

Gender Differences in the Links between Alcohol-related Consequences and
Perceived Need for and Utilization of Treatment

by

Iris Beltran Gonzalez

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved April 2013 by the
Graduate Supervisory Committee:

Laurie Chassin, Chair
Jenn-Yun Tein
William R. Corbin
Manuel Barrera, Jr.

ARIZONA STATE UNIVERSITY

May 2013

ABSTRACT

Past literature has indicated that the majority of people with alcohol problems never seek treatment and that this is especially true of women. Relatively few studies have investigated how different types of alcohol-related consequences longitudinally predict men and women's perceived need for treatment and their utilization of treatment services. The current study sought to expand the literature by examining whether gender moderates the links between four frequently endorsed types of consequences and perceived need for or actual utilization of treatment. Two-hundred thirty-seven adults ages 21-36 completed a battery of questionnaires at two time points five years apart. Results indicated that there were four broad types of consequences endorsed by both men and women. Multiple-group models and Wald chi square tests indicated that there were no significant relationships between consequences and treatment outcomes. No gender moderation was found but post-hoc power analyses indicated that the study was underpowered to detect moderation. Researchers need to continue to study factors that predict utilization of alcohol treatment services and the process of recovery so that treatment providers can better address the needs of people with alcohol-related consequences in the areas of referral procedures, clinical assessment, and treatment service provision and planning.

To my friends and family, who have shared the joys of graduate school and
helped me through the rough times.

ACKNOWLEDGMENTS

I would like to thank my advisor, Laurie Chassin for her thoughtful advice, guidance, and encouragement during my graduate school career. I would also like to thank the other members of my committee, Jenn-Yun Tien, Manuel Barrera, and Will Corbin for their insightful feedback and thought-provoking questions.

I would also like to express my sincere gratitude to all the wonderful people without whom I would not have been able to complete my degree. I am thankful to my families, both my biological one and the Richardsons, for believing in me and cheering me on through every step. A special thanks to my fellow ASU graduate students, who truly understand what it is like to get through graduate school and who never hesitated to offer countless of hours to giving me advice, encouragement, and support. I will be forever thankful to Katie Levinger, Rebecca Wershba, Matt Lee, Andrea Fowler, and the many other friends I made during the last seven years of school. I am particularly indebted to Justin, whose love, endless patience, unfaltering optimism, and home-made dinners helped me achieve one of my biggest dreams.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	vi
LIST OF FIGURES	vii
INTRODUCTION.....	1
Types of Consequences.....	4
Gender Differences in Alcohol-related Consequences	8
The Relationship between Types of Alcohol in Consequences and Treatment Utilization	14
Gender as a Moderator of the Relationship between Alcohol Consequences and Treatment Utilization	17
Perceived Need for Treatment	20
Types of Consequences as Predictors of Perceived Need for Treatment	22
Gender as a Moderator of the Relationship between Alcohol- related Consequences and Perceived Need for Treatment	23
The Present Study.....	24
METHOD	28
The Original Study	28
Participants.....	28
Recruitment.....	29
Recruitment Biases	30
Differences between Alcoholic and Control Families.....	32

	Page
The Current Study	32
Participants.....	32
Procedure	33
Measures	34
Alcohol-related Consequences	34
Alcohol Treatment and Perceived Need for Treatment.....	36
Covariates.....	36
Alcohol Use.....	37
Parental Alcoholism	37
Ethnicity.....	38
Education.....	38
Co-occurring Psychopathology.....	38
RESULTS	40
Testing Hypothesis 1	40
Testing Hypothesis 2.....	43
Testing Hypothesis 3.....	46
DISCUSSION.....	49
Limitations and Conclusions.....	65
REFERENCES	69
APPENDIX	
A MEASUREMENT ITEMS	100

LIST OF TABLES

Table	Page
1. Participants with Complete Data Compared to Participants with Missing Data at Wave 6.....	79
2. Descriptive Statistics of Variables	80
3. Correlations among Variables for the Full Sample.....	81
4. Correlations among Variables for Female (Below the Diagonal) and Male (Above the Diagonal) Participants.....	82
5. Fit Indices for Multiple-group Measurement Models.....	83
6. Four-factor Model of Alcohol-related Consequences.....	84
7. ANCOVA Results Comparing Women and Men on Drinking Consequences Controlling for Alcohol Consumption	85
8. Correlations among Original and Residualized Factor Scores	86
9. Single-group Models: Testing the Effects of Drinking Consequences on Perceived Need for Treatment First with Only One of the Consequences as a Predictor and then with All Four Consequences as Predictors in the Same Model (Controlling for Only Significant Covariates)	87
10. Single-group Models: Testing the Effects of Drinking Consequences on Treatment Utilization First with Only One of the Consequences as a Predictor and then with All Four Consequences as Predictors in the Same Model (Controlling for Only Significant Covariates).....	88

Table	Page
11. Predicting Perceived Need for Treatment from the Composite of All Consequences.....	89
12. Predicting Treatment Utilization from the Composite of All Consequences.....	90
13. Testing Effects of Each Type of Drinking Consequence on Perceived Need for Treatment First with Only One of the Consequences as a Predictor and then with All Four Consequences as Predictors in the Same Model (Controlling for Only Significant Covariates).....	91
14. Testing Effects of Each Type of Drinking Consequence on Treatment Utilization First with Only One of the Consequences as a Predictor and then with All Four Consequences as Predictors in the Same Model (Controlling for Only Significant Covariates).....	92
15. Testing Gender Differences in Effects of Each Drinking Consequence Type on Perceived Need for Treatment Using Wald Chi-Square Tests	93
16. Testing Gender Differences in Effects of Each Drinking Consequence Type on Treatment Utilization (TU) Using Wald Chi-Square Tests	94
17. Testing Effects of Total Drinking Consequence on Perceived Need for Treatment (Controlling for Only Significant Covariates).....	95
18. Testing Effects of Total Drinking Consequence on Treatment Utilization (Controlling for Only Significant Covariates)	96

LIST OF FIGURES

Figure	Page
1. Four-factor Model.....	97
2. Model of Alcohol-related Consequences Predicting Perceived Need for Treatment with Gender as a Moderator.....	98
3. Model of Alcohol-related Consequences Predicting Treatment Utilization with Gender as a Moderator.....	99

Introduction

In the last three decades, researchers have turned their attention to gender differences in patterns of alcohol consumption and indicators of problematic use. Studies of community and clinical samples of adolescents, emerging adults, and adults suggest that men and women differ in the age of onset of alcohol use and problems (Lewis, Bucholz, Spitznagel, & Shayka, 1996), problem stability (Caetano & Kaskutas, 1996), rate of symptom progression (Zilberman, Tavares, & el-Guebaly, 2004), alcohol consumption patterns (Heath, Slutske, & Madden, 1997), and frequency of heavy drinking (Barnes et al., 1997). Data from several studies (e.g., Chan, Neighbors, Gilson, Larimer, & Marlatt, 2007; Johnston et al., 2009) indicate that in general, men consume alcohol more frequently and in higher quantities than do women. Moreover, men are more likely than are women to experience alcohol-related problems (e.g., Dawson & Grant, 1993; Nelson, Heath & Kessler, 1998).

Most of the research on gender differences involves comparisons between men's and women's drinking behavior, whereas variation in the relationships between alcohol-related problems and treatment-related variables has been less frequently examined. For example, many researchers have focused on gender differences in constructs, such as total problems that are reported or percentage of men and women who seek treatment, but they have not examined whether the strength of the relationships between alcohol problems and treatment-related variables is different for men versus women. Also, few studies have examined the

effect of broad types of consequences that adults experience on their treatment-seeking behaviors.

The types of alcohol-related consequences that men and women experience might impact their perceived need for treatment of their alcohol use problems as well as the likelihood that they will utilize services. There are no known studies that have prospectively predicted these treatment-related variables from types of alcohol consequences while at the same time examining gender differences in the relationships among these constructs. Certain types of problems might be more likely to provide an impetus for treatment in men versus women, and may help mental health providers tailor treatment programs to meet the specific needs of at-risk groups.

Examining the role of gender is very important when considering the relationships between types of consequences and treatment-related variables, such as perceived need for treatment or actual utilization of services. The literature suggests two ways in which gender could play a role: 1) Gender can be a distal predictor in a mediation model in which being male or female influences the types of consequences that are experienced, which then affect treatment seeking behaviors, and 2) Gender can be a moderator, in which the relationships between types of consequences and treatment-related variables are stronger for one gender compared to the other, regardless of whether there are gender differences in the types of alcohol-related consequences experienced. Furthermore, the mediation and moderation models are not mutually exclusive. In a very complex model, gender could be a predictor of the treatment-related outcomes through its

relationship with the consequences (i.e. a mediation model), as well as a moderator, such that the consequences relate to the treatment outcomes differently for men and women. The following literature review discusses studies that are related to both possible models so as to offer a comprehensive examination of these relationships but the study will focus its analyses on testing gender as a moderator. Because little research exists on the moderation model, the following literature review also presents gender differences in the mean levels of types of consequences, which is more relevant to the mediation model. Future studies should aim to test the role of gender in the alternative mediation model and ideally, test the more complex model in which both types of gender effects are tested.

Therefore, the purpose of the current study was to examine whether certain types of consequences prospectively predict perceived need for treatment and treatment utilization in the five years following the experience of these consequences and test whether the relationships between consequences and each of the hypothesized outcomes might be moderated by gender. Because the current study focused on gender differences in the relationships between alcohol consequences and treatment variables in participants whose ages range from the early 20s to early 30s, this literature review concentrates on research that utilized samples in emerging adulthood to adulthood. The review of the literature begins with a discussion of the types of alcohol-related consequences that have been identified in previous studies. Next, research on the relationship between types of consequences and each of the treatment-related outcomes, perceived need for

treatment and treatment utilization, will be critically examined. Studies will also be presented to examine the idea that gender moderates the links from alcohol-related consequences to each treatment variable. Finally, the aims of the present study will be described.

Types of Consequences

Several studies have attempted to examine broad types of consequences. Researchers have conducted a variety of statistical analyses to identify underlying factors utilizing several different measures of consequences [e.g. Self-administered Alcoholism Screening Test (SAAST), Rutgers Alcohol Problems Index (RAPI), Drinker Inventory of Consequences, the Young Adult Alcohol Problems Screening Test (YAAPST), Young Adult Alcohol Consequences Questionnaire (YAACQ), or items developed by the researchers] (Davis & Morse, 1987; Robbins & Martin, 1993; Martens, Neighbors, Dams-O'Connor, Lee, and Larimer, 2007; Read, Kahler, Strong, & Colder, 2006; Maddock, Laforge, Rossi, & O'Hare, 2001). There has been great variability in their methodology (e.g. age range of sample, clinical vs. community samples, different measures of consequences). Furthermore, studies have utilized different samples, sets of consequence items, and statistical analyses, which might explain why they have not found the same number of factors. However, the following factors appeared in at least two studies: Dependence Symptoms (as indicated by items about perceived loss of control over drinking) (Davis & Morse, 1987; Robbins & Martin, 1993; Read et al., 2006), Problems with Productivity (i.e. occupational disruption, impaired functioning in public roles) (Davis & Morse, 1987; Martens

et al., 2007; Read et al., 2006; Robbins & Martin, 1993), and Complaints from Others (Davis & Morse, 1987; Maddock, 2001; Martens et al., 2007; Read et al., 2006; Robbins & Martin, 1993). Therefore, these categories were also examined in the current study. Moreover, because researchers have theorized that there are also gender differences in alcohol-related aggressive and destructive behavior, as discussed in the following sections, this type of consequence was included in the current study. In the present study, the dependence symptoms category was operationalized as perceived loss of control over drinking and behavior that indicated that alcohol was taking over a person's daily activities. Problems of productivity referred to alcohol-related problems that interfered with a person's ability to fulfill duties at school, work, or home. Complaints from others reflected criticism from family or friends due to participants' alcohol use.

Aggressive/destructive behavior was defined as acts that resulted in problems with the law or caused harm to other people or things.

Examining broad types of alcohol problems, rather than each individual item in a scale, might be more helpful in examining whether consequences differentially predict various alcohol outcomes for men and women. This has important implications for both outreach efforts and treatment. In terms of improving outreach efforts, knowledge about the types of consequences that predict treatment in men and women would be useful in devising outreach programs that address such problems and motivate them to seek help. In terms of improving the treatment of alcohol problems, identifying specific types of consequences that predict positive outcomes (e.g., abstinence, decrease in

consumption, decrease in symptoms) could improve our knowledge of factors that get people into treatment and facilitate the development of tailored treatment and prevention interventions that target the types of consequences that drive men and women to utilize treatment services. Given the limited financial resources allocated to alcohol treatment programs and the great number of people who face problems because of their drinking, it is critical that researchers determine how to increase the effectiveness of such programs. For instance, some studies have found that treatment seekers report greater alcohol-related psychosocial problems than non-drinkers (George & Tucker, 1996; LoCastro, Potter, Donovan, Couper, Pope, 2008) but it is not clear whether this is true for both genders. If research demonstrated that interpersonal problems, such as receiving criticism from others, were stronger predictors of entry into treatment in one gender versus the other, it would be useful in devising approaches that target these specific problems in treating the group for whom it is most relevant.

As stated in the introduction, the literature provides support for two models about how gender, alcohol-related consequences, and treatment-related outcomes are related. Establishing that there are gender differences in alcohol-related consequences would be necessary for arguing for a mediational model in which gender affects treatment-related variables through its effect on alcohol consequences. However, a moderating model, in which alcohol consequences relate to treatment-related variables differently depending on gender, is possible whether or not men and women differ in alcohol consequences. The following section reviews the theory and research on gender differences in consequences

because these differences are possible in a moderating model and it is deemed important to examine them so as to provide a thorough description of the relationships between variables in the moderation model.

It must be noted that, in examining the role of gender in subsequent sections, special attention was paid to whether studies controlled for alcohol consumption when examining differences among genders. Some have argued that when one examines the role of gender, one could in fact be assessing the role of consumption level, given that men drink with more frequency and in higher quantities than do women. Therefore, it is important to control for alcohol consumption when studying the role of gender in a model. For example, there are mixed data on whether controlling for alcohol consumption completely accounts for gender differences in alcohol-related problems. Hasin et al. (1983) and Ross (1989) found differences in the problems experienced by men and women but when they controlled for duration and consumption of alcohol use, the number of symptoms in men and women became comparable. In contrast, many other studies that controlled for alcohol consumption also found gender differences in various types of alcohol-related consequences (Bongers et al., 1998; Cooper & Orcutt, 1997; Harrington, Brigham, & Clayton, 1997; Lo, 1996; Neal, Corbin, & Fromme, 2006; Sugarman, DeMartini, & Carey, 2009). It is imperative that studies control for level of consumption when examining the role of gender and that when differences remain, researchers work on identifying the biological and environmental variables that make alcohol-related processes different for men and women. Controlling for alcohol consumption may change findings significantly.

For example, a study that does not control for consumption might find that gender moderates the relationship between dependence symptoms and treatment utilization but the data may in fact reflect that the level of frequency/quantity of drinking moderates the relationship. Since many of the studies that were relevant to the present investigation did not control for gender differences in levels of consumption, they were included in the literature review. However, this review identifies which studies controlled for drinking, especially when it could account for conflicting findings regarding the role of gender.

Gender Differences in Alcohol-related Consequences

People's excess risk for the development of alcohol problems appears to be greatest in the college/young adult years (Dawson, 1996). Studies on young adults show that overall, men tend to experience more alcohol related problems than do women (Brennan et al., 1986; Engs & Hanson, 1990; Ratliff & Burkhart, 1984), although some studies report no differences (e.g., O'Hare, 1990). Some have argued that gender differences in the total number or the type of consequences reflect the fact that men drink with more frequency and higher quantity than do women. However, as previously mentioned, the data are mixed on whether controlling for alcohol consumption completely accounts for gender differences so the following explanations for these findings have been proposed.

Nolen-Hoeksema and Hilt (2006) reviewed three of the most frequently researched psychosocial factors that could explain gender differences in the types of problems that are the focus of the present study: social sanctions; impulsivity/antisociality; and gender roles. First, some studies indicate that

women believe there are more social sanctions against drinking for them than there are for men (e.g. Blume, 1991). Therefore, women are less likely to drink in front of peers (Schmidt, Klee, & Ames, 1990) and are consequently less likely to experience the types of alcohol consequences that are associated with public intoxication (e.g. injuring another person when drunk). A second explanation for gender differences in the types of alcohol consequences is that men experience more aggressive and destructive types of alcohol-related problems because of a broad tendency toward externalizing behaviors (Zucker, 2000). Men are rated as more impulsive than are women (Petry, Kirby, & Kranzler, 2002) and they are more likely to show antisociality (Moffitt, Caspi, Rutter, & Silva, 2001). Men's underlying risk for externalizing problems could make them more likely than are women to engage in behaviors such as getting into physical fights or destroying property when intoxicated. This explanation related to men's broad tendency toward externalizing and impulsive behaviors is similar to the third theory, the Styles of Deviance Theory, which also suggests that men will be more likely to experience aggressive/destructive consequences due to their drinking. However, the Styles of Deviance Theory predicts a different pattern of consequences for women. This theory suggests that men and women have different styles of alcohol-related deviance, and that these are largely determined by traditional male gender roles that view drinking and drunkenness as acceptable for men (e.g., Lemle & Mishkind, 1989) and female gender role norms that discourage behavior that could lead to sexual promiscuity, such as public drinking (Dohrenwend & Dohrenwend, 1976; Harris, 1977). The Styles of Deviance theory suggests that

both men and women will experience social conflict but women experience it in the form of criticism of their drinking and men experience more behavioral, aggressive consequences, such as fighting.

Research on the role of social sanctions and gender roles in the development of alcohol problems having to do with relationship difficulties and criticism from others, offers mixed results. The Styles of Deviance theory is in conflict with results of two studies that did not control for gender differences in alcohol consumption and found that male college students experienced more family problems (O'Hare, 1990) and their behavior offended others more often (Perkins, 1992) compared to their female counterparts. These results were similar to those of Harrington et al. (1997) and Lo (1996) who, even after controlling for level of alcohol consumption, found that young college men, compared to women, more commonly were criticized by someone because of their drinking. In addition to the aforementioned studies on college samples, studies that utilized clinical samples of older adults also had mixed findings on social conflict, with three studies finding that men more often than women reported that others expressed concern about their alcohol use (Davis & Morse, 1987; Nichol, Krueger, & Iacono, 2007; Robbins & Martin, 1993), one study indicating that female participants more frequently reported that others objected to their drinking (Lewis et al., 1996), and one not finding gender differences in familial/marital disruption (Holdcraft & Iacono, 2002). Of these five studies, only Robbins and Martin (1993) controlled for gender differences in consumption so it is difficult to

ascertain how the findings of the other studies would have changed had they controlled for differences in drinking among male and female participants.

A clear pattern of findings emerges regarding gender differences in the consequences that are likely related to aggressive/destructive consequences, as predicted by the Styles of Deviance theory and the theory about men's underlying risk for impulsivity and antisociality. One study (Sugarman et al., 2009) partly supports the Styles of Deviance theory with its finding that when controlling for drinks per week, men reported more antisocial behaviors, such as fights, but the authors did not examine whether women experienced more criticism of their drinking. Other studies have found that young adult men tend to experience more legal problems, to engage in physical fights, (Wagner et al., 2002), to damage property, to drive when impaired, and to participate in unintended sexual activity (Perkins, 1992) when intoxicated than do their female counterparts. Although neither Perkins (1992) nor Wagner et al. (2002) took into account sex differences in overall alcohol problem severity or drinking, Kahler, Strong, Read, Palfai, and Wood (2004) compared men and women at the same level of problem severity and found that men were more likely to endorse alcohol-related problems related to physical fights, damaging property, and getting arrested for drunken behavior than did women. Therefore, it appears that the types of problems that are related to impulsivity and aggression are more common in men than in women across studies that differed in methodology.

There are also conflicting findings regarding gender differences in alcohol problems indicative of dependence symptoms. For instance, loss of control was

less likely in men than in women in a study that did not control for gender differences in consumption and utilized a clinical sample (Davis & Morse, 1987) but more likely in a study that did control for gender differences in drinking with a community sample (Dawson & Grant, 1993). Consistent with Davis and Morse (1987), Sugarman et al. (2009) found that after controlling for alcohol consumption, women surpassed men on consequences associated with dependence, such as tolerance and drinking after promising not to. It is not clear whether the results differed because of differences in sampling or differences in controlling for alcohol consumption. Furthermore, Kahler, Strong, Stuart, Moore, and Ramsey (2003) found that the item “tried and failed to cut down” on the Alcohol Dependence Scale (ADS) assessed alcohol problems similarly in both women and men.

There is some research on gender differences in consequences related to productivity in young adults. A few studies have found that alcohol consumption and problems are associated with greater unemployment and higher rates of absenteeism (e.g. Mullahy & Syndelar, 1996). At the same time, Zarkin et al. (1998) found that moderate alcohol use was actually associated with higher wages, while others found no association between alcoholism and employment. However, the aforementioned studies did not examine gender differences. When Booth and Feng (2002) examined gender differences, they found that higher quantities of alcohol consumption significantly increase the probability of not being employed similarly in both men and women. A study that utilized only female participants indicated that heavy drinking is associated with lower wage

and non-wage compensation. However, Marmot and colleagues (1993) found a U-shaped association between drinking and absenteeism for men, such that moderate male drinkers were absent from work least frequently, but both heavy drinkers and people who drank little were absent more often. This u-shaped association was not found in women, for whom there was no clear relation between drinking and absenteeism. The methodology of these various studies makes direct comparison difficult, as some utilized single gender participants, different age-ranges, and various productivity-related measures.

As mentioned before, examining gender differences in consequences would be crucial for examining the role of gender in a mediation model but these gender differences in alcohol-related problems would not preclude establishing gender as a moderator of the relationship between consequences and treatment utilization/perceived need for treatment. Although researchers have consistently found that men are more likely to experience consequences related to aggression, studies offer mixed results regarding gender differences in criticism from others due to drinking, alcohol dependence symptoms, and consequences associated with productivity at work and school. Because the research offers such mixed results, it is not clear whether there are true gender differences in the endorsement of the different types of problems, which would impact the effect of these consequences on perceived need for treatment or utilization of services (i.e. a mediation model). At the same time, in testing gender as a moderator, the current study examined mean differences in endorsement of the four different types of consequences among men and women to verify that both genders experience these problems.

Taking into consideration previous research, it was hypothesized that, when controlling for alcohol consumption, men would be significantly more likely to experience aggressive/destructive consequences. Also, men were expected to be more likely to report dependence symptoms once gender differences in alcohol consumption are controlled. Due to the conflicting results on gender differences in consequences related to productivity and criticism from others, no specific hypotheses were made regarding whether these problems would be more prevalent in men than in women.

The relationship between types of alcohol consequences and treatment utilization.

The use of treatment services is generally lower among people with alcohol problems than it is among people with almost any other psychiatric disorder (Kessler et al., 1999). Beckman and Kocel (1982) developed a model in which the inclination and ability to utilize alcohol treatment are predicted by societal and individual factors. They suggest that the presence of “cues to action” related to these factors will lead to help seeking. Using this model, Weisner (1993) identified four factors that influence help seeking: individual predisposing (such as educational attainment), social predisposing (such as social pressure), need (indicators of severity), and enabling factors (ones that allowed people to get treatment, such as employment). Hajema, Knibbe, and Drop (1999) elaborated on Beckman and Kocel’s theoretical model by proposing that the extent to which cues to action are important is determined by the potential and actual losses due to drinking. They suggest that, for the individual, utilization of treatment can either

prevent losses or regain something that was lost (e.g. diminished health, loss of employment). They proposed that alcohol-related problems differ in the extent to which they were considered losses and that some types were more predictive of help seeking than was frequency of alcohol consumption. Consequently, one would expect different types of alcohol consequences to vary in their ability to predict treatment utilization. Hajema et al.'s data from male problem drinkers in an outpatient treatment center and from a sample of the general population indicated that social aggressive consequences were associated more strongly with seeking help than were symptoms of problem drinking and intoxication. Unfortunately, they did not include women in their sample so results may not apply to both genders.

Another general model for explaining help-seeking behavior emphasizes the role of social networks and events in helping people acknowledge their alcohol problems or in being pressured by network members to seek help (Pescosolido, 1992). This model is similar to the one developed by Beckman and Kocel in that help-seeking is thought to be influenced by social networks and events. However, it differs in that help-seeking is considered a decision-making process determined by purposive decisions that involve a cost-benefit analysis of treatment utilization and its alternatives. Based on this model, alcohol consequences related to criticism from others are expected to be stronger predictors of treatment seeking than other types of problems, such as problems at work/school or dependence symptoms, as long as the person perceives the benefits of treatment to outweigh the costs.

Researchers have long been interested in the variables that predict the use of alcohol treatment services, including symptoms of alcohol abuse or dependence. For example, using cross-sectional data, Wu, Pilowsky, Schlenger, and Hasin (2007) examined whether specific symptoms of DSM-IV alcohol use disorders were associated with treatment seeking in college-age young adults who participated in the 2002 National Survey on Drug Use and Health (NSDUH). Their results indicated that alcohol-related legal problems, as assessed by the DSM-IV Alcohol Abuse criteria, were associated with increased use of alcohol services. Moreover, “reduced important activities”, a symptom of Alcohol Dependence, significantly predicted alcohol service utilization. Unfortunately, the researchers did not test gender differences in the relationships between consequences and treatment seeking.

In a similar study, Wu and Ringwalt (2004) tested the relationship between characteristics of alcohol dependence and use of treatment in non-institutionalized adults who participated in the 1999 National Household Survey on Drug Abuse (NHSDA). Data from respondents who met DSM-IV criteria for alcohol dependence revealed that in general, few people enrolled in alcohol treatment. More importantly, the cross-sectional data indicated that out of all the symptoms of dependence, being unable to cut down on alcohol use increased the odds of using treatment services among women but that this was not the case for men. It is also important to note that Wu and Ringwalt (2004) did not control for gender differences in drinking when examining whether different types of consequences predicted treatment utilization in men versus women. There is a

great need in this area for additional research that examines longitudinal data and controls for gender differences in drinking. Consequently, the present study addressed these needs and additionally, included DSM-IV criteria and a broad range of items that assess psychosocial problems caused by alcohol as predictors of treatment utilization. Based on the previously discussed theoretical models and some previous findings, it is hypothesized that all four types of consequences will predict treatment utilization but criticism from others and legal consequences will be the strongest predictors.

Gender as a moderator of the relationship between alcohol consequences and treatment utilization.

Studies suggest that there are gender differences in treatment utilization in that men are more likely to utilize substance use treatment than are women (Cohen et al., 2007; Dawson, 1996; Kaskutas et al., 1997; Raimo et al., 1999; Tighe and Saxe, 2006). Dawson (1996) examined data from the 1992 NLAES (National Longitudinal Alcohol Epidemiologic Survey) and found that among adults aged 18 and over who had a lifetime AUD (Alcohol Use Disorder) diagnosis, 23% of men and 15% of women ever received treatment for alcohol problems. These differences in prevalence of treatment have led some researchers to hypothesize that the effect of various factors on treatment varies by gender. Some research suggests that the relationship between alcohol consequences and treatment utilization is moderated by gender, such that some consequences are stronger predictors of treatment for one gender than for the other.

Weisner (1990) examined “serious events” that occurred one year prior to treatment entry and were reported to trigger treatment-utilization. Although some of these events are similar to diagnostic alcohol symptoms, they were not operationalized as such. Their results, without controlling for gender differences in alcohol consumption, indicated that different factors influenced entry into treatment, with legal consequences related to aggression being less predictive of treatment utilization among women than among men. Like Weisner (1990), Bendtsen, Dahlstrom, and Bjurulf (2002) examined problems that were associated with getting help in a sample of participants in a community-based treatment center. Although they did not control for alcohol consumption in their analyses, they did establish that male and female participants did not differ significantly in severity of their alcohol use disorder. They found that consequences such as drunk driving and arrest for drunkenness were more strongly associated with treatment-utilization in men than in their female counterparts, but women were more likely to get help after a broken relationship and unemployment than were men. In both of these cross-sectional studies, the authors reached the conclusion that some problems are more predictive of treatment utilization in one gender. Another study by Grosso, Epstein, McCrady, Gaba, Cook, Backer-Fulghum, and Graff (2013) found several women-specific motivators for treatment utilization in participants who were already involved in treatment: worry about the amount and/or increase in drinking, concern about negative interactions or embarrassing behavior while intoxicated, and concern over loss of control over drinking. The methodology of all of these studies limits their ability to ascertain whether gender

is moderating the influence of the types of consequences that predict treatment. One limitation of these studies is that they utilized samples of people who were already in treatment and who retrospectively identified the alcohol problems that led to treatment seeking. Such clinical samples contain no information on persons not entering treatment so they cannot be used to compare women's and men's rates of treatment utilization and due to their cross-sectional nature, they cannot establish the temporal order of alcohol consequences and which specific consequences led to the utilization of treatment services.

In addition to the aforementioned studies on samples of participants who are already in treatment, there is also evidence from a study with a nonclinical sample of adults that suggested that gender moderated the relationship between dependence symptoms and treatment use. Wu and Ringwalt (2004) found that only for women, tolerance and the inability to cut down on use of alcohol increased the odds of seeking treatment. However, alcohol symptoms and use of services were measured in the past year, making it difficult to establish the temporal precedence of the events as people may not accurately report which specific consequences prompted their treatment and whether they experienced any consequences even after starting treatment.

In summary, some studies support the hypothesis that the relationship between certain types of consequences and treatment utilization is moderated by gender. However, these studies tended to focus on samples that were already in treatment. The present study used longitudinal data to measure the types of consequences prior to treatment as prospective predictors of treatment seeking.

Although this study utilized data from a high-risk sample of children of alcoholics (COAs), it was a non-clinical sample. It was hypothesized that criticism from others would be a stronger predictor of treatment utilization for women than for men, whereas aggressive/destructive consequences would be stronger predictors of use of services for men than for their female counterparts.

Perceived Need for Treatment

Because treatment utilization has been reported to be low among people with AUDs and since some studies indicate gender differences in the use of substance abuse or mental health services, researchers have attempted to identify factors that facilitate entry into and the continued use of treatment. One factor that has been associated with various treatment outcomes is perceived need for treatment. It has been hypothesized that many individuals with alcohol-related problems do not seek treatment because they do not perceive a need for it (Grant, 1997; Wu, Pilowsky, Schlenger, et al, 2007). Prochaska and colleagues (Prochaska, DiClemente, & Norcross, 1992; Prochaska, DiClemente, & Norcross, 2003; Prochaska, Velicer, Rossi, et al., 1994) suggest that, in the process of changing habitual behaviors, such as alcohol use, motivation should be considered as a series of cognitive and attitudinal stages that range from failure to perceive a problem to complete acceptance of the problem. Assuming that for each stage there is a corresponding commitment to change, a transitional model of change has been proposed with the following six stages: precontemplation, contemplation, preparation, action, maintenance, and relapse. The stage of preparation is of great importance, as this is the point at which the person

perceives a need for change and moves toward taking action (i.e. seeking treatment). Problem recognition is separate from perceived need for treatment, as it is possible to recognize a problem, as is the case in the contemplation stage, but not perceive a need for treatment if the person believes that they can resolve the problem on their own or that the problem is transient. Another way of conceptualizing perceived need is proposed by the aforementioned Beckman and Kocel model. Following this framework, perceived need would be a predisposing factor that reflects the attitudes or beliefs of the individual about the disorder or treatment.

A study by Witbrodt and Romelsjo (2010) suggested that for both men and women, perceiving a need for treatment was one of the variables that predicted continued attendance in AA, which they hypothesized would lead to better long-term outcomes. Edlund, Booth, and Feldman (2009) found that, among adults who met criteria for alcohol abuse and dependence, fewer than one in nine people perceived a need for treatment but that, among those with perceived need, two out of three people reported receiving treatment in the past year. They argue that, in addition to focusing on improving alcohol treatment, it is important that researchers determine how to increase the number of individuals who perceive a need for treatment. Unfortunately, because the present study assessed perceived need and treatment utilization in the same time frame, it was not possible to determine whether perceived need actually predicted treatment utilization or whether it mediated the relationship between types of alcohol-related consequences and involvement in treatment.

Types of consequences as predictors of perceived need for treatment.

Little research has been conducted on the determinants of perceived need for treatment even though such knowledge could help us design programs that educate people about symptoms of an AUD, treatment services, and benefits of treatment. In examining data from the NESARC and NSDUH, Edlund, Booth, and Feldman (2009) found that diagnostic problems were better predictors of treatment and of perceived need for treatment compared to demographic factors, such as marital status, education, income, insurance coverage, and ethnicity. Edlund and colleagues found that age was the only significant sociodemographic predictor of perceived need such that younger individuals were less likely to perceive a need for treatment compared to their older counterparts. On the other hand, the following alcohol dependence and abuse symptoms significantly predicted perceived need for alcohol treatment: withdrawal, unsuccessful efforts to control use, continued use despite psychological or physical problems, recurrent legal problems, and continued use despite persistent social problems.

Results from another study provide additional support for the relationship between alcohol problems and perceived need. Like the aforementioned study, Wu, Pilowsky, Schlenger, and Hasin (2007) found that the abuse item of “continued alcohol use despite problems with family and friends”, plus the dependence items of “emotional/physical problems”, and “unable to cut down on use” were associated with a perceived need for treatment. In this study other significant predictors were the abuse item of “serious problems at work, home, or school” and the dependence item of “spent a great deal of time on alcohol.”

Interestingly, consequences associated with the physiological aspects of alcohol use disorders (e.g., withdrawal symptoms) were not associated with perceived need, even though these symptoms predict chronic dependence.

Given the paucity of research regarding consequences as predictors of perceived need for treatment, the present study examined broad types of consequences as predictors of perceived need. It was hypothesized that, like in the few previous studies, social problems and dependence symptoms will be stronger predictors of perceived need for help than aggressive/destructive problems (e.g., legal problems).

Gender as a moderator of the relationship between alcohol-related consequences and perceived need for treatment. Although there appears to be some evidence to hypothesize that gender moderates the relationship between alcohol-related consequences and treatment utilization there does not seem to be much evidence to indicate that the association between types of consequences and perceived need for treatment is different for men versus women. The few studies on alcohol consequences as prospective predictors of perceived need for treatment controlled for gender but did not directly examine whether gender moderated the relationship.

There is a theoretical basis for the hypothesis that criticism from others might be a stronger predictor of perceived treatment need for women than for men, even though the research on mean differences in endorsement of this type of problem is mixed, with some, but not all, studies indicating that men are more likely to experience criticism from friends and family. The Styles of Deviance

Theory suggests that women internalize society's disapproval of female drunkenness and Nolen-Hoeksema (2004) points out that women believe there are more social sanctions against drinking for them than there are for men, that they feel more pressure from their friends not to use alcohol, and that they themselves more strongly disapprove of a woman getting drunk than of men getting drunk. Consequently, women who receive complaints from family or friends might be more likely to perceive a need for treatment because they recognize these repercussions as being more severe than men would in the same circumstances. Therefore, the present study hypothesizes that criticism from others will be a stronger predictor of perceived need for women than for men. Though no a priori hypothesis are made regarding gender as a moderator of the relationships between perceived need for treatment and consequences related to productivity, aggression, and physical dependence, the present study will perform exploratory analyses examining whether the relationships are different for men compared to women.

The Present Study

The purpose of the present study was to understand how different types of alcohol-related consequences influence perceived need for treatment and the use of treatment and how gender might moderate these relationships. This study tested the following hypotheses:

1. To examine the moderation model, the first set of analyses needed to establish that the four types of consequences were present in the data. It was hypothesized that the four factor

model would fit the data. Furthermore, to use the four latent factors in the full proposed models, it was necessary to test measurement invariance (i.e., to show that the model is gender invariant). It was hypothesized that there would not be a significant difference between the constrained and unconstrained four-factor models, indicating that a four factor model was adequate for both male and female study participants. Finally, although mean level differences in the endorsement of consequences by men and women are not necessary to demonstrate the moderating effects of gender, they were examined to describe the four types of consequences as they appear in men and women. It was hypothesized that although both men and women experienced the four general categories of consequences, there would be significant mean differences in endorsement of certain problems. Taking into consideration previous research, it was hypothesized that, when controlling for alcohol consumption, men would be significantly more likely to experience aggressive/destructive consequences. Also, men were expected to be more likely to report dependence symptoms once gender differences in alcohol consumption were controlled. Due to the conflicting results on gender differences in consequences related to productivity and criticism from others, no specific hypotheses

were made regarding whether these problems would be more prevalent in men than in women.

2. The current study hypothesized that the four types of alcohol problems would prospectively predict perceived need for treatment and treatment utilization.
3. The current study hypothesized that even when no gender differences in consequences were found in the aforementioned analyses, the strength of the relationship between alcohol consequences and treatment utilization would be different for men compared to women such that criticism from others would be a stronger predictor of treatment utilization for women than for men, whereas aggressive/destructive consequences would be a stronger predictor of treatment utilization for men than for their female counterparts. In addition, it was hypothesized that the relation between alcohol consequences and perceived need for services would be moderated by gender such that criticism from others would be a stronger predictor of perceived need for women than for men.

The current study aimed to contribute to the literature in several important ways. First, other researchers have noted the potential clinical utility of attempting to cluster alcohol-associated consequences by type of consequence because such clustering could be used to point people to particular targets of behavior change, especially ones that lead them to enter treatment (Perkins, 2002). Second,

knowing whether some consequences are stronger predictors of perceived need and treatment utilization for one gender versus the other is relevant to the development of tailored outreach, prevention, and treatment programs for alcohol problems. For example, in terms of outreach and prevention, information about which consequences of alcohol use are most salient to men and women would help service providers tailor certain processes, such as the selection of items that are used to screen people for alcohol-related problems or the diffusion of community-level pamphlets with information about these specific consequences. Such interventions have been shown to reduce drinking in the community and to increase help-seeking over a one-year period (Sobell, Sobell, Leo, et al., 2002) and might be even more effective if they are tailored to the problems that stand out for people. In terms of the actual treatment, such knowledge could also have an impact in the interventions that are used. For example, knowing that criticism from others is a stronger predictor of entry into treatment in women versus men would be useful in creating programs that involve family and friends in treatment and might prompt professionals to address such problems directly in treatment. Third, because studies have suggested that a lack of perceived need for treatment is a barrier to seeking services, knowing which specific symptoms increase the perceived need for treatment might help researchers determine the mechanisms by which men and women become aware of their problems and are motivated to seek help. Consequently, interventions could use this knowledge to motivate people with problematic alcohol use to seek treatment that directly addresses their problems.

The present study was also an improvement on previous research because of its methodology. Most of the research on treatment has been conducted with older adult samples or populations with a very wide age range (Dawson, 1996; Hasin & Grant, 1995; Weisner & Matzger, 2002; Wu, Kouzis, & Leaf, 1999). In contrast, the current study took a longitudinal approach starting with emerging adulthood, a period of peak risk for problem drinking behaviors. While binge drinking and heavy alcohol use among emerging and young adults have been studied extensively, little is known about the use of alcohol treatment services among people in these age groups (Wu, Pilowsky, Schlenger, & Hasin, 2007). Moreover, women have often been underrepresented in previous studies of treatment services use. The current study was also different from previous work in that it examined consequences with a wider range of severity compared to past studies that have examined predictors of treatment mainly in samples that were already in treatment or had been diagnosed with an AUD. Therefore, the conclusions from this study may apply to a wider range of people with alcohol-related problems.

Method

The Original Study

Participants. Study participants were from the Adolescent and Family Development Project (AFDP), a longitudinal study of children of alcoholics (COAs) and controls (Chassin et al., 1991; 1993; 1999). The original sample at Time 1 (T1) consisted of 454 adolescents and their parents. COAs ($n = 246$) had at least one biological alcoholic parent who was currently a custodial parent and

met lifetime DSM-III criteria for alcohol abuse or dependence. Demographically matched controls ($n = 208$) had no biological or custodial alcoholic parents. All participants were interviewed annually for three consecutive years and then every five years three additional times. At Waves 4-6 full biological siblings of the original target participants who were within the same 7 year age band were invited to participate in the study and were referred to as “age eligible” siblings. These siblings did not differ significantly in age from original participants. A total of 376 age-eligible siblings were interviewed at least once; 327 siblings were interviewed at Wave 4 and 350 siblings were interviewed at Wave 5. A total of 762 participants (original targets and age-eligible) were interviewed at Wave 5 and 759 were interviewed at Wave 6. In the current study, targets and age-eligible siblings will be referred to as “original study participants” as distinctions among them are not relevant for the current analyses.

The current study utilizes the participants that were interviewed in the two most recent waves of data collection that assessed all the variables of interest: Waves 5 and 6.

Recruitment. COA families were recruited for participation in the state of Arizona via DUI records, health maintenance (HMO) wellness records, and telephone screenings. Records were examined for potential indicators of alcoholism, such as blood alcohol content of at least .15 at time of arrest, prior alcohol-related arrests, or previous diagnoses. All participants, COAs and controls, were English-speaking. The study initially focused on recruiting Hispanic and non-Hispanic Caucasian participants but a small number of

participants later reported belonging to other minority ethnic groups. Families were included in the original study if they included a biological child between the ages of 11 and 15.

Examination of records and telephone screenings were followed by interviews using the Diagnostic Interview Schedule (DIS, Version III; Robins, Helzer, Croughan, & Ratcliff, 1981). Data from face-to-face interviews with the alcoholic parent were used to ascertain parental alcoholism. These reports were supplemented with data from the other parent using Family History Research Diagnostic Research Criteria (FH-RDC, Endicott, Andreason, & Spitzer, 1975). These procedures yielded 219 biological fathers and 59 biological mothers who met DSM-III diagnosis of lifetime alcoholism (abuse or dependence).

Control families were recruited using reverse directories to find families living in the same neighborhood as the COA families. Control families were matched according to child's age (within one year), family composition (one-parent or two-parent), ethnicity, and socioeconomic status (based on property value or parental income). Neither biological nor custodial parent met DSM-III or FH-RDC lifetime diagnosis of alcohol abuse or dependence. This information was gathered from direct interview data.

Recruitment biases. The longitudinal study had two possible sources of recruitment bias. One was selective contact with COAs and second was participant attrition. The impact of selective contact was assessed by comparing data on study participants to court records and HMO wellness questionnaires of people who were not contacted. *T*-test and chi-square comparisons found no

differences between contacted participants and non-contacted people with respect to blood alcohol level at time of the arrest, number of prior alcohol-related arrests, or Michigan Alcoholism Screening Test results; however, non-contacted potential participants were more likely to be younger (37 vs. 39), from court sources (90% vs. 87%), of Hispanic ethnicity (22% vs. 18%), unmarried (64% vs. 48%), and were more likely to be of low SES (*t*-test or chi-square comparisons significant at $p < .05$). These analyses indicate that recruitment procedures were slightly less likely to reach Hispanic and lower SES participants though the groups did not differ significantly on alcoholism indicators.

The second source of recruitment bias was refusal to participate. Although contact rates were low (38% from archival records and 44% from reverse directories), 73% of eligible COA families participated and 77% of eligible control families participated. Moreover, participants and persons who refused to participate did not differ on alcoholism indicators, age, gender, or SES ratings of their residence; however, persons who refused to participate were more likely to be Hispanic (24% vs. 18%) and married (69% vs. 50%) at the time of their assessment (chi-square comparisons significant at $p < .05$). Because of these biases, generalization of findings should be made with caution.

For the control sample, refusal bias was estimated on the basis of a sample of 91 families who refused to participate in the study but who were willing to provide demographic information. No differences were found in family composition or SES ratings of their residence; however, both mothers and fathers who refused to participate were more likely to be Hispanic (41% vs. 18% for

mothers and 40% vs. 22% for fathers) than were those who agreed to be in the study. More information on possible bias in contact and recruitment samples are discussed in detail elsewhere (see Chassin, Barrera, Bech, & Kossak-Fuller, 1992; Chassin, Rogosch, & Barrera, 1991).

Differences between alcoholic and control families. Analyses on the similarities and differences between alcoholic and control families are reported elsewhere (e.g., Chassin, Pillow, Curran, Molina, & Barrera, 1993; Chassin et al., 1991). There were significant differences on certain demographic variables. Alcoholic families had lower levels of parent education (42% of alcoholic fathers vs. 25% of control fathers had a high school degree or less education, $p < .001$) and marginally higher proportions of Hispanics. There was also significantly more psychopathology in the alcoholic families. For example, alcoholic parents were more likely to meet DSM-III criteria for major depression or dysthymia (e.g., 11% of alcoholic fathers vs. 3% of control fathers, 14% of alcoholic mothers vs. 4% of control mothers). COAs were also more likely to have internalizing (M internalizing: COA = .38, control = .28, $p < .05$) and externalizing symptoms (M externalizing: COA = .38, control = .26, $p < .001$).

The Current Study

Participants. This current study employed a subsample of the original participants, namely those who were interviewed at the fifth (W5) and sixth (W6) waves of measurement. At W5, 762 participants agreed to be interviewed. Of this sample, 606 reported drinking alcohol in the past year and therefore, there was a possibility for them to have experienced alcohol-related consequences. Ten

additional participants were excluded from the sample because they did not have complete data at Wave 5 on the measures of interest. Finally, only participants who endorsed at least one alcohol-related consequence at W5 were included in the current analyses ($N=237$); however, 17 of these participants did not complete an interview at W6 so the descriptive data and correlations for the two outcome variables are based on a sample of 220. Chi-squares and t -tests were conducted to assess differences between participants with complete data at both waves ($N = 220$) and those who did not have Wave 6 data ($N = 17$). Table 1 contains information regarding the comparisons between these two groups of participants on gender, the four types of consequences, alcohol consumption at Wave 5, externalizing psychopathology, internalizing psychopathology, age at Wave 5, parental alcoholism, education, and ethnicity. The groups did not differ significantly on any of the variables but it must be noted that the analysis was underpowered to detect such small effect sizes. Since the groups were largely comparable on the variables of interest, missing data techniques were used on the Wave 6 variables to maximize the size of the sample and to produce a final sample of 237 in the current study's analyses.

At W5 there were 168 men, 150 COAs, and participants had a mean age of 25.95 years (range 21.92 to 36.67, $SD = 2.36$). Table 2 contains descriptive statistics, which are based on a sample of 237 for the variables measured at Wave 5 and a sample of 220 for the Wave 6 variables.

Procedure. Participating families were informed that the project was supported by the National Institute on Drug Abuse and was designed to explore

the reasons why certain people develop problems while others do not. They were also informed that they would be asked questions pertaining to drug and alcohol use, but not that parental alcoholism was a selection criterion.

W5 and W6 interviews were conducted at the family's residence or on the Arizona State University campus. During the interview, responses were entered into a laptop computer. Trained project personnel read items aloud and participants had the options either to enter responses themselves or to respond verbally. To ensure privacy and confidentiality, family members were interviewed in separate rooms. Interviews lasted approximately one to two hours and families were paid for their participation.

Measures. The measures used in the current study were part of the larger interview battery. See Appendix A for a list of the items used in the present study, Table 2 for descriptive statistics on all of the variables, and Table 3 for correlations among variables. Table 4 also shows the correlations among variables separated by gender, with correlations for female participants on the lower half of the table and correlations for male participants on the upper half.

Alcohol-related consequences. At Wave 5, participants ($N = 237$) reported whether they experienced alcohol-related problems and symptoms from their alcohol use and how recently they experienced these consequences. The alcohol-related problems were: little time for anything but securing or thinking about alcohol, feeling need or dependence on alcohol, unable to cut down on alcohol, needing a drink before breakfast, complaints from family, complaints from friends, absence from school or work, getting in trouble at school or work,

problems with work or studying, getting in a physical fight or doing mean things, arrested, destroying property, financial problems, injuring someone else, and neglect of usual responsibilities. The consequences and symptoms were adapted from Sher (1993) and from the drug use section of the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981). Each item was coded as a binary variable, where “yes” was coded ‘1’ and “no” was coded ‘0’ to indicate whether the participant experienced the consequence.

In the present study, these items were tested as indicators of the four types of consequences, which were treated as latent variables. For “Dependence Symptoms”, the four possible indicators were: needing a drink before breakfast, feeling need or dependence on alcohol, unable to cut down on alcohol, and little time for anything but securing or thinking about alcohol. The five indicators for “Consequences related to productivity” were: getting in trouble at school or work, absence from school or work, problems with work or studying, neglect of usual responsibilities, and financial problems. “Aggressive/destructive consequences” was made up of four items: injuring someone else, getting in a physical fight or doing mean things, arrested, and destroying property. For the fourth type of alcohol-related problems, “Criticism from others”, there were the following two indicators: complaints from family and complaints from friends. A variable of total consequences was also created by adding each consequence endorsed by the participant. Descriptive statistics for the consequences variables and correlations with other variables are provided in Tables 2 and 3, respectively. For the four

latent consequences variables, factor scores were saved out and it was then possible to calculate descriptive statistics.

Alcohol treatment and perceived need for treatment. At Wave 6, participants were asked for the first time if they had ever received treatment or counseling for alcohol use. If they reported “yes” to this item, they were then asked how many times they received treatment for alcohol use, with responses ranging from “one time” to “more than 5 times.” They were then asked to report the first and most recent year in which they received treatment for alcohol use. A binary variable was created from this information to indicate whether people had been in treatment between the two waves. At Wave 6, 42 participants (19.1%) reported having utilized treatment since their Wave 5 interview.

At Wave 6 only, participants were also asked “During the past 12 months, did you ever feel that you needed treatment or counseling for your alcohol use?” to assess perceived need for treatment. In the current sample, 20 (9.1%) participants stated that they felt a need for alcohol treatment in the past year.

Covariates. The purpose of including covariates is to increase the power and sensitivity of a statistical test by minimizing uncontrolled variability. Moreover, the covariates in the model account for some variance that would otherwise be considered error. The effect of each covariate and the interactions with the outcomes were tested in a series of preliminary analyses. Those covariates that showed a significant effect on the predictors were kept in the model. To test the model in which alcohol consequences predict treatment utilization and perceived need for treatment, it is necessary to also control for

Wave 5 drinking. The following covariates were also chosen because they are believed to correlate with both alcohol problems and the treatment-related variables: parental alcoholism, ethnicity, education, and co-occurring internalizing and externalizing psychopathology.

Alcohol use. Items about alcohol consumption were adapted from Sher (1993). At waves 5 and 6, participants who reported any lifetime level of drinking were asked about the frequency of their consumption of specific types of alcoholic beverages within the past year. Participants reported on the frequency of their consumption of wine, beer or wine coolers in the past year, with response options ranging from (0) “Never” to (7) “Everyday.” A second item asked them to report on the frequency of hard alcohol use over the same time period using the same response scale. Furthermore, participants reported the typical quantity they would consume of each type of alcoholic beverage in a given drinking session, with response options ranging from (0) “No drinks” to (8) “Nine or more drinks.” A quantity/frequency summary score was then computed from these four items, with higher scores indicating higher use. This score was used as a covariate, alcohol consumption at Wave 5 (see Table 2 for descriptive statistics on these variables).

Parental alcoholism. Parent lifetime DSM-III diagnoses of alcohol abuse or dependence were assessed with the DIS (Version 3, Robins et al., 1981) at Wave 1. For parents who were not interviewed, lifetime diagnoses were based on RDC criteria (Version 3; Endicott et al., 1975) reported by the spouse. Of all parents diagnosed as having alcohol abuse or dependence, only 17.91% of

participants did not report on their own symptoms (Chassin, Barrera, Bech, & Kossak-Fuller, 1992). For the current study, the parental alcoholism variable was dichotomous: COA if at least one biological parent met lifetime criteria or non-COA if neither parent met lifetime criteria. See Table 2 for descriptives on this variable.

Ethnicity. Participants were asked to pick the best description of their ethnic background from the following choices: Caucasian (not Hispanic); Hispanic; Asian, Oriental or Pacific Islander; American Indian; Black or Afro-American; or Other. Participants were considered Hispanic if they and at least one biological parent were Hispanic. This variable was re-coded into a binary variable such that Caucasian, non-Hispanic was coded ‘0’ and other ethnicities were coded ‘1.’ See Table 2 for descriptives on this variable.

Education. At Wave 5, participants were asked to report which of the following categories described the highest educational level they had achieved: 8th grade or less, some high school, high school graduate, GED, some vocational/technical school, completed vocational/technical school, some college, AA degree, BA or BS, some graduate/professional school, or completed graduate/professional school. This variable was collapsed into a dichotomous variable coded ‘0’ for no college and ‘1’ for some college or higher. See Table 2 for descriptives on this variable.

Co-occurring psychopathology. At Wave 5, participants reported on their levels of externalizing behavior within the past year using items selected from the Achenbach Childhood Behavior Checklist (CBCL; Achenbach & Edelbrock,

1981), Jessor and Jessor's (1981) young adult questionnaire, the Denver Youth Project (Huizinga, Finn-Aage, & Wylie, 1991), and some written by project staff. Items included: argued a lot, explosive, skipped or ditched work or school, rebellious, stole things, mean or cruel to others, destroyed things belonging to others, disobeyed rules, started fights, lied or cheated, physically attacked people, threatened to hurt people, borrow money without intent to repay, providing false information on applications, wrote a check knowing it would bounce, using someone else's credit card or bank card, charge a telephone call to someone else's number, avoid bills, harass someone, engage in vandalism, and start untrue rumors. These items tap many aspects of deviant behaviors engaged in by young adults, including items that provide information on deviant behaviors in which women, compared to men, may be more likely to engage. The response scale for all items ranged from (1) "Almost always" to (5) "Almost never", with higher scores reflecting lower levels of externalizing behavior. A summary score for externalizing behavior was computed. See Table 2 for descriptives on this variable.

At Wave 5, participants also reported on their levels of internalizing symptoms within the past year using items from the CBCL and from the Mood and Anxiety Symptom Questionnaire (MASQ; Watson et al., 1995) These items included: felt lonely, cried a lot, felt had to be perfect, felt no one loved me, felt worthless/inferior, felt nervous/high-strung/tense, felt too fearful/anxious, felt too guilty, unhappy/sad/depressed, felt worried, felt uneasy, felt afraid, felt dizzy, felt light-headed, was trembling/shaking, had shaky hands, had trouble swallowing,

was short of breath, felt really lively/up, felt really happy, felt I had a lot of energy, was having a lot of fun, felt I had much to look forward to, and felt cheerful. The last six items were reverse scored so that higher values reflect anhedonia. The response scale for all affect items ranged from (1) “Almost always” to (5) “Almost never”. A summary score for internalizing behavior was computed so that higher scores reflecting lower levels of symptoms. See Table 2 for descriptives of this variable.

Results

Testing Hypothesis 1

To examine the moderation model, the first set of analyses sought to establish that the data fit a four-factor model. Furthermore, to use the four latent factors in the full proposed models, it was necessary to test measurement invariance (i.e., to show that the model was gender invariant). It was hypothesized that there would not be a significant difference between the constrained and unconstrained four-factor models, indicating that the four factor model was adequate for both male and female study participants. Finally, although mean level differences in the endorsement of consequences by men and women was not necessary to demonstrate moderating effects of gender, they were examined to describe the latent factors. The present study hypothesized that although both men and women experience the four general categories of consequences, there would be significant mean differences in endorsement of certain problems when analyses

controlled for level of consumption. Taking into consideration previous research, it was hypothesized that men would be significantly more likely to experience aggressive/destructive consequences and dependence symptoms than were women. It was also hypothesized that women would be more likely than were men to endorse receiving criticism from others due to drinking. Due to the lack of theory and research on gender differences in consequences related to productivity, no specific hypotheses were made regarding whether these problems would be more prevalent in men than in women.

To test the current study's hypotheses, it was necessary to first establish the factor structure of drinking consequences at Wave 5 and examine whether the factor structure was the same for men and women. The software package Mplus version 5.0 (Muthen & Muthen, 2007) was used to conduct a CFA to test the proposed four-factor model. Model fit was tested using Standardized Root Mean Square Residual (SRMS or SRMR in Mplus), Root Mean Squared Error of Approximation (RMSEA), and the Comparative Fit Index (CFI), as recommended by Hu and Bentler (1998). SRMS and RMSEA are badness of fit indexes that indicate a good fit if they are less than .05 or adequate fit if they are less than .08. CFI is a goodness of fit index for which conventionally, values greater than .95 indicate good fit and values greater than .90 indicate adequate fit. Because the participants in the study are siblings, the data are non-independent. Consequently, there could be interdependence among observations. To adjust the standard errors, the COMPLEX command in Mplus was used, with siblings as the cluster variable.

A four factor model was tested with all the proposed indicators; however, there were two items (“arrest” and “trouble at school/work”) that had some positive correlations with the other indicators for the same latent variable but also had negative correlations with other indicators. Since in a factor structure, the indicators of a latent factor were expected to be in the same direction, a four factor model without the two items was tested and it had a much better model fit compared to the model with the items. Therefore, the two items were dropped from all subsequent analyses. This four-factor model was also tested against a more parsimonious model with three factors, one factor comprising of both types of social consequences: aggressive consequences and criticism from others; however, the four-factor model had a better fit compared to the more parsimonious one (see Table 5). The final four-factor model had adequate model fit ($\chi^2[123] = 125.38$; RMSEA = .01; CFI = .99). See Tables 3 and 6 for correlations and factor loadings respectively. Figure 1 shows the final four-factor model. Analyses then tested whether the 4-factor model was invariant across the genders using a multi-group CFA. To demonstrate gender invariance, the item factor loadings, thresholds, intercepts, and residual variances were constrained between genders. Thus, strict measurement invariance was specified, which is the most conservative type (i.e., requires the most constraints between groups). The difference between the unconstrained model ($\chi^2[118] = 124.65$) and the model in which the factor loadings and intercepts were constrained ($\chi^2[136] = 139.89$) was not significant ($\Delta\chi^2[18] = 15.24, p = .65$). The difference between models reflects the average difference of all the parameters. A closer inspection of the model

(using modification indices) showed that only the difference of the factor means on aggression was statistically significant ($M_{\text{male}} = 1.34$, $M_{\text{female}} = 00$). All of the other factor means and factor loadings were statistically equivalent across genders.

SPSS was then used to estimate ANCOVA models to test whether men and women differed in their factor scores for each category of consequences while controlling for alcohol consumption. Because of the small sample of female participants ($N = 68$), a composite score (i.e., mean of the items) for each category of consequence was computed instead of using the latent variables that were used for the previous analyses. Results (see Table 7) indicated that men experience significantly more aggression-related consequences than women, even after controlling for alcohol consumption.

Testing Hypothesis 2

The current study hypothesized that the four types of alcohol problems measured at Wave 5 would prospectively predict treatment utilization and perceived need for treatment five years later at Wave 6. Because both of the outcome variables were binary, these hypotheses were tested with logistic regression models using maximum likelihood estimation in Mplus version 5.0. For these analyses, the latent variables for the four types of consequences were used. Missing data on endogenous variables were estimated as a function of the observed exogenous variables under the missingness at random assumption (Schafer & Graham, 2002). To account for the clustering of sibling participants

within families, all models used a robust sandwich estimator (i.e., Mplus option TYPE=COMPLEX) to obtain adjusted standard errors and fit statistics.

Preliminary analyses tested the effects of each proposed covariate, and covariate by predictor interactions, separately on both outcomes, perceived need for treatment and treatment utilization. Only internalizing, education, and parental alcoholism were significant or marginally significant predictors of perceived need for treatment and only alcohol consumption and education were significant predictors of treatment utilization. Consequently, these were the covariates that were included in later models. Predictor by covariate interactions were also tested for statistical purposes. Because of the large number of covariate by predictor interactions, alpha inflation had to be considered and when the Bonferroni procedure was applied, there was only one significant interaction of ethnicity by productivity on treatment utilization; however, there was no theoretical rationale for explaining the significant interaction of ethnicity by productivity so this interaction was not included in later models.

High correlations among the four types of consequences raised concerns about multicollinearity (see Table 3 for correlations among included covariates and the four types of consequences). Consequently, analyses explored whether the multicollinearity could be due to the fact that all of the items were caused by alcohol consumption. Therefore, a residual score was created for each of the four types of alcohol problems after accounting for alcohol consumption. Specifically, using regression models that predicted factor scores for each of the four consequence types with alcohol consumption, consequence type factor scores

were saved out: (a) residualized by the original consumption variable, (b) residualized by drinking quantity, (c) residualized by binge drinking frequency, and (d) residualized by drinking frequency, quantity, and binge drinking combined. Unfortunately, none of these new sets of residualized factor scores showed major reductions in correlations compared to the original factor scores (see Table 8). Because the correlations did not change much, the original non-residualized factor scores were kept; however, results of later models suggest that multicollinearity is not of concern because results did not change when individual types of consequences were tested uniquely above the covariates (Table 9, columns 1-4) compared to when they were all tested in one model (column 5). Specifically, above and beyond the covariates, none of the four types of consequences predicted perceived need for treatment when only one consequence and the covariates were tested, or when all four types of consequences and the covariates were tested in one model (see Table 9), and none of the four types of consequences predicted treatment utilization when only one consequence and the covariates were tested, or when all four types of consequences and the covariates were tested in one model (see Table 10). Figures 2 and 3 show the model tested for perceived need for treatment and treatment utilization respectively. Given the high intercorrelations among types of consequences, models were run predicting each treatment outcome from the composite of all consequences (see Tables 11 & 12). The total consequences variable did predict Treatment Utilization but not Perceived Need.

Testing Hypothesis 3

The final set of analyses tested the hypothesis that the strength of the relationship between alcohol consequences at Wave 5 and treatment utilization at Wave 6 would be different for men compared to women such that criticism from others would be a stronger predictor of treatment utilization for women than for men, whereas aggressive/destructive consequences would be a stronger predictor of treatment utilization for men relative to their female counterparts. In addition, it was hypothesized that the relation between alcohol consequences at Wave 5 and perceived need for services at Wave 6 would be moderated by gender such that criticism from others would be a stronger predictor of perceived need for women than for men.

These hypotheses were tested using multiple-group versions of the models used to test hypothesis 2. For these analyses, the latent variables for the four consequences were used. First, the effects of each type of drinking consequence on each outcome were tested in men and women first separately (i.e., only one consequence at a time in the model) and then all together (i.e., all of the consequences were included in the model simultaneously), over and above covariates (see Table 13 for results for perceived need for treatment and Table 14 for results for treatment utilization). Then gender moderation was tested with Wald Chi Square tests to test whether the effect of each type of consequence on the outcome differed between men and women (both in models testing each consequence type separately and in models testing them all together). These Wald Chi Square tests assess moderation by testing the extent to which model fit

decreases when effects are constrained to be the same between genders. None of the tests of gender moderation were significant (at $p < .05$) or marginally significant (at $p < .10$; see Tables 15 & 16). In other words, the Wald Chi Square tests indicated that model fit did not significantly decrease when the effect of each consequence on each outcome was constrained to be the same between men and women.

The final set of analyses tested gender as a moderator of the effects of total drinking consequences on perceived need for treatment and on treatment utilization controlling for only significant covariates. In the model predicting perceived need for treatment (see Table 17), the significant covariates were alcohol consumption, internalizing problems, externalizing problems, and education; however, when all of these covariates and the total number of consequences were entered into the same model, none of them were significant predictors of perceived need for treatment. Furthermore, the Wald test of difference in the effect of total consequences between genders was non-significant ($\chi^2[1] = .198; p = .657$), indicating that gender did not moderate the relationship between total number of consequences and perceived need for treatment.

In the model predicting treatment utilization (see Table 18), alcohol consumption, internalizing problems, and education were significant covariates; however, when all of these covariates and the total number of consequences were entered into the same model, none of them were significant predictors of treatment utilization. The Wald test of difference in the effect of total consequences between genders was non-significant ($\chi^2[1] = .754; p = .385$),

indicating that gender did not moderate the relationship between total number of consequences and treatment utilization.

Post-hoc analyses of power were conducted to determine if a possible reason why gender moderation was not evident was low power to detect such effects. GPower was utilized to assess power for the given sample size and these post-hoc analyses confirmed that power was low ($< .8$; Cohen, 1988) to detect moderation for small to medium effects (Fritz & MacKinnon, 2007).

Since the more complex moderation models that tested hypothesis three did not produce significant findings, the patterns in the correlations between consequences and treatment variables were examined separately for men and women (see Table 4). First, the correlations between each consequence and perceived need for treatment were examined. Correlations of aggression-related consequences and perceived need for treatment were not significant either for men or women ($r_{\text{women}} = .08$; $r_{\text{men}} = .04$). Regarding the relationship between dependence symptoms and perceived need for treatment, the correlation was significant for men but not for women ($r_{\text{women}} = .11$; $r_{\text{men}} = .18$, $p < .05$). The correlation between productivity consequences and perceived need for treatment was significant for men but not women ($r_{\text{women}} = .07$; $r_{\text{men}} = .17$, $p < .05$). Finally, the relationships between criticism from others and perceived need for treatment were not statistically significant ($r_{\text{women}} = .08$; $r_{\text{men}} = .08$).

Regarding the patterns of correlations between types of consequences and treatment utilization, there was no support for the study's hypothesis that the relationship between aggressive consequences and treatment utilization would be

stronger for men versus women ($r_{\text{women}} = .11$; $r_{\text{men}} = .10$). For female participants, the dependence symptoms variable was a marginally significant predictor of treatment utilization, but it was not significant for men ($r_{\text{women}} = .24$, $p = .05$; $r_{\text{men}} = .15$). For productivity consequences there was a significant correlation for women but not for men ($r_{\text{women}} = .27$, $p < .05$; $r_{\text{men}} = .14$). Regarding the relationship between criticism from others and treatment utilization, the correlation was significant for women but not for men ($r_{\text{women}} = .28$, $p < .05$; $r_{\text{men}} = .06$).

Discussion

The present study utilized longitudinal data from a high-risk community sample to test the links between different types of alcohol-related consequences, treatment utilization, perceived need for treatment, and gender. This study hypothesized that participants would report experiencing four broad types of consequences due to their drinking and that these consequences would prospectively predict whether people perceived a need for treatment or utilized services. Furthermore, this study examined whether gender moderated these relationships, that is, whether the strength of the relationships between consequences and treatment-related variables differed for men versus women.

Regarding the first hypothesis, which stated that the four proposed types of consequences would emerge in the data, results indicated that indeed a four-factor model was an adequate fit for the data for both male and female participants, and this model fit better than a more parsimonious model. Moreover, as hypothesized, men experienced significantly more aggression-related consequences than did women, even after controlling for alcohol consumption.

This is consistent with the clear patterns of findings in the literature of men's tendency to experience consequences that are related to impulsivity and antisociality, such as physical fights, damage to property, or legal problems (Wagner et al., 2002; Perkins, 1992; Kahler et al., 2004). This finding is also consistent with the Styles of Deviance theory, which suggests that men will experience more aggressive, public consequences due to their drinking. However, this theory also states that women will experience more criticism from others but the current study found no gender differences in drinking-related criticism. In the larger literature, there are conflicting findings about whether or not women experience more drinking-related criticism than do men. One possible reason for the conflicting results is that all of these studies included different items that measured whether participants received criticism from others. For example, our item directly asked participants whether they felt family or friends criticized their drinking, but other studies have asked whether their behavior while intoxicated offended others. Conflicting findings could also be explained by the type of participants in the study. The criticism construct is measured through self-report, which requires that participants have paid attention to others' feedback regarding their drinking and perhaps, that they are insightful and high-functioning enough to recognize subtle criticism.

The current study also did not find gender differences in mean levels of dependence symptoms. There are conflicting findings in the previous literature. Three studies discussed in the literature review found gender differences, although not in the same direction, and one study (Kahler et al., 2003), like the

current one, did not find gender differences. There does not seem to be a clear pattern of methodological differences that would explain the conflicting information. However, all of these studies did not utilize the same items to measure dependence symptoms. Some utilized several indicators to create a construct, while others used only one item. Furthermore, the wording of items also varied and could have influenced participants' endorsement of the symptom. Future studies should examine which items are best indicative of dependence symptoms in men and women, as well as whether this methodological difference completely accounts for discrepancies in findings.

Like the results for dependence symptoms, there were no gender differences in consequences related to productivity at work or school in the present study. In the previous literature, one study found that alcohol consumption had a comparable effect on the probability of unemployment for both men and women (Booth & Feng, 2002). However, Sugarman and colleagues (2009) found that even after controlling for alcohol consumption and BAC, male college students reported more instances of going to school drunk. Finally, another study found that gender differences in absenteeism from work were also related to level of drinking, such that light, moderate, and heavy drinkers exhibited different patterns of absenteeism in women and men (Marmot et al., 1993). Few studies in the literature were found that tested gender differences in productivity-related consequences and they all differed in their methodology so it is important to continue examining the effect of drinking on women and men's ability to meet the demands of work and school.

Regarding hypothesis two, which stated that the four types of alcohol-related consequences would prospectively predict perceived need for treatment and treatment utilization, the results of the current study suggest that consequences are not the strongest predictors of perceiving a need for treatment or treatment utilization once covariates are taken into account. First, the effects of each of the four consequences on perceived need for treatment were tested. In the overall sample, when each type of consequence was tested as an individual predictor of perceived need for treatment, only productivity consequences and dependence symptoms were significant predictors. Of the covariates that were tested, internalizing psychopathology, education, and COA status were significant or marginally significant predictors of perceived need for treatment when each was tested as the sole predictor. Regarding COA status, it is possible that children of alcoholics are more sensitive to the warning signs of alcohol problems due to having witnessed the problems of their parent who had alcohol dependence/abuse and consequently, they are more likely to see a need for treatment. It could be that internalizing psychopathology was a marginally significant predictor of perceived need for treatment, when no other predictors were included, because mood-related problems might be so distressing that people are likely to see a need for help. These findings appear to be in conflict with the study by Edlund et al (2009), which found that consequences were stronger predictors than demographic variables such as education. However, when all of four consequences and the significant covariates were tested in the same model, none of them were statistically significant predictors of perceived need for treatment.

Analyses indicate different findings based on the bivariate correlations between the four types of consequences and each treatment-related variable, versus the results of the models with covariates. For instance, consequences related to dependence and productivity had statistically significant correlations with perceived need for treatment; however, these variables were not significant predictors once covariates were included in the model. It appears that the effects of the two types of consequences disappeared when COA status and educational status were taken into account. These results suggest that having a higher level of education, some college or more, is associated with lower levels of perceived need for treatment and being a COA is associated with higher levels of perceived need for treatment. Study participants with more education may be more likely to believe that they do not need treatment because they are higher-functioning than less educated peers. In other words, they might perceive themselves to have fewer productivity consequences and might feel that they have the intellectual resources to compensate for the difficulties at school or work caused by their alcohol use. Regarding COA status, it could be that this variable is correlated with dependence symptoms and when it is included in the model, the effect of the dependence symptoms on perceived need for treatment is no longer statistically significant. There is a possibility that children of alcoholics are more sensitive to and knowledgeable of alcohol-related problems and treatment. This sensitivity and knowledge are due to being raised by a parent who experienced consequences due to their drinking and when they become older and start drinking alcohol, they are more likely to perceive a need for treatment. Consequently, the effects of

productivity-related consequences and dependence symptoms disappear in multivariate models because COA status and educational level explain a large proportion of the variance in perceived need for treatment. Replication of these results is needed before definitive conclusions can be made about the relationships among educational level, COA status, productivity consequences, dependence symptoms, and perceived need for treatment.

Regarding the different findings based on the bivariate correlations versus the results of the models with covariates, the significant correlations between productivity-related consequences and criticism from others with treatment utilization disappeared once the effects of covariates were taken into account. In this case, alcohol consumption seems to be the strongest predictor of treatment utilization, as it was the only statistically significant predictor in the model with all four types of consequences. These results suggest that people enter treatment when the quantity and frequency of their drinking is high. People who drink are likely to have expectations about what it means to drink “too much” and when they notice that their intake of alcohol reaches a certain level, they get help regardless of the specific types of problems that their alcohol use is causing.

In the overall sample, when each type of consequence was tested as an individual predictor of treatment utilization, aggressive, productivity, and dependence consequences were significant predictors. These preliminary analyses seemed promising and consistent with Hajema, Knibbe, and Drop (1999), who proposed that alcohol-related consequences would differ in the extent to which they were considered losses and that some types were more predictive of

treatment utilization than was frequency of alcohol consumption. However, the statistically significant effects of the three types of consequences on treatment utilization were no longer detectable once covariates were included in the same model. When the four types of consequences and the two covariates were in the same model predicting treatment utilization, only alcohol consumption was a statistically significant predictor. Alcohol consumption appears to be a strong predictor of use of treatment in our study. This finding is consistent with one study by Seigers and Carey (2010) that found that about a third of college students being screened for treatment were reporting high levels of and frequent alcohol consumption. However, other studies indicate that high levels of drinking lead very small numbers of people to utilize treatment. For instance, a study of a community-based national alcohol screening program (Greenfield et al., 2003) found that 43% of their participants reported a high frequency and quantity of alcohol consumption, but only 13% reported having been treated for alcohol problems in the past and only 2% reported current treatment. Therefore, one must conclude that there are other factors, besides frequency and quantity of drinking, that predict treatment utilization.

Since our results did not indicate that any given type of consequence was a significant predictor of perceived need for treatment or treatment utilization, exploratory analyses tested whether these variables were predicted by the total number of alcohol-related problems. The total consequences variable did predict treatment utilization, but not perceived need for treatment. This finding probably

indicates that people with more severe disorders (i.e. who experience more consequences) get sent for treatment regardless of whether they think they need it.

The results of the current study also did not provide support for the third hypothesis, which states that the strength of the relationship between alcohol consequences and treatment utilization, or perceived need for treatment, will be different for men compared to women. The first part of the hypothesis stated that consequences related to criticism from others would be a stronger predictor of treatment utilization for women than for men, whereas aggression-related consequences would be a stronger predictor of treatment utilization for men than for women. The results also failed to support the second part of the third hypothesis, which stated that criticism from others would be a stronger predictor of perceived need for women than for men. Post-hoc analyses of power indicate that the current study was underpowered to detect a moderating effect of gender, given the sample size, the small number of women participants, and the number of predictor variables. Since the more complex moderation models did not produce significant findings, the patterns in the correlations between consequences and treatment variables were examined separately for men and women.

First, the correlations between each consequence and perceived need for treatment will be discussed. Correlations of aggression-related consequences and perceived need for treatment were not significant either for men or women. This finding is puzzling, as aggression-related consequences are thought to be more visible to the individual and others, and to have more immediate costs. However,

it is possible that for most individuals, this type of consequence does not occur frequently enough to be internalized and deemed a problem. Regarding the relationship between dependence symptoms and perceived need for treatment, the correlation was significant for men but not for women. This suggests that consequences related to loss of control, spending a lot of time on alcohol-related activities, inability to cut down, and feeling a need for alcohol had a statistically significant relationship to perceiving a need for treatment for men. This is consistent with the findings from Edlund and colleagues (2009), who also found that problems related to dependence were predictive of perceived need for treatment. The correlation between productivity consequences and perceived need for treatment was significant for men but not women. It seems that productivity consequences could lead men to recognize a need for treatment, but for women, other factors may influence their perceived need for treatment. This may be due to gender roles, which socialize men to value their role as the financial provider in the home (Robbins & Martin, 1993) and when this role is threatened, they may be more willing to perceive a need to get help. Finally, the relationships between criticism from others and perceived need for treatment were not statistically significant, contrary to the initial hypothesis. It appears that even when men and women in our sample received negative feedback from others regarding their drinking, they did not perceive that there was a problem. This lack of relationship may be explained in part by the framework proposed by Beckman and Kocel (1982), which argues that perceived need for treatment reflects the attitudes or beliefs of the individual about the disorder or treatment. It may be that perceived

need for treatment is not heavily influenced by the criticism from others because the person's beliefs may depend more on factors that are unrelated to feedback from family and friends, such as the individual's previous experiences with alcohol, positive expectancies about alcohol, knowledge of symptoms, and attitudes about what defines problematic drinking.

Regarding the patterns of correlations between types of consequences and treatment utilization, theory and previous research would suggest that aggressive, destructive consequences would be significant predictors of treatment utilization for men, but not for women. This was not the case and it may be due to the low power in the study to detect these effects. For female participants, the dependence symptoms variable was a marginally significant predictor of treatment utilization, but it was not significant for men. This finding is consistent with Wu and Ringwalt (2004), whose study found that tolerance and the inability to cut down on alcohol use increased the odds of women receiving treatment, but this was not the case for men in their study. They argued that this may reflect a recent change in women's access to substance abuse care due to increased awareness of alcohol problems and greater availability of women-focused treatment programs. For productivity consequences there was a significant correlation for women, but not for men. This is consistent with Bendtsen et al. (2002), who found that women were more likely than men to utilize treatment services after unemployment, perhaps because the women in their study were also more likely to have a lower socioeconomic status than the men and experienced more economic pressure to resolve the alcohol problems that led to unemployment. It appears that when

alcohol use interferes with women's ability to carry out their responsibilities, they tend to get treatment for their alcohol use. Regarding the relationship between criticism from others and treatment utilization, the correlation was significant for women, but not for men. This is consistent with the hypothesis that criticism from others would be a predictor of treatment utilization for women because they feel more pressure from society against alcohol use (Keefe, 1994) and they themselves more strongly disapprove of drinking by women.

There are some interesting patterns in the findings of correlations between types of consequences and the two treatment-related variables. For instance, results suggest that the correlation between dependence symptoms and perceived need for treatment was significant for men and not for women, but the relationship between dependence symptoms and treatment utilization was significant for female participants, but not the men in the sample. Together, these findings suggest that there is a pattern in which dependence symptoms lead men to perceive a need for treatment, but they do not actually end up using services for this reason alone. For women, it appears that there are other unknown factors that increase women's perceived need for treatment, but it is when they develop dependence symptoms that they actually utilize treatment services. Similarly, productivity problems were significantly related to perceived need for treatment in men but not women and in contrast, productivity problems were significantly related to treatment utilization in women but not men. Again, it is possible that productivity consequences lead men to recognize a need for treatment, but they do not take action. For women, it could be that other consequences increase women's

perceived need for treatment, but when they develop problems at school or work, then they actually take action and enter into treatment.

In summary, the pattern of correlations seems to suggest that for men, consequences might predict perceived need for treatment but not actual use of treatment services. For women, consequences seem to predict receiving treatment but not perceived need for treatment. One explanation for this pattern is that men might have more variability in perceived need for treatment than do women, and women may have more variability in treatment utilization than do men. However, when the data were examined, this was not the case. A possible explanation is that men, whose alcohol-related consequences lead them to perceive a need, do not actually get help perhaps because of barriers to treatment or the stigma associated with the disorder and/or treatment. In contrast, women who experience dependence symptoms, productivity consequences, or criticism from others, are pressured by people in their social circles to utilize treatment services regardless of whether they feel they need formal help.

Previous observational studies and randomized control trials have consistently found that participation in formal alcohol treatment and/or self-help (for example, Alcoholics Anonymous) is associated with better outcomes (Dawson et al., 2006; Timko et al., 2006). A study by Grosso and colleagues (Grosso, Epstein, McCrady, Gaba, Cook, Backer-fulghum, and Graff, 2007) suggests that the influence of alcohol-related problems on people's decision to utilize treatment should be measured more directly by asking study participants if a given consequence was a concern that brought them to treatment, instead of

making the assumption that because a person experienced a consequence, it motivated them to enter treatment. If consequences are not the strongest predictors of perceived need for treatment or utilization of services, researchers must look into the variables that drive people to perceive a need for treatment and that motivate them enough to take action and utilize services that are available to them. Untreated individuals with AUDs have reported that one of the reasons they do not utilize treatment is the belief that a person should be strong enough to handle consequences on their own (Cohen et al., 2007; Edlund et al., 2009). People also cite stigma associated with alcoholism and mental health treatment, lack of health insurance coverage of these services, and the belief that treatment will not work. Treatment utilization entails that the person recognizes he/she has a drinking problem, admits that these problems interfere with aspects of their lives, and moreover, that these problems cannot be solved by the individual. Researchers have theorized that the most compelling obstacle is that treatment implies that the person will have to give up drinking completely and that consequently, the person will incur several negative “personal and social costs” because of stopping their drinking habits (Hajema, Knibbe, and Drop, 1999). For example, treatment could lead people to have to give up some of their social activities that revolve around drinking, such as work happy-hours or parties, and may compromise their relationships with friends and family members who drink. Unfortunately, this study did not ask participants about the potential costs they perceived in utilizing treatment. Furthermore, since several studies have found that many problem drinkers are able to resolve their problems without formal

treatment (Sobell et al., 1996), people may recognize that they have a problem due to their drinking but at the same time, they may have a strong belief in their ability to cope with the problem or decrease their drinking.

The current study focused on gender as a moderator of the relation between drinking consequences and alcohol treatment-related variables and did not test whether alcohol-related consequences mediated possible gender differences in perceived need for treatment or treatment utilization. Our results indicate that for three of the consequences, there were no gender differences in the mean levels of consequences, which is a requisite for establishing mediation. However, the ANCOVA results suggest that men and women did differ in mean levels of aggression-related consequences and the relationship between aggressive consequences and treatment utilization was statistically significant in the overall sample. Therefore, it is possible that aggression-related consequences mediate the relationship between gender and treatment utilization. In other words, results suggest that men, compared to women, are more likely to experience consequences related to aggressive and destructive behavior while drinking, which then leads them to be more likely to use alcohol-treatment services. However, the exact mechanism is unclear and this theory should be tested in future studies. It could be that men who experience aggression-related consequences are more likely to be legally mandated to get treatment, or experience more social pressure to receive help.

It must be noted that there is a very high correlation between productivity consequences and dependence symptoms. This raises conceptual concerns about

whether these two types of consequences actually reflect one construct. There are also statistical concerns about multicollinearity when their effects are tested together in one model. The two factors are highly related, supporting that they result from a single underlying disorder. Conceptually, the previous literature did not provide evidence for grouping these constructs. Also, examining the face validity of the items suggests that they are conceptually distinct. Moreover, the purpose of this study was to study the effect of these four types of consequences, which have been found in previous studies that examined factors in consequences. On the issue of multicollinearity, as mentioned previously, the results did not differ whether consequences were tested individually with covariates, or all four types together. Future studies should continue to examine whether this pattern of correlations occurs in other samples and whether there are conceptual reasons for explaining how these two factors are so closely related. It would also be important to test this factor structure in other samples and whether other models, with additional indicators, have a better fit compared to the four-factor model tested in this study. For example, it would be useful to include other types of consequences and additional indicators of each type of consequence. Furthermore, it would also be important to test a model in which the indicators of both factors were combined to form one factor or a model in which the two factors are related to one higher-order factor.

Surprisingly, in this study parental alcoholism was not significantly correlated with alcohol consumption or externalizing symptoms. This finding was unexpected, as other studies based on other subsamples from the same dataset

(Chassin, Pitts, DeLucia, & Todd, 1999) and several other studies in the literature (McGue, Sharma, & Benson, 1996; Sher, 1993) have found that parental alcoholism is related to the aforementioned constructs. The lack of significant correlations with COA status might be due to smaller effects of parental alcoholism at older ages. Research indicates that the effects of parental alcoholism are less evident at older ages, perhaps because when people are younger the effect of parental alcoholism is largely due to alcoholic parents' direct influence on their offspring through parenting behavior. As children get older, the effects of parental alcoholism decrease as the offspring's exposure to their parents decreases. For instance, behavioral genetic studies suggest that shared family environment has the greatest influence on substance use (e.g. alcohol, marijuana, and tobacco) during early adolescence, and then declines in importance through young adulthood (Kendler et al., 2008). Since the average age of the sample in the current study is 25.95, we would expect the majority of participants to live out of the home and away from their parents. Another possible explanation is that among non-COAs, alcohol problems increase and become similar in level to COAs during young adulthood because of environmental influences, such as being exposed to drinking peers and having more social opportunities that revolve around drinking. One final explanation is that we selected a subsample of non-COAs from the original group of participants that is at particularly high risk, as we only included not only young adults who drank but also, we limited our sample to those who reported one or more consequences.

Limitations and Conclusions

This study has several limitations that should be acknowledged. First, the present study did not assess in detail certain alcohol-related consequences, such as health problems caused by alcohol. It is important that studies gather additional information about the role of those consequences on people's perceptions of need for treatment or their willingness to utilize treatment services. Second, the sample size was relatively small and within this sample, female participants were underrepresented and there were few participants who reported perceiving a need for treatment. As discussed in previous sections, the small sample size limited the amount of statistical power to detect significant effects, especially those of moderation. Therefore, future studies should examine the relationships among consequences, treatment, and gender in larger samples. Third, since perceived need for treatment and utilization of treatment were assessed in different time frames, it was difficult to examine their relationship. It would be important for future studies to examine the factors that increase perceived need for treatment and to examine perceived need for treatment as a prospective predictor of treatment. Fourth, this study did not assess important aspects of treatment that could be influenced by different types of consequences, such as involvement in treatment or voluntary vs. mandated treatment. The item that assesses treatment utilization did not allow for quantification of the level of involvement in treatment and does not allow for exploration of whether there are different types of consequences associated with low versus high involvement in treatment, or whether gender moderated these relationships. In addition, our measure of

treatment utilization did not distinguish between voluntary and mandated utilization. Correlates of different types of treatment utilization may differ depending on whether care is voluntarily sought, but this question cannot be addressed in the data. Similarly, our data cannot examine whether the relationship between aggressive consequences and treatment utilization may be largely due to treatment being mandated. Fifth, this study solely utilized self-report to assess the consequences that participants experienced within a period of five years. Self-report could be influenced by memory and reporting biases. Also, it is possible that alcohol-related consequences lead to perceived need for treatment and treatment utilization within a time frame that is shorter than five years. Furthermore, since women are socialized differently from men, women may remember and report any alcohol-related problems differently from the way men do (Block, 1983).

In spite of these limitations, the current study attempted to further our knowledge of how alcohol-related consequences longitudinally predict treatment utilization among men and women in a high-risk community sample. Results of our study indicate that our participants experienced four broad types of consequences: criticism from others, dependence symptoms, aggressive/destructive consequences, and consequences related to productivity at school or work. The current analyses did not find that these four types of consequences predicted perceived need for treatment or treatment utilization over and above the effect of covariates. Additionally, results also indicate that gender is not a moderator of the relationships between consequences and perceived need for treatment or treatment utilization. However, the study was underpowered to

detect the moderating effect of gender so future studies should examine this hypothesis in a larger sample. One strength of this study is that it examined the use of treatment among people who drank and had experienced one or more consequence due to their drinking, unlike other studies that limited their research to people already in treatment and with the most severe patterns of substance misuse. Another strength of this study is that it highlights the need to continue to research significant predictors of perceived need for treatment, which has been understudied in the literature. Likewise, future studies should design longitudinal studies that assess the relationship between perceived need for treatment and actual use of services. Future studies should also address the relationship of gender in help-seeking behaviors across service settings and there is a great need for well-controlled treatment trials evaluating the effects of multimodal treatment services that address the needs of women and men.

The findings of this study, together with previous literature, suggest that there is a need to continue to examine the process for utilizing treatment services among drinkers who are experiencing consequences due to their drinking and to develop ways to measure the costs and benefits of drinking versus those of treatment. Improved knowledge about identification of problems, referral, and treatment procedures could potentially help lessen the gap between need for services and utilization of treatment (Ilgen et al., 2011). There is a lot we do not yet know about treatment for alcohol-related problems. Researchers need to provide information that will help treatment providers to better address the needs

of people with alcohol-related consequences in the areas of referral procedures, clinical assessment, and treatment service provision and planning.

References

- Achenbach, T. M., & Edelbrock, C. (1981). *Behavioral problems and competencies reported by parents of normal and disturbed children aged 4-16*. Monographs of the Society for Research in Child Development, 46, (1 Serial No. 188.)
- Barnes, G. M., Farrell, M. P., & Dintcheff, B. A. (1997). Family socialization effects on alcohol abuse and related problem behaviors among female and male adolescents. In R. W. Wilsnack, & S. C. Wilsnack (Eds.), *Gender and alcohol: Individual and social perspectives*. (pp. 156-175). Piscataway, NJ, US: Rutgers Center of Alcohol Studies.
- Beckman, L. J., & Kocel, K. M. (1982). The treatment-delivery system and alcohol abuse in women: Social policy implications. *Journal of Social Issues*, 38, 139-151.
- Bendtsen, P., Dahlström, M. L., & Bjurulf, P. (2002). Sociodemographic gender differences in patients attending a community-based alcohol treatment centre. *Addictive Behaviors*, 27, 21-33. doi:10.1016/S0306-4603(00)00160-X
- Block, J. H. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. *Child Development*, 54, 1335-1354.
- Blume, S. B. (1991). Sexuality and stigma: The alcoholic woman. *Alcohol Health & Research World. Special Issue: Alcohol and Sexuality*, 15, 139-146.
- Bongers, I. M. B., van de Goor, L. A. M., van Oers, J. A. M., & Garretsen, H. F. L. (1998). Gender differences in alcohol-related problems: controlling for drinking behaviour. *Addiction*, 93, 119-123.
- Booth, B. M., & Feng, W. (2002). The impact of drinking and drinking consequences on short-term employment outcomes in at-risk drinkers in six southern states. *The Journal of Behavioral Health Services & Research*, 29, 157-166. doi: <http://dx.doi.org/10.1007/BF02287702>
- Brennan, A. F., Walfish, S., & AuBochon, P. (1986). Alcohol use and abuse in college students: A review of individual and personality correlates. *International Journal of the Addictions*, 21, 449-474.
- Caetano, R., & Kaskutas, L. A. (1996). Changes in drinking patterns among Whites, Blacks, and Hispanics. *Substance use and Misuse*, 56, 558-565.
- Chan, K., Neighbors, C., Gilson, M., Larimer, M. E., & Marlatt, G. A. (2007). Epidemiological trends in drinking by age and gender: Providing normative feedback to adults. *Addictive Behaviors*, 32, 967-976.

- Chassin, L., Barrera, M., Bech, K., & Kossak Fuller, J. (1992). Recruiting a community sample of adolescent children of alcoholics: A comparison of three subject sources. *Journal of Studies on Alcohol*, *53*, 316-319.
- Chassin, L., Rogosch, F., & Barrera, M. (1991). Substance use and symptomatology among adolescent children of alcoholics. *Journal of Abnormal Psychology*, *100*, 449-463.
- Chassin, L., Pillow, D., Curran, P., Molina, B., Barrera, M. (1993). Relation of parental alcoholism to early adolescent substance use: a test of three mediating mechanisms. *Journal of Abnormal Psychology*, *102*, 3-19.
- Chassin, L., Pitts, S., DeLucia, C., & Todd, M. (1999). A longitudinal study of children of alcoholics: Predicting young adult substance use disorders, anxiety and depression. *Journal of Consulting and Clinical Psychology*, *109*, 106-119.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cohen, E., Feinn, R., Arias, A., & Kranzler, H. R. (2007). Alcohol treatment utilization: Findings from the national epidemiologic survey on alcohol and related conditions. *Drug and Alcohol Dependence*, *86*, 214-221. doi: <http://dx.doi.org/10.1016/j.drugalcdep.2006.06.008>
- Cooper, M. L., & Orcutt, H. K. (1997). Drinking and sexual experience on first dates among adolescents. *Journal of Abnormal Psychology*, *106*, 191-202. doi: <http://dx.doi.org/10.1037/0021-843X.106.2.191>
- Corcoran, K. J., & Thomas, L. R. (1991). The influence of observed alcohol consumption on perceptions of initiation of sexual activity in a college dating situation. *Journal of Applied Social Psychology*, *21*, 500-507. doi:10.1111/j.1559-1816.1991.tb00533.x
- Davis, L. J., & Morse, R. M. (1987). Age and sex differences in the responses of alcoholics to the self-administered alcoholism screening test. *Journal of Clinical Psychology*, *43*, 423-430.
- Dawson, D. A. (1996). Gender differences in the probability of alcohol treatment. *Journal of Substance Abuse*, *8*, 211-225. doi:10.1016/S0899-3289(96)90260-6
- Dawson, D.A., & Grant, B.F. (1993). Gender effects in diagnosing alcohol abuse and dependence. *Journal of Clinical Psychology*, *49*, 298-307.
- Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2006). Estimating the effect of help-seeking on achieving recovery from alcohol dependence.

Addiction, 101, 824-834. doi: <http://dx.doi.org/10.1111/j.1360-0443.2006.01433.x>

- Dohrenwend, B. P., & Dohrenwend, B. S. (1976). Sex differences and psychiatric disorders. *American Journal of Sociology*, 81, 1447-1454.
- Edlund, M. J., Booth, B. M., & Feldman, Z. L. (2009). Perceived need for treatment for alcohol use disorders: Results from two national surveys. *Psychiatric Services*, 60, 1618-1628. doi:10.1176/appi.ps.60.12.1618
- Endicott, J., Anderson, N., & Spitzer, R. L. (1975). *Family History Diagnostic Criteria*. New York Biometrics Research, New York Psychiatric Institute.
- Engs, R. C., & Hanson, D. J. (1990). Gender differences in drinking patterns and problems among college students: A review of the literature. *Journal of Alcohol and Drug Education*, 35, 36-47.
- George, A. A., & Tucker, J. A. (1996). Help-seeking for alcohol-related problems: Social contexts surrounding entry into alcoholism treatment or alcoholics anonymous. *Journal of Studies on Alcohol*, 57, 449-457.
- Grant, B. F. (1997). Barriers to alcoholism treatment: Reasons for not seeking treatment in a general population sample. *Journal of Studies on Alcohol*, 58, 365-371.
- Greenfield, S. F., Keliher, A., Sugarman, D., Kozloff, R., Reizes, J. M., Kopans, B., & Jacobs, D. (2003). Who comes to voluntary, community-based alcohol screening? Results of the First Annual National Alcohol Screening Day, 1999. *The American Journal of Psychiatry*, 160, 1677-1683.
- Grosso, J. A., Epstein, E. E., McCrady, B. S., Gaba, A., Cook, S., Backer-Fulghum, L. M., & Graff, F. S. (2013). Women's motivators for seeking treatment for alcohol use disorders. *Addictive Behaviors*, 38, 2236-2245. doi: 10.1016/j.addbeh.2013.02.004
- Hajema, K., Knibbe, R. A., & Drop, M. J. (1999). Social resources and alcohol-related losses as predictors of help seeking among male problem drinkers. *Journal of Studies on Alcohol*, 60, 120-129.
- Harrington, N. G., Brigham, N. L., Clayton, R. R. (1997). Differences in alcohol use and alcohol-related problems among fraternity and sorority members. *Drug and Alcohol Dependence*, 47, 237-246.
- Harris, A.R. (1977). Sex and theories of deviance: Toward a functional theory of deviant type-scripts. *American Sociological Review*, 42, 3-16.

- Hasin, D. S., & Grant, B. F. (1995). AA and other helpseeking for alcohol problems: Former drinkers in the U.S. general population. *Journal of Substance Abuse, 7*, 281-292. doi: [http://dx.doi.org/10.1016/0899-3289\(95\)90022-5](http://dx.doi.org/10.1016/0899-3289(95)90022-5)
- Hasin, D. S., Grant, B. F., Weinflash, J. (1988). Male/female differences in alcohol-related problems: alcohol rehabilitation patients. *International Journal of Addiction, 23*, 437-448.
- Heath, A. C., Slutske, W. S., & Madden, P. A. F. (1997). Gender differences in the genetic contribution to alcoholism risk and to alcohol consumption patterns. In R. W. Wilsnack, & S. C. Wilsnack (Eds.), *Gender and alcohol: Individual and social perspectives*. (pp. 114-149). Piscataway, NJ, US: Rutgers Center of Alcohol Studies.
- Holdcraft, L. C., & Iacono, W. G. (2002). Cohort effects on gender differences in alcohol dependence. *Addiction, 97*, 1025-1036.
- Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3*, 424-453. doi:10.1037/1082-989X.3.4.424
- Huizinga, D. E., Finn Aage, W., & Wylie, A. (1991). Are there multiple paths to delinquency? *Journal of Criminal Law and Criminology, 82*, 83-118.
- Ilgen, M. A., Price, A. M., Burnett-Zeigler, I., Perron, B., Islam, K., Bohnert, A. S. B., & Zivin, K. (2011). Longitudinal predictors of addictions treatment utilization in treatment-naive adults with alcohol use disorders. *Drug and Alcohol Dependence, 113*, 215-221. doi: <http://dx.doi.org/10.1016/j.drugalcdep.2010.08.006>
- Jessor, R. & Jessor, S. L. (1981). *Young Adult Follow-up Study: 1981 Annual Questionnaire*. Institute of Behavioral Science: University of Colorado, Boulder.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2009). *Monitoring the Future national survey results on drug use, 1975-2008. Volume I: Secondary school students* (NIH Publication No. 09-7402). Bethesda, MD: National Institute on Drug Abuse, 721.
- Kahler, C. W., Strong, D. R., Read, J. P., Palfai, T. P., & Wood, M. D. (2004). Mapping the continuum of alcohol problems in college students: A Rasch model analysis. *Psychology of Addictive Behaviors, 18*, 322-333.
- Kahler, C. W., Strong, D. R., Stuart, G. L, Moore, T. M., & Ramsey, S. E. (2003). Item functioning of the alcohol dependence scale in a high-risk sample. *Drug and Alcohol Dependence, 72*, 183-192.

- Kaskutas, L. A., Weisner, C., & Caetano, R. (1997). Predictors of help seeking among a longitudinal sample of the general public, 1984-1992. *Journal of Studies on Alcohol*, *58*, 155-161.
- Keefe, K. (1994). Perceptions of normative social pressure and attitudes toward alcohol use: Changes during adolescence. *Journal of Studies on Alcohol*, *55*, 46-54.
- Kendler, K. S., Schmitt, J. E., Aggen, S. H., & Prescott, C. A. (2008). Genetic and environmental influences on alcohol, caffeine, cannabis, and nicotine use from early adolescence to middle adulthood. *Archives of General Psychiatry*, *65*, 674-682.
- Kessler, R. C., Zhao, S., Katz, S. J., Kouzis, A. C., Frank, R. G., Edlund, M., & Leaf, P. (1999). Past-year use of outpatient services for psychiatric problems in the national comorbidity survey. *The American Journal of Psychiatry*, *156*, 115-123.
- Lemle, R., & Mishkind, M. E. (1989). Alcohol and masculinity. *Journal of Substance Abuse Treatment*, *6*, 213-222.
- Lewis, C. E., Bucholz, K. K., Spitznagel, E., & Shayka, J. J. (1996). Effects of gender and comorbidity on problem drinking in a community sample. *Alcoholism: Clinical and Experimental Research*, *20*, 466-476.
- Lo, C. C. (1996). Are women heavier drinkers than we thought they were? *Journal of Studies on Alcohol*, *57*, 531-535.
- LoCastro, J. S., Potter, J. S., Donovan, D. M., Couper, D., & Pope, K. W. (2008). Characteristics of first-time alcohol treatment seekers: The COMBINE study. *Journal of Studies on Alcohol and Drugs*, *69*, 885-895.
- Maddock, J. E., Laforge, R. G., Rossi, J. S., & O'Hare, T. (2001). The college alcohol problems scale. *Addictive Behaviors*, *26*, 385-398. doi:10.1016/S0306-4603(00)00116-7
- Marmot, M. G., North, F., Feeney, A., & Head, J. (1993). Alcohol consumption and sickness absence: From the Whitehall II study. *Addiction*, *88*, 369-382. doi: <http://dx.doi.org/10.1111/j.1360-0443.1993.tb00824.x>
- Martens, M. P., Neighbors, C., Dams-O'Connor, K., Lee, C. M., & Larimer, M. E. (2007). The factor structure of a dichotomously scored Rutgers Alcohol Problems Index. *Journal of Studies on Alcohol and Drugs*, *68*, 597-606.
- McGue, M., Sharma, A., & Benson, P. (1996). Parent and sibling influences on adolescent alcohol use and misuse: Evidence from a U.S. adoption cohort. *Journal of Studies on Alcohol*, *57*, 8-18.

- Moffitt, T. E., Caspi, A., Rutter, M., & Silva, P. A. (2001). *Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the dunedin longitudinal study*. New York, US: Cambridge University Press. doi:10.1017/CBO9780511490057
- Mojtabai, R., Olfson, M., & Mechanic, D. (2002). Perceived need and help-seeking in adults with mood, anxiety, or substance use disorder. *Archives of General Psychiatry*, *59*, 77-84. doi:10.1001/archpsyc.59.1.77
- Mullahy, J., & Sindelar, J. (1996) Employment, unemployment, and problem drinking. *Journal of Health Economics*, *15*, 409-434, doi: 10.1016/S0167-6296(96)00489-4.
- Muthén, L. K. & Muthén, B. O. (2007). *Mplus user's guide (5th Ed)*. Los Angeles, CA: Authors.
- Neal, D. J., Corbin, W. R., & Fromme, K. (2006). Measurement of alcohol-related consequences among high school and college students: Application of item response models to the Rutgers Alcohol Problem Index. *Psychological Assessment*, *18*, 402-414. doi: <http://dx.doi.org/10.1037/1040-3590.18.4.402>
- Nelson, C. B., Heath, A. C., & Kessler, R. C. (1998). Temporal progression of alcohol dependence symptoms in the U.S. household population: Results from the national comorbidity survey. *Journal of Consulting and Clinical Psychology*, *66*, 474-483. doi: <http://dx.doi.org/10.1037/0022-006X.66.3.474>
- Nichol, P. E., Krueger, R. F., & Iacono, W. G. (2007). Investigating gender differences in alcohol problems: A latent trait modeling approach. *Alcoholism: Clinical and Experimental Research*, *31*, 783-794. doi:10.1111/j.1530-0277.2007.00375.x
- Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review*, *24*, 981-1010. doi:10.1016/j.cpr.2004.08.003
- Nolen-Hoeksema, S., & Hilt, L. (2006). Possible contributors to the gender differences in alcohol use and problems. *Journal of General Psychology*, *133*, 357-374. doi:10.3200/GENP.133.4.357-374
- O'Hare, T. M. (1990). Drinking in college: Consumption patterns, problems, sex differences and legal drinking age. *Journal of Studies on Alcohol*, *51*, 536-541.

- Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4th ed.). England: Open University Press McGraw-Hill Education.
- Perkins, H. W. (1992) Gender Patterns in consequences of collegiate alcohol abuse: A 10-year study of trends in an undergraduate population. *Journal of Studies on Alcohol*, *53*, 458-462.
- Perkins, H. W. (2002). Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol. Special Issue: College Drinking – What It Is, and What To Do about It: Review of the State of the Science*, *14*, 91-100.
- Pescosolido, B. A. (1992). Beyond rational choice: The social dynamics of how people seek help. *American Journal of Sociology*, *97*, 1096-1138. doi:10.1086/229863
- Petry, N. M., Kirby, K. N., & Kranzler, H. R. (2002). Effects of gender and family history of alcohol dependence on a behavioral task of impulsivity in healthy subjects. *Journal of Studies on Alcohol*, *63*, 83-90.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (2003). In search of how people change: Applications to addictive behaviors. In P. Salovey, & A. J. Rothman (Eds.), *Social psychology of health* (pp. 63-77). New York, US: Psychology Press.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, *47*, 1102-1114. doi:10.1037/0003-066X.47.9.1102
- Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. G., Marcus, B. H., Rakowski, W., Fiore, C., Harlow, L. L., Redding, C. A., Rosenbloom, D., & Rossi, S. R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology*, *13*, 39-46. doi:10.1037/0278-6133.13.1.39
- Raimo, E. B., Daeppen, J., Smith, T. L., Danko, G. P., & Schuckit, M. A. (1999). Clinical characteristics of alcoholism in alcohol-dependent subjects with and without a history of alcohol treatment. *Alcoholism: Clinical and Experimental Research*, *23*, 1605-1613. doi: <http://dx.doi.org/10.1097/00000374-199910000-00006>
- Ratliff, K. G., & Burkhart, B. R. (1984). Sex differences in motivations for and effects of drinking among college students. *Journal of Studies on Alcohol*, *45*, 26-32.

- Read, J. P., Kahler, C. W., Strong, D. R., & Colder, C. R. (2006). Development and preliminary validation of the young adult alcohol consequences questionnaire. *Journal of Studies on Alcohol*, *67*, 169-177.
- Robbins, C. A. & Martin, S. S. (1993). Gender, styles of deviance, and drinking problems. *Journal of Health and Social Behavior*, *34*, 302-321.
- Robins, L. N., Helzer, J. E., Croughan, J. L., & Ratcliff, K. S. (1981). National Institute of Mental Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of General Psychiatry*, *38*, 381-389.
- Ross, H.E. (1989). Alcohol and drug abuse in treated alcoholics: a comparison of men and women. *Alcoholism: Clinical and Experimental Research*, *13*, 810-816.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147-177. doi: <http://dx.doi.org/10.1037/1082-989X.7.2.147>
- Schmidt, C., Klee, L., & Ames, G. (1990). Review and analysis of literature on indicators of women's drinking problems. *British Journal of Addiction*, *85*, 179-192. doi: <http://dx.doi.org/10.1111/j.1360-0443.1990.tb03069.x>
- Seigers, D. K. L., & Carey, K. B. (2010). Alcohol use, psychopathology, and treatment utilization in a university mental health clinic. *Journal of College Student Psychotherapy*, *24*, 328-337. doi: <http://dx.doi.org/10.1080/87568225.2010.509250>
- Sher, K. (1993). *Alcohol Health and Behavior Study*. Columbia, MO: University of Missouri, Columbia.
- Sobell, L. C., Cunningham, J. A., & Sobell, M. B. (1996). Recovery from alcohol problems with and without treatment: Prevalence in two population surveys. *American Journal of Public Health*, *86*, 966-972.
- Sobell, L. C., Sobell, M. B., Leo, G. I., Agrawal, S., Johnson-Young, L., & Cunningham, J. A. (2002). Promoting self-change with alcohol abusers: A community-level mail intervention based on natural recovery studies. *Alcoholism: Clinical and Experimental Research*, *26*(6), 936-948. doi: <http://dx.doi.org/10.1097/00000374-200206000-00025>
- Sugarman, D. E., DeMartini, K. S., & Carey, K. B. (2009). Are women at greater risk? An examination of alcohol-related consequences and gender. *The American Journal on Addictions*, *18*, 194-197. doi: [10.1080/10550490902786991](http://dx.doi.org/10.1080/10550490902786991)

- Tighe, E., & Saxe, L. (2006). Community-based substance abuse reduction and the gap between treatment need and treatment utilization: Analysis of data from the "fighting back" general population survey. *Journal of Drug Issues, 36*, 295-312.
- Timko, C., DeBenedetti, A., & Billow, R. (2006). Intensive referral to 12-step self-help groups and 6-month substance use disorder outcomes. *Addiction, 101*, 678-688. doi: <http://dx.doi.org/10.1111/j.1360-0443.2006.01391.x>
- Wagner, E. F., Lloyd, D. A., & Gil, A. G. (2002). Racial/ethnic and gender differences in the incidence and onset age of DSM-IV alcohol use disorder symptoms among adolescents. *Journal of Studies on Alcohol, 63*, 609-619.
- Watson, D., Weber, K., Assenheimer, J., Clark, L., Strauss, M.E., & McCormick, R. (1995). Testing a tripartite model I: Evaluating the convergent and discriminant validity of anxiety and depression symptom scales. *Journal of Abnormal Psychology, 104*, 3-15.
- Weisner, C. (1990). The alcohol treatment-seeking process from a problems perspective: Responses to events. *British Journal of Addiction, 85*, 561-569. doi:10.1111/j.1360-0443.1990.tb01677.x
- Weisner, C. (1993). Toward an alcohol treatment entry model: A comparison of problem drinkers in the general population and in treatment. *Alcoholism: Clinical and Experimental Research, 17*, 746-752. doi:10.1111/j.1530-0277.1993.tb00833.x
- Weisner, C., & Matzger, H. (2002). A prospective study of the factors influencing entry to alcohol and drug treatment. *The Journal of Behavioral Health Services & Research, 29*, 126-137. doi:10.1007/BF02287699
- Witbrodt, J., & Romelsjo, A. (2010). Gender differences in mutual-help attendance one year after treatment: Swedish and U. S. samples. *Journal of Studies on Alcohol and Drugs, 71*, 125-135.
- Wu, L., Kouzis, A. C., & Leaf, P. J. (1999). Influence of comorbid alcohol and psychiatric disorders on utilization of mental health services in the national comorbidity survey. *The American Journal of Psychiatry, 156*, 1230-1236.
- Wu, L., Pilowsky, D. J., Schlenger, W. E., & Hasin, D. (2007). Alcohol use disorders and the use of treatment services among college-age young adults. *Psychiatric Services, 58*, 192-200. doi: <http://dx.doi.org/10.1176/appi.ps.58.2.192>

- Wu, L., & Ringwalt, C. L. (2004). Alcohol dependence and use of treatment services among women in the community. *The American Journal of Psychiatry*, *161*, 1790-1797. doi:10.1176/appi.ajp.161.10.1790
- Zarkin, G.A., French, M.T., Mroz, T., & Bray, J. W. (1998) Alcohol use and wages: new results from the National Household Survey on Drug Abuse. *Journal of Health Economics*, *17*, 53-68. doi: 10.1016/S0167-6296(97)00023-4
- Zilberman, M., Tavares, H., & el-Guebaly, N. (2004). Gender similarities and differences: The prevalence and course of alcohol- and other substance-related disorders. *Journal of Addictive Diseases*, *22*, 61-74.
- Zucker, R. A. (2000). *Alcohol involvement over the life course. Special Report to the U.S. Congress on Alcohol and Health*. National Institute on Alcohol Abuse and Alcoholism.

Table 1

*Participants with Complete Data Compared to Participants with Missing Data
at Wave 6*

Variable	Complete data at W5 and W6 (N = 220)	Incomplete data at W6 (N = 17)	Effect Size
W5 Aggressive consequences	.22 (.25)	.26 (.26)	.16
W5 Dependence symptoms	.11 (.21)	.09 (.18)	.09
W5 Productivity consequences	.23 (.24)	.31 (.19)	.34
W5 Criticism from others	.32 (.36)	.44 (.43)	.33
W5 Alcohol consumption	13.17 (7.82)	16.29 (10.28)	.39
W5 Externalizing psychopathology	4.74 (.26)	4.75 (.16)	.04
W5 Internalizing psychopathology	4.26 (.73)	4.21 (.61)	.07
W5 Age	25.88 (2.29)	26.88 (2.01)	.44
Gender			.12
Female	67 (30.5%)	2 (11.8%)	
Male	153 (69.5)	15 (88.2%)	
Parental alcoholism			.04
Non-COA	82 (37.3%)	5 (29.4%)	
COA	138 (62.7%)	12 (70.6%)	
Ethnicity			.13
Non-Caucasian	65 (29.5%)	8 (47.1%)	
Caucasian	155 (70.5%)	9 (52.9%)	
Education			.02
No college	83 (37.7%)	7 (41.2%)	
Some college	137 (62.3%)	10 (58.8%)	

Note. COA = Children of alcoholic; W5 = Wave 5; W6 = Wave 6. Effect size for t-test were measured by Cohen's d, with guidelines stating that .1 is small, .3 is medium, and .5 is large (Pallant, 2010). Effect size for chi square tests were measured by Cramer's V, with Cohen's (1988) guidelines stating that .1 is small, .3 is medium, and .5 is large.

Table 2

Descriptive Statistics of Variables

Categorical variables	Frequency				
Gender	168 (70.9%) men 69 (29.1%) women				
Ethnicity	163 (68.8%) non-Hispanic Caucasian 74 (31.2%) Hispanic/other				
Parental alcoholism	87 (36.7%) children of non-alcoholics 150 (63.3%) children of alcoholics				
Education	228 (38.0) no college 147 (62.0%) some college or more				
Perceived need for treatment ^a	200 (90.9%) not endorsed 20 (9.1%) endorsed				
Treatment utilization ^a	178 (80.9%) not endorsed 42 (19.1%) endorsed				
Continuous, Count, and Factor Scores Variables	<i>M</i> (<i>SD</i>)	Min.	Max	Skewness	Kurtosis
W5 Aggressive consequences	1.50 (1.13)	-.68	4.20	-.30	-.29
W5 Dependence symptoms	1.17 (3.66)	-3.802	14.21	.91	.12
W5 Productivity consequences	.08 (.69)	-1.04	2.21	.64	-.35
W5 Criticism from others	-.45 (2.34)	-4.08	4.54	.20	-.84
W5 alcohol consumption (frequency X quantity)	13.39 (8.04)	0.00	38.50	.49	-.11
W5 frequency of alcohol consumption	4.38 (1.35)	1.00	7.00	-.66	-.01
W5 quantity of alcohol consumption	4.57 (2.06)	.00	8.00	.01	-.96
W5 Externalizing psychopathology	4.74 (.25)	3.48	5.00	-2.22	7.03
W5 Internalizing psychopathology	4.26 (.72)	1.50	5.00	-1.50	2.43
W5Age	25.95 (2.36)	21.92	36.67	1.03	1.52
Total consequences at W5 ^a	2.15 (2.57)	1.00	12.00	1.40	1.36

Note. $n = 237$. Descriptives on consequence variables are calculated from factor scores. High scores on alcohol consumption indicate greater frequency and quantity. High scores on Internalizing psychopathology indicate a lack of negative affect and higher scores on externalizing psychopathology indicate lower levels of externalizing behavior. Children-of-alcoholic status is coded such that '0' indicates no parental alcoholism and '1' indicates a parental diagnosis. Educational attainment is coded such that '0' indicates no college and '1' indicates some college. Ethnicity is coded such that '0' indicates Caucasian and '1'. W5 = Wave 5.

^a $n = 220$ (due to missing data at Wave 5).

Table 3

Correlations among Variables for the Full Sample

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Gender	--													
2. W5 Aggressive consequences	.58**	--												
3. W5 Dependence symptoms	-.06	.46**	--											
4. W5 Productivity consequences	-.06	.32**	.91**	--										
5. W5 Criticism from others	-.25**	.07	.62**	.75**	--									
6. W5 Alcohol consumption	.21**	.31**	.24*	.22**	.12	--								
7. W5 Externalizing psychopathology	.05	-.32**	-.38**	-.34**	-.16*	-.21**	--							
8. W5 Internalizing psychopathology	.30**	-.06	-.30**	-.28*	-.21**	-.02	.50**	--						
9. Parental alcoholism	.03	.09	.16*	.15*	.10	.03	-.12	-.08	--					
10. Ethnicity	.03	.09	.06	.05	.03	.05	-.06	-.01	.06	--				
11. W5 Educational attainment	-.02	-.17*	-.16*	-.14*	-.11	-.14*	.15*	.13	-.07	-.15*	--			
12. W5 Age	.00	.02	-.04	-.03	.08	.03	.10	-.13	.04	.02	-.09	--		
13. W6 Perceived need for treatment	-.03	.03	.16*	.15*	.08	.09	-.08	-.13	.15*	-.10	-.15*	.03	--	.
14. W6 Treatment utilization	.15*	.16*	.15*	.15*	.05	.21**	-.09	-.03	.06	-.04	-.15*	-.02	.25**	--
15. Total consequences at W5	.05	.56**	.88**	.88**	.67**	.27**	-.38**	-.22**	.14*	.09	-.15*	-.03	.13	.19*

Note. High scores on Internalizing psychopathology indicate a lack of negative affect and higher scores on externalizing psychopathology indicate lower levels of externalizing behavior. COA status is coded such that '0' indicates no parental alcoholism and '1' indicates a parental diagnosis. Educational attainment is coded such that '0' indicates no college and '1' indicates some college. Ethnicity is coded such that '0' indicates Caucasian and '1' indicates all other ethnicities.

Table 4

Correlations among Variables for Female (Below the Diagonal) and Male (Above the Diagonal) Participants

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Aggressive Consequences at W5	--	.68**	.62**	.23**	.20**	-.50**	-.33**	.08	.05	-.13	-.09	.04	.10	.72**
2. Dependence Symptoms at W5	.57**	--	.98**	.60**	.20*	-.43**	-.45**	.14	.09	-.20*	-.03	.18*	.15	.89**
3. Productivity Consequences at W5	.27*	.81**	--	.74**	.20**	-.37**	-.42**	.13	.08	-.20**	.00	.17*	.14	.90**
4. Criticism from others at W5	.46**	.80**	.92**	--	.12	-.09	-.18*	.09	.05	-.12	.11	.08	.06	.67**
5. Alcohol Consumption at W5	.31*	.39**	.36**	.43**	--	-.11	-.05	.01	.08	-.08	.04	.14	.17*	.19*
6. Externalizing Psychopathology at W5	-.38**	-.28*	-.26*	-.37**	-.46**	--	.55**	-.16*	-.03	.08	.17*	-.14	-.12	-.41**
7. Internalizing Psychopathology at W5	-.27*	-.06	.04	-.08	-.16	.443**	--	-.07	.06	.07	-.04	-.19*	-.15	-.35**
8. Parental Alcoholism	.09	.23	.21	.20	.07	-.05	-.14	--	.17*	-.11	.02	.08	.05	.14
9. Ethnicity	.16	.00	-.03	.01	-.05	-.16	-.15	-.21	--	-.13	.04	-.04	-.01	.12
10. Educational Attainment at W5	-.29*	-.10	.02	-.09	-.29*	.32**	.27*	.01	-.18	--	-.13	-.25*	-.18*	-.16*
11. Age at W5	.19	-.06	-.11	-.07	-.01	-.07	-.35**	.07	-.04	.05	--	.04	-.02	-.02
12. Perceived Need for Treatment at W6	.08	.11	.07	.08	.00	.06	-.01	.28*	-.22	.06	.01	--	.23**	.14
13. Treatment Utilization at W6	.11	.24	.27*	.28*	.23	-.01	.11	.08	-.12	-.04	.00	.36**	--	.16*
14. Total Consequences at W5	.66**	.87**	.84**	.89**	.45**	-.35**	-.05	.13	.01	-.12	-.05	.12	.29*	--

Note. High scores on Internalizing psychopathology indicate a lack of negative affect and higher scores on externalizing psychopathology indicate lower levels of externalizing behavior. COA status is coded such that '0' indicates no parental alcoholism and '1' indicates a parental diagnosis. Educational attainment is coded such that '0' indicates no college and '1' indicates some college. Ethnicity is coded such that '0' indicates Caucasian and '1' indicates all other ethnicities.

Table 5

Fit Indices for Multiple-group Measurement Models

Model	4-factor model	3-factor model
Chi square	$\chi^2(123) = 125.38 (p = .42)$	$\chi^2(186) = 260.15 (p = .000)$
RMSEA	.01 ($p = .97$)	.04 ($p = .78$)
CFI	.99	.92

Table 6

Four-factor Model of Alcohol-related Consequences

	4-Factor Model	
	Loading	<i>p</i> -value
Aggression-related consequences		
Physical fights	.684	< .001
Injured someone	.808	< .001
Destroyed property	.591	< .001
Criticism from others		
Family	.588	< .001
Friends	.778	< .001
Productivity-related consequences		
Absence from school/work	.496	< .001
Problems working/studying	.433	< .01
Neglected responsibilities	.667	< .001
Financial problems	.924	< .001
Dependence symptoms		
Drink before breakfast	.651	< .001
Felt need/dependence	.976	< .001
Unable to cut down	.645	< .001
Had little time for anything else	.711	< .001

Table 7

ANCOVA Results Comparing Women and Men on Drinking Consequences Controlling for Alcohol Consumption

Models	Observed consequence means		Adjusted consequence Means		Gender effect			Consumption effect		
	Women	Men	Women	Men	F	<i>p</i>	<i>Eta</i> ²	F	<i>p</i>	<i>Eta</i> ²
Total drinking consequences	.213	.223	.229	.216	.229	.632	.001	17.524	< .001	.070
Aggression consequences	.135	.268	.152	.261	7.017	.009	.029	8.003	.005	.033
Criticism from others	.362	.316	.384	.307	2.109	.148	.009	7.664	.006	.032
Productivity consequences	.283	.268	.300	.261	1.048	.307	.004	9.498	.002	.039
Dependence Symptoms	.102	.087	.110	.077	1.934	.166	.008	5.829	.017	.024

Note. *Eta*² is a measure of effect size that can be interpreted the same way as *R*² (i.e., .01 = small; .06 = medium; .14 = large).

Table 8

Correlations among Original and Residualized Factor Scores

Correlations	Original factor scores		Residualized by alcohol consumption (quantity X frequency)		Residualized by drinking quantity		Residualized by binge drinking		Residualized by frequency, quantity, and binge drinking	
	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value
Criticism with Aggression	.065	.318	.03	.646	.029	.660	.052	.429	.027	.674
Productivity with Aggression	.323**	< .001	.275**	< .001	.276**	< .001	.303**	< .001	.274**	< .001
Productivity with Criticism	.754**	< .001	.752**	< .001	.752**	< .001	.754**	< .001	.753**	< .001
Dependence with Aggression	.463**	< .001	.421**	< .001	.416**	< .001	.451**	< .001	.416**	< .001
Dependence with Criticism	.617**	< .001	.610**	< .001	.612**	< .001	.614**	< .001	.614**	< .001
Dependence with Productivity	.913**	< .001	.908**	< .001	.910**	< .001	.912**	< .001	.911**	< .001

Table 9

Single-group Models: Testing the Effects of Drinking Consequences on Perceived Need for Treatment First with Only One of the Consequences as a Predictor and then with All Four Consequences as Predictors in the Same Model (Controlling for Only Significant Covariates)

Effects	Aggressive only model		Criticism only model		Productivity only model		Dependence only model		All consequences types	
	β	p	β	p	β	p	β	p	β	p
Internalizing psychopathology	-.135	.177	-.123	.224	-.103	.315	-.098	.351	-.094	.368
Education	-.198	.093	-.185	.117	-.180	.126	-.178	.131	-.202	.084
COA status	.289	.046*	.279	.054	.263	.072	.260	.077	.255	.081
Aggressive consequences	-.056	.629							-.163	.218
Criticism from others			.060	.639					-.153	.445
Productivity consequences					.135	.254			.136	.643
Dependence symptoms							.133	.254	.176	.505

Note. COA = Children of alcoholic.

Table 10

Single-group Models: Testing Effects of Drinking Consequences on Treatment Utilization First with Only One of the Consequences as a Predictor and then with All Four Consequences As Predictors in the Same Model (Controlling for Only Significant Covariates)

Effects	Aggressive only model		Criticism only model		Productivity only model		Dependence only model		All consequences types	
	β	p	β	p	β	p	β	p	β	p
Consumption	.225	.014*	.260	.004**	.229	.012*	.229	.012*	.217	.018*
Education	-.148	.090	-.162	.067	-.153	.082	-.150	.088	-.153	.080
Aggressive consequences	.142	.140							.084	.460
Criticism from others			.013	.892					-.181	.216
Productivity consequences					.128	.147			.322	.236
Dependence symptoms							.122	.164	-.096	.703

Table 11

Predicting Perceived Need for Treatment from the Composite of All

Consequences

	β	SE	p
Total consequences	.113	.083	.173
Alcohol consumption	.018	.030	.547
Education	-.897	.487	.066

Table 12

Predicting Treatment Utilization from the Composite of All Consequences

	<i>B</i>	<i>SE</i>	<i>p</i>
Total Consequences	.158	.063	.013
Internalizing symptoms	.139	.253	.582
COA status	.168	.381	.660
Education	-.666	.360	.064

Note. COA = Children of alcoholic.

Table 13

Testing Effects of Each Type of Drinking Consequence on Perceived Need for Treatment First with Only One of the Consequences as a Predictor and then with All Four Consequences As Predictors in the Same Model (Controlling for Only Significant Covariates)

	Aggressive only model				Criticism from others only model				Productivity only model				Dependence only model				All consequences types			
	Female		Male		Female		Male		Female		Male		Female		Male		Female		Male	
	<i>B</i>	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>P</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Alcohol consumption	.06	.78	.22	.12	.02	.92	.20	.16	.04	.88	.19	.19	.01	.96	.19	.18	.02	.95	.21	.11
Internalizing problems	-.07	.76	-.27	.09	-.11	.63	-.24	.13	-.12	.59	-.21	.20	-.10	.67	-.20	.21	-.07	.79	-.17	.27
Externalizing problems	.23	.44	-.01	.94	.22	.47	.04	.80	.21	.50	.05	.74	.21	.50	.06	.69	.22	.48	-.01	.96
Education	.16	.48	-.41	.00	.11	.63	-.40	.00	.09	.69	-.39	.00	.11	.64	-.39	.00	.16	.53	-.39	.00
Aggressive consequences	.21	.32	-.16	.37													.07	.84	-.43	.05
Criticism from others					.18	.41	.01	.96									.21	.81	-.32	.33
Productivity consequences									.17	.49	.10	.50					-.28	.80	.34	.73
Dependence symptoms													.23	.28	.12	.45	.20	.60	.24	.77

Table 14

Testing Effects of Each Type of Drinking Consequence on Treatment Utilization First with Only One of the Consequences as a Predictor and then with All Four Consequences As Predictors in the Same Model (Controlling for Only Significant Covariates)

	Aggressive only model				Criticism from others only model				Productivity only model				Dependence only model				All consequences types				
	Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		
	β	p	β	p	β	p	β	p	β	p	β	P	β	p	β	p	β	p	β	p	
Alcohol consumption	.38	.03	.21	.05	.23	.26	.22	.04	.27	.19	.21	.05	.31	.11	.21	.05	.23	.24	.21	.05	
Internalizing problems	.45	.07	-.15	.15	.48	.06	-.15	.10	.48	.09	-.13	.19	.49	.07	-.12	.23	.51	.05	-.12	.27	
Education	-.01	.97	-.20	.04	-.04	.84	-.20	.04	-.06	.75	-.20	.04	-.02	.94	-.20	.04	-.02	.90	-.20	.04	
Aggressive consequences	.08	.67	.02	.82													-.14	.61	-.03	.81	
Criticism from others					.31	.12	-.01	.97										.59	.37	-.07	.78
Productivity consequences									.30	.17	.04	.69						-.29	.74	-.02	.98
Dependence symptoms													.23	.26	.06	.62	.11	.76	.14	.84	

Table 15

Testing Gender Differences in Effects of Each Drinking Consequence Type on

Perceived Need for Treatment Using Wald Chi Square Tests

Gender differences	When testing each consequence type separately	When testing all consequence types together
Effect of Aggression consequences on perceived need for treatment	$\chi^2(1) = 1.573$ ($p = .210$)	$\chi^2(1) = 2.696$ ($p = .101$)
Effect of Criticism from others on perceived need for treatment	$\chi^2(1) = .501$ ($p = .479$)	$\chi^2(1) = .276$ ($p = .599$)
Effect of Productivity consequences on perceived need for treatment	$\chi^2(1) = .042$ ($p = .837$)	$\chi^2(1) = .189$ ($p = .664$)
Effect of Dependence symptoms on perceived need for treatment	$\chi^2(1) = .029$ ($p = .864$)	$\chi^2(1) = .013$ ($p = .910$)

Table 16

Testing Gender Differences in Effects of Each Drinking Consequence Type on Treatment Utilization Using Wald Chi -Square Tests

Gender differences	When testing each consequence type separately	When testing all consequence types together
Effect of Aggression consequences on treatment utilization	$\chi^2(1) = .027$ ($p = .870$)	$\chi^2(1) = .061$ ($p = .805$)
Effect of Criticism from others on treatment utilization	$\chi^2(1) = 2.100$ ($p = .147$)	$\chi^2(1) = .766$ ($p = .382$)
Effect of Productivity consequences on treatment utilization	$\chi^2(1) = 1.247$ ($p = .264$)	$\chi^2(1) = .058$ ($p = .809$)
Effect of Dependence symptoms on treatment utilization	$\chi^2(1) = .483$ ($p = .487$)	$\chi^2(1) = .001$ ($p = .980$)

Table 17

Testing Effects of Total Drinking Consequence on Perceived Need for Treatment (Controlling for Only Significant Covariates)

	Female		Male	
	β	p	β	p
Alcohol consumption	.014	.952	.192	.178
Internalizing problems	-.106	.637	-.225	.148
Externalizing problems	.220	.469	.064	.699
Education	.117	.611	-.397	.003
Overall consequences	.213	.320	.070	.642

Note. Wald test of difference in overall consequence effect between genders was non-significant ($\chi^2[1] = .198; p = .657$).

Table 18

*Testing Effects of Total Drinking Consequence on Treatment Utilization
(Controlling for Only Significant Covariates)*

	Female		Male	
	β	p	β	p
Alcohol consumption	.275	.186	.210	.049
Internalizing problems	.481	.075	-.138	.165
Externalizing problems	-.040	.842	-.201	.039
Education	.217	.273	.030	.783
Overall consequences	.275	.186	.210	.049

Note. Wald test of difference in overall consequence effect between genders was non-significant ($\chi^2[1] = .754; p = .385$).

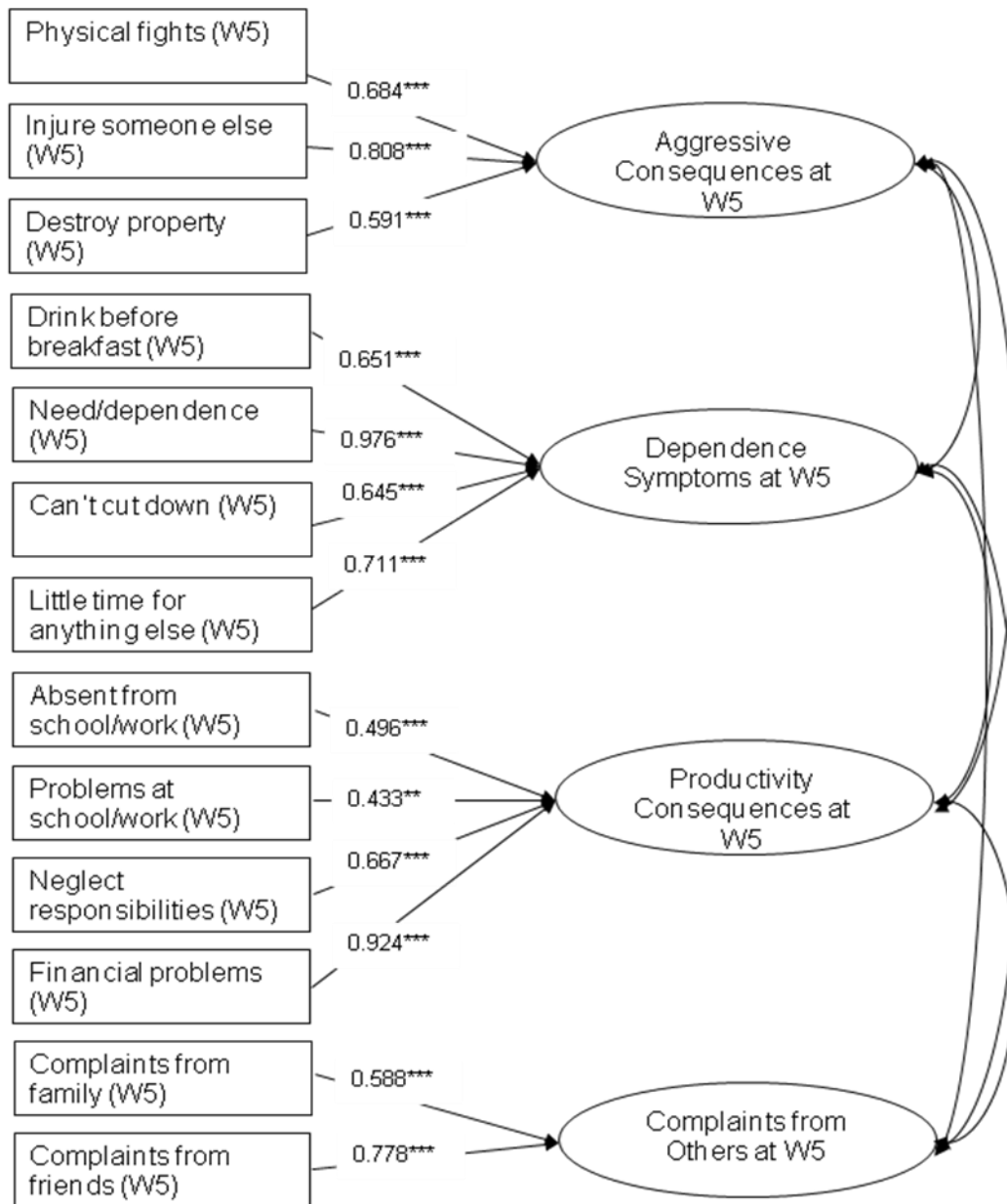


Figure 1. Four-factor model. All factor loadings are standardized. * $p < .05$,

** $p < .01$, *** $p < .001$.

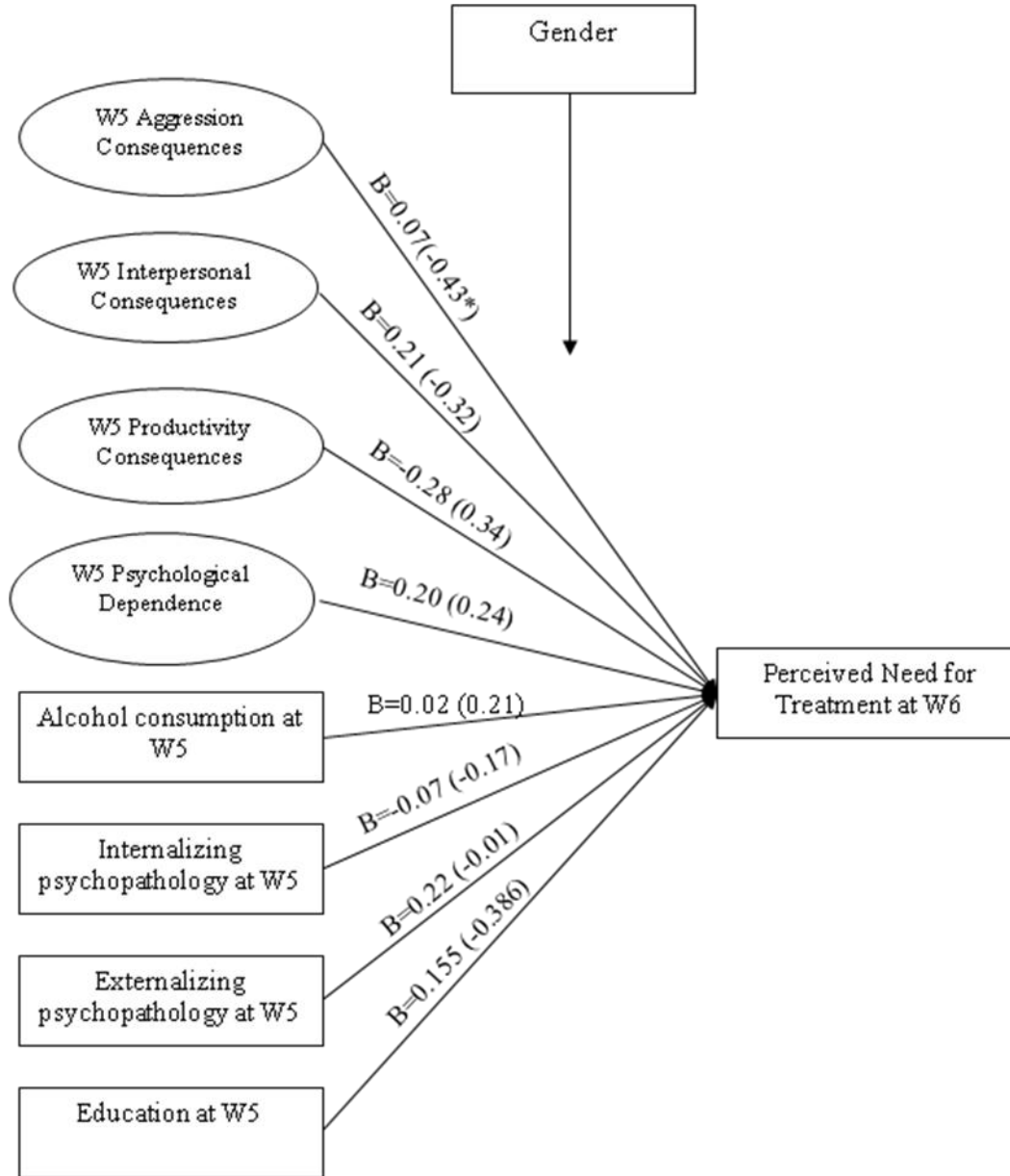


Figure 2. Model of alcohol-related consequences predicting perceived need for treatment with gender as a moderator.

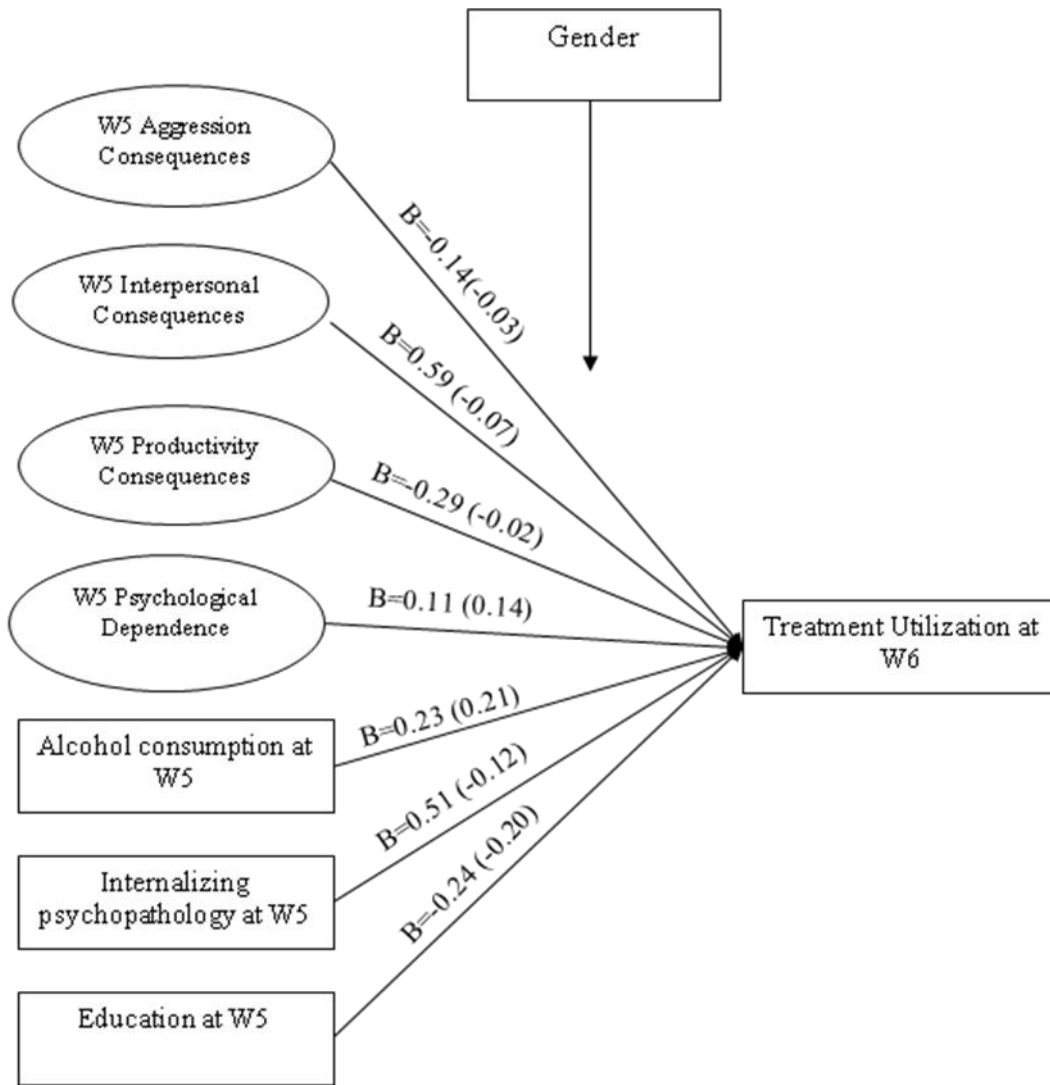


Figure 3. Model of alcohol-related consequences predicting treatment utilization with gender as a moderator.

APPENDIX A
MEASUREMENT ITEMS

Participants' Alcohol-related Consequences at Wave 5

How recently did you get complaints from family for your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you get complaints from your friends for your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you get in trouble at school/work because of your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you miss school or work because of your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you have problems with work/studying because of your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently has your alcohol use caused you to have financial problems?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently has your alcohol use caused you to neglect some of your usual responsibilities?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you get into a physical fight or do mean things because of your alcohol use?

1. Within the past 3 months
2. Within the past year

3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you destroy of property because of your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently did you get arrested because of your alcohol use?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently has your alcohol use caused you to injure someone else?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently has there been a period where you spent so much time arranging to get alcohol or having it on your mind so much that you had little time for anything else?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently have you used alcohol enough so that you felt like you needed it or depended on it?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently have you tried to cut down on alcohol but found that you couldn't?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

How recently have you needed a drink just after you'd gotten up – that is, before breakfast?

1. Within the past 3 months
2. Within the past year
3. 1-2 years ago
4. 2-5 years ago
5. More than 5 years ago
6. Never

Participants' Alcohol Consumption at Waves 5 & 6

1. How often did you drink wine or beer or wine coolers in the past year?

- 0. Never
- 1. 1-2 times
- 2. 3-5 times
- 3. More than 5 times, but less than once a month
- 4. 1-3 times a month
- 5. 1-2 times a week
- 6. 3-5 times a week
- 7. Every day

2. How often did you drink hard alcohol in the past year?

- 0. Never
- 1. 1-2 times
- 2. 3-5 times
- 3. More than 5 times, but less than once a month
- 4. 1-3 times a month
- 5. 1-2 times a week
- 6. 3-5 times a week
- 7. Every day

3. When you drink, about how many cans of beer, glasses of wine, or bottles of wine cooler do you usually have?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7-8
- 8. 9 or more

4. When you drink, about how many drinks of hard liquor do you usually have?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7-8
- 8. 9 or more

Participants' Use of Alcohol Treatment at Wave 6

How long has it been since you were last in treatment or counseling for alcohol use?

- 1. I am currently in treatment
- 2. Within the past 30 days
- 3. More than 30 days ago, but within the past 12 months
- 4. More than 12 months ago, but within the past 5 years
- 5. More than 5 years ago

Participants' Perceived Need for Treatment at Wave 6

During the past 12 months, did you ever feel that you needed treatment or counseling for your alcohol use?

- 1. No
- 2. Yes, for alcohol use
- 3. Yes, for drug use
- 4. Yes, for both alcohol and drug use