSurvey: Advanced**Branch: New Branch**

If

If Over the past week, have you... - Yes Is Greater Than 4

EndSurvey:

APPENDIX D

Informed Consent Documentation

Consent Form

CONSENT FOR RESEARCH

The Pennsylvania State University

Title of Project: Psychological Factors Associated with Risky Drinking in Later Life

Principal Investigator: Tomorrow Danielle Wilson, M.S.

Address:

Department of Biobehavioral Health
 Pennsylvania State University
 230 Biobehavioral Health Building
 University Park, PA 16802

Telephone Number: 814-769-9043

Advisor: Linda A. Wray, Ph.D.

Advisor Telephone Number: 814-865-0764

Subject's Printed Name: _____

We are asking you to be in a research study. This form gives you information about the research.

Whether or not you take part is up to you. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you.

Please ask questions about anything that is unclear to you and take your time to make your choice.

Why is this research study being done?

We are asking you to be in this research because you have indicated that you are aged 65 or older and have that you have consumed alcohol in the past month.

This research is being done to find out how stress, beliefs about alcohol use, and reasons for alcohol use are related to drinking behavior in adults aged 65 and older. The hope is to be able to enhance intervention strategies to prevent unhealthy alcohol use through stress management and modification of alcohol use beliefs.

Approximately 150 people will take part in this research study within Centre County.

What will happen in this research study?

After completion of the consent form, you will be given forms asking for basic information (such as age, level of education, smoking behavior, etc). You will also be given questionnaires asking about your alcohol

use, stress, beliefs about alcohol use, and reasons for your alcohol use. Once all forms and questionnaires are completed, you will receive \$25 as compensation for your participation.

Note: You are free to skip any questions that you would prefer not to answer.

What are the risks and possible discomforts from being in this research study?

There are minimal risks associated with this research study. You will be asked to report your alcohol use, stress, beliefs about alcohol use, and reason for your alcohol, which may seem private. You may be uncomfortable or feel like the questions are intrusive. You are free to decline participation at any time and skip any questions you do not wish to answer.

There is a risk of loss of confidentiality if your information or your identity is obtained by someone other than the investigators, but precautions will be taken to prevent this from happening. The confidentiality of your electronic data created by you or by the researchers will be maintained to the degree permitted by the technology used. Absolute confidentiality cannot be guaranteed.

What are the possible benefits from being in this research study?

a. What are the possible benefits to you?

Participants may learn more about their stress, belief about and reasons for alcohol use, drinking norms, coping behavior, and their drinking behavior. It is possible that questions on positive alcohol outcome expectancies, drinking norms, coping, and drinking behaviors may prompt participants to reevaluate their current beliefs and behaviors.

b. What are the possible benefits to others?

This information may be used to help inform factors associated with unhealthy alcohol use in older adults. Individuals 65 years of age and older represented 14.5% of the US population in the year 2014 which is expected to grow to be 21.7% by 2040. Examination of possible factors related to unhealthy alcohol use may inform future research, and subsequently, prevention and intervention efforts to foster improved quality of life in the growing population of older adults.

What other options are available instead of being in this research study?

You may decide not to participate in this research.

How long will you take part in this research study?

If you agree to take part, it will take you about 45 minutes to complete this research study.

How will your privacy and confidentiality be protected if you decide to take part in this research study?

Efforts will be made to limit the use and sharing of your personal research information to people who have a need to review this information. No identifiers will be included or associated with the data. All data and other information will be maintained confidentially.

To protect against risks posed by a breach in confidentiality all data will be identified by only a unique code number that will be randomly generated for study purposes and all identifiable information (i.e., the informed consent form) will be stored separately from data. In addition, all members of the research study team have completed the required research training in the protection of human subjects. All data based on this research study will be reported as group and no individual responses will be identified.

- Hardcopies of data and other information will be retained in locked file cabinets accessible to the principal investigator (Tomorrow D. Wilson, M.S.), the supervising advisor (Linda A. Wray, Ph.D.), and trained research personnel.
- Electronic versions of the data will be stored on a secure web application, REDCap, and a password-protected and encrypted USB drive. These data will be accessible only to the principal investigator (Tomorrow D. Wilson, M.S.) and the supervising advisor (Linda A. Wray, Ph.D.).

In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

We will do our best to keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people may find out about your participation in this research study. For example, the following people/groups may check and copy records about this research.

- The Office for Human Research Protections in the U. S. Department of Health and Human Services
- The Institutional Review Board (a committee that reviews and approves research studies) and
- The Office for Research Protections.

Some of these records could contain information that personally identifies you. Reasonable efforts will be made to keep the personal information in your research record private. However, absolute confidentiality cannot be guaranteed.

Will you be paid or receive credit to take part in this research study?

Once you have completed all research study forms and questionnaires, you will receive \$25.

Who is paying for this research study?

Funding disclosure: The current research study is funded through the Sloan UCEM-Match scholarship, Hintz Graduate Education Enhancement Fellowship, and supported by Award Number T32 DA017629 from the National Institute on Drug Abuse. The content is solely the responsibility of the principal investigator and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

What are your rights if you take part in this research study?

Taking part in this research study is voluntary.

- You do not have to be in this research.
- If you choose to be in this research, you have the right to stop at any time.

- If you decide not to be in this research or if you decide to stop at a later date, there will be no penalty or loss of benefits to which you are entitled.

The person in charge of the research study can remove you from the research study without your approval.

12. If you have questions or concerns about this research study, whom should you call?

You have the right to have any questions answered regarding this research study.

Please call the head of the research study (principal investigator), Tomorrow D. Wilson, M.S, at 814-769-9043 if you:

- Have questions, complaints or concerns about the research.
- Believe you may have been harmed by being in the research study.

You may also contact the Office for Research Protections at (814) 865-1775, ORProtections@psu.edu if you:

- Have questions regarding your rights as a person in a research study.
- Have concerns or general questions about the research.
- You may also call this number if you cannot reach the research team or wish to offer input or to talk to someone else about any concerns related to the research.

INFORMED CONSENT TO TAKE PART IN RESEARCH

Signature of Person Obtaining Informed Consent

Your signature below means that you have explained the research to the subject or subject representative and have answered any questions he/she has about the research.

Signature of person who explained this research Date Printed Name

(Only approved investigators for this research may explain the research and obtain informed consent.)

Signature of Person Giving Informed Consent

Before making the decision about being in this research you should have:

- Discussed this research study with an investigator,
- Read the information in this form, and
- Had the opportunity to ask any questions you may have.

Your signature below means that you have received this information, have asked the questions you currently have about the research and those questions have been answered. You will receive a copy of the signed and dated form to keep for future reference.

Signature of Subject

By signing this consent form, you indicate that you voluntarily choose to be in this research and agree to allow your information to be used and shared as described above.

Qualtrics Waiver of Written Documentation of Consent

CONSENT FOR RESEARCH The Pennsylvania State University

Title of Project: Psychological Factors Associated with Risky Drinking in Later Life

Principal Investigator: Tomorrow Danielle Wilson, M.S.

Address:

Department of Biobehavioral Health
Pennsylvania State University
230 Biobehavioral Health Building
University Park, PA 16802

Telephone Number: 814-769-9043

Advisor: Linda A. Wray, Ph.D.

Advisor Telephone Number: 814-865-0764

We are asking you to be in a research study. This form gives you information about the research.

Whether or not you take part is up to you. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you.

Please ask questions about anything that is unclear to you and take your time to make your choice.

1. Why is this research study being done?

We are asking you to be in this research because you have indicated that you are aged 65 or older and have that you have consumed alcohol in the past month.

This research is being done to find out how stress, beliefs about alcohol use, and reasons for alcohol use are related to drinking behavior in adults aged 65 and older. The hope is to be able to enhance intervention strategies to prevent unhealthy alcohol use through stress management and modification of alcohol use beliefs.

Approximately 150 people will take part in this research study within Centre County.

2. What will happen in this research study?

After agreeing to complete the study, you will be directed to a survey asking for basic information (such as age, level of education, smoking behavior, etc). You will also be presented with questionnaires asking about your alcohol use, stress, beliefs about alcohol use, and reasons for your alcohol use. Once all forms and questionnaires are completed, you will be given a link to enter the address where you would like the compensation for your participation sent in the form of a \$25 Visa gift card.

Note: You are free to skip any questions that you would prefer not to answer.

3. What are the risks and possible discomforts from being in this research study?

There are minimal risks associated with this research study. You will be asked to report your alcohol use, stress, beliefs about alcohol use, and reason for your alcohol, which may seem private. You may be uncomfortable or feel like the questions are intrusive. You are free to decline participation at any time and skip any questions you do not wish to answer.

There is a risk of loss of confidentiality if your information or your identity is obtained by someone other than the investigators, but precautions will be taken to prevent this from happening. The confidentiality of your electronic data created by you or by the researchers will be maintained to the degree permitted by the technology used. Absolute confidentiality cannot be guaranteed.

4. What are the possible benefits from being in this research study?

4a. What are the possible benefits to you?

Participants may learn more about their stress, belief about and reasons for alcohol use, drinking norms, coping behavior, and their drinking behavior. It is possible that questions on positive alcohol outcome expectancies, drinking norms, coping, and drinking behaviors may prompt participants to reevaluate their current beliefs and behaviors.

4b. What are the possible benefits to others?

This information may be used to help inform factors associated with unhealthy alcohol use in older adults. Individuals 65 years of age and older represented 14.5% of the US population in the year 2014 which is expected to grow to be 21.7% by 2040. Examination of possible factors related to unhealthy alcohol use may inform future research, and subsequently, prevention and intervention efforts to foster improved quality of life in the growing population of older adults.

5. What other options are available instead of being in this research study?

You may decide not to participate in this research.

6. How long will you take part in this research study?

If you agree to take part, it will take you about 45 minutes to complete this research study.

7. How will your privacy and confidentiality be protected if you decide to take part in this research study?

Efforts will be made to limit the use and sharing of your personal research information to people who have a need to review this information. No identifiers will be included or associated with the data. All data and other information will be maintained confidentially.

To protect against risks posed by a breach in confidentiality all data will be identified by only a unique code number that will be randomly generated for study purposes and all identifiable information (i.e., the informed consent form) will be stored separately from data. In addition, all members of the research study team have completed the required research training in the protection of human subjects. All data based on this research study will be reported as group and no individual responses will be identified.

- Electronic versions of the data will be stored on a secure web application, REDCap, and a password-protected and encrypted USB drive. These data will be accessible only to the principal investigator (Tomorrow D. Wilson, M.S.) and the supervising advisor (Linda A. Wray, Ph.D.).

In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

We will do our best to keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people may find out about your participation in this research study. For example, the following people/groups may check and copy records about this research.

- The Office for Human Research Protections in the U. S. Department of Health and Human Services
- The Institutional Review Board (a committee that reviews and approves research studies) and
- The Office for Research Protections.

Some of these records could contain information that personally identifies you. Reasonable efforts will be made to keep the personal information in your research record private. However, absolute confidentiality cannot be guaranteed.

8. What are the costs of taking part in this research study?

N/A

9. Will you be paid or receive credit to take part in this research study?

Once you have completed all research study forms and questionnaires, you will receive \$25 in the form of a Visa gift card.

10. Who is paying for this research study?

Funding disclosure: The current research study is funded through the Sloan UCEM-Match scholarship, Hintz Graduate Education Enhancement Fellowship, and supported by Award Number T32 DA017629 from the National Institute on Drug Abuse. The content is solely the responsibility of the principal investigator and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

11. What are your rights if you take part in this research study?

Taking part in this research study is voluntary.

- You do not have to be in this research.

- If you choose to be in this research, you have the right to stop at any time.
- If you decide not to be in this research or if you decide to stop at a later date, there will be no penalty or loss of benefits to which you are entitled.

12. If you have questions or concerns about this research study, whom should you call?

You have the right to have any questions answered regarding this research study.

Please call the head of the research study (principal investigator), Tomorrow D. Wilson, M.S, at 814-769-9043 if you:

- Have questions, complaints or concerns about the research.
- Believe you may have been harmed by being in the research study.

You may also contact the Office for Research Protections at (814) 865-1775, ORProtections@psu.edu if you:

- Have questions regarding your rights as a person in a research study.
- Have concerns or general questions about the research.
- You may also call this number if you cannot reach the research team or wish to offer input or to talk to someone else about any concerns related to the research.

INFORMED CONSENT TO TAKE PART IN RESEARCH

Your participation implies your voluntary consent to participate in the research. Please keep or print a copy of this form for your records.

Please keep or print a copy of this form for your records.

[PAUS Consent Form](#)

- I agree. (1)
- I do not agree. (2)

APPENDIX E

Alcohol Use Measures

Daily Drinking Questionnaire (DDQ)

Consider a typical week during the **LAST MONTH**. How much alcohol, on average, (measured in number of drinks*), do you drink on each day of a typical week?

***PLEASE NOTE:** A standard drink consists of 12oz of beer or wine cooler, 8.5oz of malt liquor, 4oz of wine, 3.5oz of fortified wine, 1.5oz of hard liquor.

	Number of drinks
On a typical MONDAY , I have...	
On a typical TUESDAY , I have...	
On a typical WEDNESDAY , I have...	
On a typical THURSDAY , I have...	
On a typical FRIDAY , I have...	
On a typical SATURDAY , I have...	
On a typical SUNDAY , I have...	

Heavy Episodic Drinking (HED)

Think back over the **LAST MONTH**. How many times have you had 3 or more drinks in a row within 2 hours, if you are female? Or 4 or more drinks in a row within 2 hours, if you are male?

- Never
- 1 to 2 times
- 3 to 4 times
- 5 to 6 times
- 7 to 8 times
- 9 or more times

APPENDIX F

Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the **LAST MONTH**. In each case, you will be asked to indicate your response by placing an “X” in the box representing **HOW OFTEN** you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question.

	Never	Almost Never	Sometimes	Fairly Often	Very Often
1. How often have you felt that you were unable to control the important things in your life?					
2. How often have you felt confident about your ability to handle your personal problems?					
3. How often have you felt that things were going your way?					
4. How often have you felt difficulties were piling up so high that you could not overcome them?					

APPENDIX G

Positive Alcohol Outcome Expectancies

Here is a list of some effects or consequences that some people experience after drinking alcohol. How likely is it that these things happen to you when you drink alcohol? Please check the box that best describes how drinking alcohol would affect you. (If you do not drink at all, you can still fill this out: just answer it according to what you think would happen to you if you did drink.).

“When I drink alcohol: _____?”	Very Unlikely	Unlikely	Likely	Very Likely
1. I am more accepted socially				
2. I am more outgoing				
3. I have a good time				
4. It is easier for me to socialize				
5. I feel a part of the group				
6. I am able to take my mind of my problems				
7. I enjoy the buzz				
8. I am less shy				
9. I am more energetic				
1. I feel relaxed				
11. I am less sexually inhibited				

APPENDIX H

Adapted Version of Baer's Injunctive Drinking Norms Items

Please indicate how strongly each individual would approve or disapprove of the following actions.

How would the typical adult aged 65 and older respond if they knew...

	Strong disapproval	Moderate disapproval	Mild disapproval	Wouldn't care	Mild approval	Moderate Approval	Strong Approval
1. You drank alcohol every weekend							
2. You drank alcohol daily							
3. You drove a car after drinking							
4. You drank enough alcohol to pass out							

How would the typical same-sex adult aged 65 and older respond if they knew...

	Strong disapproval	Moderate disapproval	Mild disapproval	Wouldn't care	Mild approval	Moderate Approval	Strong Approval
1. You drank alcohol every weekend							
2. You drank alcohol daily							
3. You drove a car after drinking							
4. You drank enough alcohol to pass out							

How would your friends respond if they knew...

	Strong disapproval	Moderate disapproval	Mild disapproval	Wouldn't care	Mild approval	Moderate Approval	Strong Approval
1. You drank alcohol every weekend							
2. You drank alcohol daily							
3. You drove a car after drinking							
4. You drank enough alcohol to pass out							

SKIP THIS QUESTION IF YOU DO NOT HAVE A SPOUSE OR PARTNER**How would your spouse/partner respond if they knew...**

	Strong disapproval	Moderate disapproval	Mild disapproval	Wouldn't care	Mild approval	Moderate Approval	Strong Approval
1. You drank alcohol every weekend							
2. You drank alcohol daily							
3. You drove a car after drinking							
4. You drank enough alcohol to pass out							

APPENDIX I

Drinking Motive Questionnaire Revised (DMQ-R) Drinking to Cope subscale

INSTRUCTIONS: Listed below are 5 reasons people might be inclined to drink alcoholic beverages. Using the five-point scale below, decide how frequently your own drinking is motivated by each of the reasons listed.

	YOU DRINK...	Almost Never/Never	Some of the time	Half of the time	Most of the time	Almost Always/Always
1.	To forget your worries.					
2.	Because it helps you when you feel depressed or nervous.					
3.	To cheer up when you are in a bad mood.					
4.	Because you feel more self-confident and sure of yourself.					
5.	To forget about your problems.					

APPENDIX J**Demographics**

1. What is your age? _____
2. What is your sex?
 - Male
 - Female
3. What race do you consider yourself to be?
 - White
 - Black or African American
 - American Indian
 - Alaska Native
 - Asian
 - Native Hawaiian
 - Pacific Islander
 - Other: _____
4. Do you consider yourself Hispanic or Latino?
 - Yes
 - No
5. What is the highest level of education you completed?
 - Less than high school
 - High school diploma or equivalent (e.g., GED)
 - Some college (less than 4 years)
 - College (4-year degree)
 - Graduate/Professional (e.g., M.A./M.S., MBA, JD, MD, Ph. D.)
6. What is your yearly household income? _____
7. What is your marital status?
 - Never been married
 - Separated
 - Widowed
 - Divorced
 - Living with a partner
 - Married
8. At this time, do you consider yourself to be retired?
 - Yes
 - No

Health Information

1. What is your current height (in feet and inches)? _____
2. What is your current weight? (in pounds) _____
3. Has a doctor ever told you that you had any of the following? (Please check all that apply)
 - High blood pressure/Hypertension
 - Diabetes
 - Chronic lung disease (such as chronic bronchitis or emphysema)
 - Heart condition (such as coronary heart disease, angina, congestive heart failure)
 - Arthritis/Rheumatism
4. Has a doctor ever told you that you have depression?
 - Yes
 - No
5. Has a doctor ever told you that you have anxiety?
 - Yes
 - No
6. How many **prescription and over-the-counter medications** are you currently taking? _____
7. How many **supplements (such as multi-vitamins, calcium, vitamin D, probiotics)** are you currently taking? _____
8. Do you currently take over-the-counter or prescription medications to manage pain?
 - Yes
 - No
9. Do you currently smoke tobacco?
 - Yes
 - No
10. Have any of your biological relatives, regardless of whether or not they are now living, **EVER** had a significant drinking problem—one that should or did lead to treatment?
 - Yes
 - No

11. Does your spouse/partner consume alcohol?

- Yes
- No
- I don't have a spouse or partner

APPENDIX K

Correlations Between Sample Characteristics, Predictors, and Risky Drinking Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Heavy drinker ^a	-																
2. Heavy episodic drinker ^a	.357**	-															
3. Age	.092	-.133	-														
4. Sex ^b	.177	.081	.103	-													
5. Race/Ethnicity ^c	.102	.091	-.087	.111	-												
6. Highest level of education ^d	.218*	.148	.191	.077	-.007	-											
7. Marital status ^e	.092	-.039	-.163	.380**	.092	.100	-										
8. Retired ^a	-.271**	.011	-.020	-.034	-.063	-.094	-.268**	-									
9. Sum of chronic health conditions	-.211*	-.023	.114	.106	-.001	-.175	.100	.044	-								
10. Ever diagnosed with depression ^a	-.100	-.064	-.125	-.059	.073	-.008	.046	-.253*	.192†	-							
11. Ever diagnosed with anxiety ^a	.012	-.045	.063	-.246*	-.111	-.074	-.258*	.008	.088	.307	-						
12. Number of RX and OTC medications	.001	-.074	.126	.209*	-.049	-.268**	.040	-.170	.496**	.251	-.058	-					
13. Number of supplements	-.024	-.155	.179	.221*	.008	-.173	-.2338	.044	.036	.080	.003	.234*	-				
14. Use pain medication ^a	.003	.003	-.092	-.090	.102	-.035	-.005	.035	-.104	.104	.444	.158	.170	-			
15. Smoke tobacco ^a	.084	-.075	.065	.071	.026	.033	.123	.051	-.070	.146	.585	-.021	-.088	-.082	-		
16. Family history of alcohol problems ^a	-.099	-.026	-.131	-.150	.015	-.066	-.087	-.009	-.128	.168	.123	-.135	.027	.000	.188†	-	
17. Spouse/Partner use alcohol ^f	.064	-.006	-.170	.357**	.075	.045	.947**	-.234*	.148	.004	-.226*	.076	-.329**	-.012	.070	-.135	-

Note. Significant correlations in bold; * $p \leq .05$, ** $p \leq .01$, † $.05 > p \leq .07$; ^a0 = no, 1 = yes; ^b0 = female, 1 = male; ^c0 = White, 1 = not White; ^d0 = less than HS, 1 = HS or equivalent, 2 = Some college, 3 = College, 4 = Graduate/professional; ^e0 = not married/partnered, 1 = married/living with partner; ^f -1 = N/A, 0 = spouse/partner does not use alcohol, 1 = spouse/partner uses alcohol

Curriculum Vitae Tomorrow D. Wilson

Education

2018 Ph.D. Biobehavioral Health, The Pennsylvania State University
2012 M.S. Psychology (emphasis: life-span development), West Virginia University
2010 B.A. Psychology, West Virginia University

Selected Awards

2016-2017 Hintz Graduate Education Enhancement Fellowship
2014-2018 Alfred P. Sloan UCEM-Match Scholar
2014-2016 Prevention and Methodology Training (PAMT) Pre-doctoral Fellow
2012-2013 Excellence in Graduate Recruitment Award
2010- 2012 Southern Regional Education Board Doctoral Scholars Fellowship

Publications

Wilson, T. D., McNeil, D. W., Kyle, B. N., Weaver, B., & Graves, R. (2014). Effects of conscious sedation on patient recall of anxiety and pain after oral surgery. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology*, *117* (3), 277-282. doi: 10.1016/j.oooo.2013.11.489

Kelly, K. M., Schoenberg, N., Wilson, T. D., Atkins, E., Dickinson, S., & Paskett, E. (2015). Cervical cancer worry and screening among appalachian women. *Journal of Primary Prevention*, *36* (2), 79-92. doi: 10.1007/s10935-014-0379-7

Kyle, B. N, McNeil, D. W., Weaver, B., & Wilson, T. (2016). Recall of dental pain and anxiety in a cohort of oral surgery patients. *Journal of Dental Research*, *95* (6), 629-634. doi: 10.1177/0022034516631977

Statistical & Technical Skills

- SPSS
- AMOS
- SAS
- Mplus
- Adobe Photoshop and Acrobat