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Social Connectedness and College Student Alcohol Use: Understanding the Role of Alcohol Expectancies, Social Anxiety, and Need to Belong

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SOCIAL CONNECTEDNESS AND COLLEGE STUDENT ALCOHOL USE:
UNDERSTANDING THE ROLE OF ALCOHOL EXPECTANCIES, SOCIAL ANXIETY,
AND NEED TO BELONG

By

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ABSTRACT

Despite recent decreases in college alcohol use, alcohol related harms continue to occur at high rates and currently available interventions do not work as well as previously thought. Research has found sociability expectancies to be particularly important in predicting risky alcohol use, and expectancy challenge programs that target these expectancies can be effective in reducing heavy drinking. Little is known, however, about how other social variables might contribute to the influence of expectancies in promoting alcohol use.

The current study used structural equation modeling to test models of alcohol use examining how need to belong and social connectedness fit into an expectancy model of alcohol use while controlling for social anxiety. Results found significant relationships between need to belong, social anxiety, and alcohol expectancies. Social connectedness significantly predicted social anxiety but was not connected to expectancies or alcohol use directly. Expectancies significantly predicted drinking and partially mediated the relationship between need to belong and alcohol use, as well as the relationship between social anxiety and alcohol use. These results suggest that targeting need to belong and social anxiety might increase the impact of expectancy challenge interventions.

Keywords: *college alcohol use, alcohol expectancies, social anxiety, social connectedness, need to belong, structural equation modeling (SEM)*

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LIST OF ABBREVIATIONS

Cognitive Behavioral Inhibition (CBI)

Comprehensive Effects of Alcohol (CEOA)

Daily Drinking Questionnaire (DDQ)

Liquid Courage (LC)

Need to Belong (NTB)

Need to Belong Scale (NTBS)

Risk and Aggression (RA)

Self-perception (SP)

Social Anxiety (SA)

Social Interaction Anxiety Scale (SIAS)

Social Connectedness (SC)

Tension Reduction (TR)

University of Central Florida (UCF)

INTRODUCTION

College alcohol use continues to be prevalent and associated with a wide array of negative outcomes (Hingson et al., 2017; Schulenberg et al., 2019), and most currently available interventions are largely ineffective (Carey et al., 2012; Cole et al., 2018; Hennessy et al., 2019). The Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, 1999) is the only program thus far that has demonstrated meaningful positive effects at both short and long-term follow-up (12 months; Terlecki et al., 2015). Unfortunately, BASICS is relatively expensive to deliver, and a recent meta-analysis concluded that it may be less effective than previously thought (Huh et al., 2015). The Expectancy Challenge Alcohol Literacy Curriculum (ECALC; Dunn et al., 2019; Fried & Dunn, 2012) is a non-experiential expectancy challenge (EC) and can be delivered to groups in less than an hour. ECALC has demonstrated very good short-term effects, and superior reductions in drinking compared to BASICS. An added advantage is that ECALC is substantially less expensive to implement than BASICS; however, long-term outcomes have yet to be established (Scott-Sheldon et al., 2012). The effectiveness of ECALC seems to be based on successfully challenging social facilitation expectancies, and these expectancies have routinely been found to account for more variance in college alcohol use than any other variable identified thus far (Iwamoto et al., 2014; Linden et al., 2014; Mezquita et al., 2015; Stacy et al., 1990). Therefore, a thorough understanding of the connection between the drive for social interaction, expectancies, and alcohol use has the potential to inform improvements in EC methods that could increase short-term impact and facilitate positive long-term effects. To this end, the current study will focus on validating a theoretical model of college alcohol use based on social connectedness, need to belong, social anxiety, and alcohol expectancies.

College Alcohol Use

The 2017 National Survey of Drug Use and Health estimates that 81% of 18-25 year-olds have used alcohol in their lifetime, and 56.3% have used alcohol in the past month (*2017 National Survey on Drug Use and Health: Detailed Tables*, 2017). Alcohol use is even more prevalent among college students with 75% reporting alcohol use compared to 70% of non-college attending peers within the past year, and 60% reporting alcohol use in the past 30 days compared to 50% of noncollege attending peers in 2018. Additionally, it has been found that college students engage in binge drinking, and report being drunk more than their non-college attending peers (Schulenberg et al., 2019). Recent studies also indicate that college students drink more often and more heavily than their non-college attending peers and are less likely to seek treatment for alcohol-related problems (Blanco et al., 2008; Merrill & Carey, 2016; Schulenberg et al., 2019). While overall alcohol use has decreased modestly in recent years, serious harm associated with drinking remains relatively unchanged (Hingson et al., 2017; White & Hingson, 2013). There were 1,519 unintentional alcohol-related deaths among college students in 2014 (Hingson, et al., 2017). In addition to fatalities, alcohol use is the leading cause of most types of harms experienced by college students including physical assault, injury, memory blackouts, declines in cognitive functioning, and academic failure (Hingson et al., 2017; White & Hingson, 2013). Risk for experiencing these harms is greatly increased by binge drinking, defined as five or more standard drinks in two hours for men, four or more for women (NIAAA, 2014). Several studies have shown as binge rates increase, harms increase (Linden‑Carmichael et al., 2017; White & Hingson, 2013). According to the 2018 *Monitoring the Future* study, 29% of college students engaged in binge drinking over a two-week period, and this was greater than

their non-college attending peers (Schulenberg, et al., 2019). College men reported binge drinking at higher rates than college women, despite a slightly lower 30-day prevalence of any alcohol use (Schulenberg, et al., 2019). Also based on the 2016 *National Survey on Drug Use and Health*, 6.70% of individuals aged 18 or older are heavy alcohol users, which they define as individuals who engage in binge drinking five or more days within 30 days. Because binge drinking and heavy alcohol use are clearly associated with greater likelihood of negative alcohol-related consequences, the rates of binge drinking among college students is alarming in spite of the modest decrease in this behavior in recent decades.

Prevention and Brief Alcohol Interventions for College Students

There are numerous interventions designed to prevent development of heavy alcohol use patterns among college students. Prevention programming usually targets first year college students during their first few weeks in school, while other interventions target students who have already exhibited risky drinking, such as mandated students. Currently available prevention programs are largely unsuccessful at achieving the goal of preventing heavy alcohol use patterns (Carey et al., 2012; Cole et al., 2018; Hennessy et al., 2019). AlcoholEdu, is one of the most widely used alcohol prevention programs for incoming first-year college students and has been found to be less effective than alternatives such as e-checkup to go (e-CHUG; Hennessy et al., 2019). Furthermore, AlcoholEdu, e-CHUG, and other computer delivered interventions have been found to have little or no effect overall (Cole et al., 2018) and do not fare well when compared to in-person interventions (Carey et al., 2012) . These programs are widely used as the first alcohol prevention/intervention college students experience and are largely ineffective at preventing heavy alcohol use and associated consequences.

Empirically supported interventions being used to reduce drinking in students who have displayed heavy drinking patterns include BASICS and ECALC, and both have produced significant reductions in alcohol use and alcohol-related consequences among college students (Dunn et al., 2019; Fried & Dunn, 2012; Terlecki et al., 2015). In a recent study, ECALC produced better short-term effects among mandated college students when directly compared to BASICS, indicating that expectancy-based interventions show promise (Dunn et al., 2019). While these interventions work well, BASICS is expensive may be less effective than previously thought, and effects of ECALC have not been measured beyond 30 days (Huh et al., 2015; Dunn et al., 2019). However, promising short-term results of ECALC combined with the advantages of being a low-cost, group-delivered program support further development of this approach. The next step in improving EC interventions like ECALC is to examine other constructs that influence drinking and likely interact with expectancies.

Alcohol Expectancies

Alcohol expectancies are beliefs stored in memory regarding the potential or imagined effects of alcohol (Goldman et al., 1999) and meet criteria for being a causal variable in determining alcohol use. Expectancies develop in young children before direct experience with alcohol, predict current and future alcohol use, are changeable with predictable changes in drinking, and mediate the influence of other antecedent variables (Christiansen et al., 1989; Darkes & Goldman, 1993, 1998; Dunn & Goldman, 1996, 1998; Sher et al., 1991; Stacy et al., 1990). Theoretical research based on a memory model has been used to develop interventions that challenge individual's expectancies, and this approach has been successful in reducing drinking among high school and college students (Dunn et al., 2019; Fried & Dunn, 2012).

Rudimentary alcohol expectancies develop among preschoolers as soon as they begin to understand the effects of alcohol (Kuntsche, 2017). By 3rd grade, children have acquired most of the expectancies identified among adults, although 3rd graders' expectancies are predominantly negative. By 12th grade, developing cognitive capacity and acquisition of more information about alcohol contributes to a fuller understanding of potential effects that includes positive and negative aspects, as well as arousing and sedating effects (Dunn & Goldman, 1996, 1998, 2000). Development of expectancies in children is influenced by exposure to information about the potential effects of alcohol, including advertising (Dunn & Yniguez, 1999). One of the most intriguing findings from a developmental perspective is that longitudinal research has indicated expectancies predict future alcohol use among children (Christiansen et al., 1989; Dunn, Flori et al., 2019). These results support the idea that as children development, expectancies develop and change before use as they learn more about the potential effects of alcohol. In other words, changes in expectancies precede onset of drinking.

The literature on adult alcohol expectancies is vast and spans five decades. Numerous studies have shown that alcohol expectancies are strong predictors of current and future alcohol use (e.g., Lac & Brack, 2018; Madden & Clapp, 2019; Patrick et al., 2010). Expectancies typically predict more variance in drinking than all other measurable variables, accounting for 40% or more of the variance in alcohol use, and accounting for 45% of the variance in alcohol-related problems is not uncommon (Iwamoto et al., 2014; Linden et al., 2014; Mezquita et al., 2015; Stacy et al., 1990). Several studies have shown that expectancies partially or fully mediate the relationship between other antecedent variables and alcohol use and alcohol-related problems (Darkes et al., 2004; Goldman et al., 1999). These variables include masculinity (Iwamoto et al., 2014), social anxiety (Meade Eggleston et al., 2004), neuroticism, extraversion and low-

conscientiousness from the five-factor personality model (Mezquita et al., 2015), and ADHD behaviors (Elmore et al., 2018). These results suggest that these variables may not be directly related to alcohol use, or alcohol-related problems, and instead are indirectly related to drinking through expectancies.

Expectancies are changeable with predictable changes in alcohol use (Darkes & Goldman, 1993; Dunn et al., 2019; Fried & Dunn, 2012; Scott-Sheldon et al., 2012). In 1993, an expectancy challenge method was used to show that changing certain expectancies produced subsequent decreases in drinking (Darkes & Goldman, 1993). These results were replicated in another study with two separate expectancy challenge groups targeting different expectancy dimensions (Darkes & Goldman, 1998) and have subsequently been replicated by several other research groups (e.g., Dunn et al., 2000; Scott-Sheldon et al., 2012).

Research on types of expectancies using a factor model approach have consistently identified seven general categories including sociability, tension reduction, liquid courage, sexuality, risk and aggression, self-perception, and cognitive behavioral impairment (Fromme et al., 1993; Goldman et al., 1997). Additionally, several studies have found that for individuals between the ages of 18 and 24, sociability expectancies tend to account for the most variance in alcohol use and related problems and are useful targets for intervention (Lau-Barraco et al., 2016; Pabst et al., 2014). Similar to factor model findings, studies using a memory model approach to understand the mechanism by which expectancies influence drinking have concluded that expectancies are stored in memory along two bipolar dimensions, arousal-sedation and prosocial-antisocial (or positive-negative in young children; Dunn & Goldman, 1996, 1998, 2000; Rather et al., 1992). Activation of arousing and prosocial expectancies in memory has been linked to early onset of alcohol use among children and heavier drinking

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among college students (Dunn & Goldman, 1998, 2000; Dunn et al., 2000; Rather & Goldman, 1994). Despite the influence of social expectancies on alcohol use for college-aged individuals, there are no studies examining social constructs within an expectancy framework.

In an effort to understand the mechanism by which expectancies influence alcohol use and improve expectancy-based prevention and intervention methods, a memory model has been applied to expectancy development and function (Dunn & Goldman 1996, 1998, 2000; Rather et al., 1992; Rather & Goldman, 1994). Differences in expectancy organization and activation in relation to experience with alcohol can be seen as early as third grade (Dunn & Goldman, 1998, 2000), and these differences predict future onset of alcohol use between 5th and 9th grades. Specifically, memory modeling analyses of the expectancies of fifth graders revealed differences between children who would begin drinking during the next four years and those who would continue to abstain (Dunn, Flori et al., 2019). Studies focused on adults and children have found that expectancy activation patterns can be changed, and changes in activation patterns correspond to changes in future drinking (Dunn et al., 2000; Cruz & Dunn, 2003). Finally, experiments designed to test the memory model have found that activation of expectancies corresponds to increases in immediate consumption of alcohol (Lau-Barracco & Dunn, 2009). These findings have been used to develop the only non-experiential expectancy challenge that has been effective in reducing alcohol use (Dunn et al., 2019; Fried & Dunn, 2012). Although EC interventions have been shown to be effective at reducing alcohol use, there is room for improvement (Dunn et al., 2019; Scott-Sheldon et al., 2012). Identifying potential new targets for intervention, or variables that help us better understand alcohol use patterns could be used to improve EC interventions. While the influence of believed social enhancement on alcohol use has been examined and shown to be an effective target for college populations, social constructs

have not been thoroughly examined in the expectancy literature, and the current study seeks to fill this gap by examining social constructs within an expectancy model of alcohol use.

Need to Belong and Social Connectedness

Social factors play a key role in several major theories of alcohol use, and several studies have examined how these factors influence alcohol use among college students (Collins et al., 1985; Ham, 2009; Lewis & Neighbors, 2006; MacKillop et al., 2013; Meade Eggleston et al., 2004; Pabst et al., 2014). Studies examining social influences on alcohol use have largely focused on social density as a measure of the social network and social environment of students. Social density is usually assessed by having participants think about the four closest people in their life starting with the person they are closest to, and then answering questions about their drinking (MacKillop et al., 2013). While these studies have demonstrated one aspect of the impact of social factors on drinking, they have all focused on how the individual views peers in their social circle and not their self-perception of how they fit into these social circles.

The self-perception aspect of social influences on alcohol use has been measured in several ways. Need to belong (NTB) is a psychological construct referring to an individual's need for acceptance and belonging within a social environment. NTB is correlated with, but distinct from other variables such as extraversion (Leary et al., 2013). Recent studies have explored how an individual's NTB fits into models of alcohol use, and results suggest that NTB moderates the relationship between normative beliefs about close friends and alcohol use (Litt et al., 2012). Additionally, research has suggested that unmet NTB could moderate other risk factors (Hamilton & DeHart, 2017). However, the relationship between NTB and alcohol expectancies has yet to be examined.

Social connection is an individual's perception of their connection to others (Lee et al., 2001) and has been linked to interpersonal problems and poor well-being (Lee et al., 2001; Lee et al., 2008). Other studies have shown that social and school connectedness in adolescence can predict later substance use, but there is a dearth of research on college students' social connectedness as it relates to alcohol (Bond et al., 2007). While research on alcohol has emphasized the importance of social context and its influence on drinking, how social context is motivating, or how individual differences impact engagement in these environments have yet to be fully explored.

The current study seeks to explore how NTB interacts with an individual's perception of their social connectedness. Previous studies exploring unmet NTB did so by experimental manipulation (Hamilton & DeHart, 2017). The current study seeks to explore how these variables may interact and lead to increased drinking. Alcohol research has examined how individuals view their social environment without assessing how they fit into it. Differences in alcohol use and alcohol-related problems could be explained by unmet NTB or by an imbalance between their NTB and social connectedness (SC).

College students drinking in social environments often engage in unsafe drinking behaviors such as binge drinking and engaging in drinking games that encourage binge drinking. Drinking games have been shown to increase risk of negative alcohol-related consequences, and increased consumption (Borsari, 2004; Zamboanga et al., 2014, 2018). Additionally, studies have shown that weekend drinking is associated with increased consumption, and that expectancies predicting weekend drinking differ from those predicting drinking at other times (Lac & Luk, 2016; Lau-Barraco et al., 2016). Furthermore, weekend drinking was found to be associated with sociability expectancies in both studies, suggesting that increased weekend drinking is associated

with the activation of sociability expectancies. Understanding how social constructs such as NTB and SC may factor into this pattern of alcohol use could help improve current EC interventions. While EC interventions have been shown to work well in the short term, there is little evidence of long-term effects (Scott-Sheldon et al., 2012), and identifying new targets for intervention could add to longevity of effects. Sociability expectancies are a strong motivator for alcohol use, and the activation of these expectancies puts individuals at increased risk to engage in unsafe drinking behaviors such as binge drinking and playing drinking games (Baumeister & Leary, 1995; Borsari, 2004; Lac & Luk, 2016; Lau-Barraco et al., 2016; Zamboanga et al., 2014, 2018). If NTB and SC are predictors of alcohol use, then given the role expectancies play in several models of alcohol use, it is possible that these social constructs are mediated by alcohol expectancies due to the predictive power of sociability expectancies within the college student population (Lau-Barraco et al., 2016; Pabst, et al., 2014).

Social Anxiety

Social anxiety (SA) has been linked to higher risk of alcohol-related consequences, but has been negatively associated with alcohol use (Brook & Willoughby, 2016; Ham, 2009; Ham et al., 2007, 2009, 2011; Ham & Hope, 2006; Meade Eggleston et al., 2004; Schry et al., 2016; Schry & White, 2013; Villarosa et al., 2014). The prevalence of social anxiety disorder is approximately 7%, with similar rates for children and adults; however, this does not account for individuals with sub-clinical levels of social anxiety (American Psychiatric Association, 2013). A review of the literature highlighted the complexity of the relationship between social anxiety disorder and substance use disorders and outlined support for a complex biopsychosocial model of comorbidity (Buckner et al., 2013). Some studies have found that the relationship between SA

and drinking behaviors and outcomes is partially mediated by alcohol expectancies, specifically social expectancies, while other studies have found evidence that tension reduction expectancies moderate the relationship between SA and alcohol use (Gilles et al., 2006; Ham, 2009). While these results suggest that expectancies play a role in drinking in individuals with SA, they also suggest there is a missing variable (or variables) that may moderate or mediate the relationship between social anxiety and alcohol expectancies, or the relationship between social anxiety and drinking. Identifying other variables may improve this model and help us better understand drinking within this population.

SA may also be impacted by an individual's NTB and social connectedness. While the relationship between social anxiety and drinking is partially mediated by sociability expectancies, SA has also been shown to have a relationship with coping drinking motives (Ham et al., 2007, Schry et al., 2016). Unmet NTB may contribute to this, as individuals who have a strong desire to fit in, but experience SA, may drink to both reduce anxiety and meet this need to belong. This suggests NTB may act as a moderator in the relationship between SA and sociability expectancies or coping motives. Similarly, SC may moderate the relationship between SA and sociability expectancies, as individuals who have high levels of SC may not drink to become more sociable. Previous studies have shown a relationship between NTB and SA, but not in the context of drinking (Brown et al., 2007). Similarly, SC and SA have been shown to relate in significant ways related to self-esteem and test anxiety, but not alcohol use (Fatima et al., 2017; Kavanagh, et al., 2017).

Present Study

The present study examined how the social constructs of NTB and SC factor into models of alcohol use. Studies indicate that college students binge drink at an alarming rate (Schulenberg et al., 2019) and that this type of behavior is often encouraged in social drinking environments (Borsari, 2004; Zamboanga et al., 2014, 2018). Therefore, understanding how individuals view themselves fitting into these environments could improve our understanding of risky alcohol use patterns. While SA has been shown to negatively predict alcohol use, its relationship to alcohol use and related problems are not fully mediated by expectancies or other variables such as drinking motives (Brook & Willoughby, 2016; Gilles et al., 2006; Ham et al., 2007, 2009). The present study examined how NTB and SC mediate or moderate this relationship. Additionally, we examined these variables within an expectancy framework to facilitate improvement of EC interventions. The present study was exploratory, and several models were tested to account for the most variance in alcohol use, and to gain understanding of how these variables interact with each other.

HYPOTHESES

1. Positive alcohol expectancies (sociability, liquid courage, tension reduction, and sexuality), analyzed as a latent variable, will account for significant variance in alcohol use. (H1)

2. Social anxiety (SA) will predict alcohol use, such that individuals with higher SA scores will drink less than individuals with low SA scores. (H2)

3. Alcohol expectancies will partially mediate the relationship between social anxiety and alcohol use, supporting previous literature, such that individuals with higher expectancy scores will consume more alcohol than individuals with lower expectancy scores regardless of SA scores. (H3)

4. Need to belong (NTB) will predict alcohol use such that alcohol use will increase as NTB increases. (H4)

5. Alcohol expectancies will vary with NTB such that individuals who have high NTB will hold more positive expectancies than individuals with low NTB. (H5)

6. Social connectedness (SC) will predict alcohol use such that individuals with low SC will drink more than individuals with high SC. (H6)

7. SC will interact with NTB to predict drinking, such that individuals who have a high NTB, and low SC will drink more than individuals with high SC and low NTB. (H7)

8. Alcohol expectancies will fully mediate the relationship between the SC and NTB interaction and alcohol use. (H8)

9. The interaction between SC and NTB will moderate the relationship between SA, and expectancies, and alcohol use. (H9)
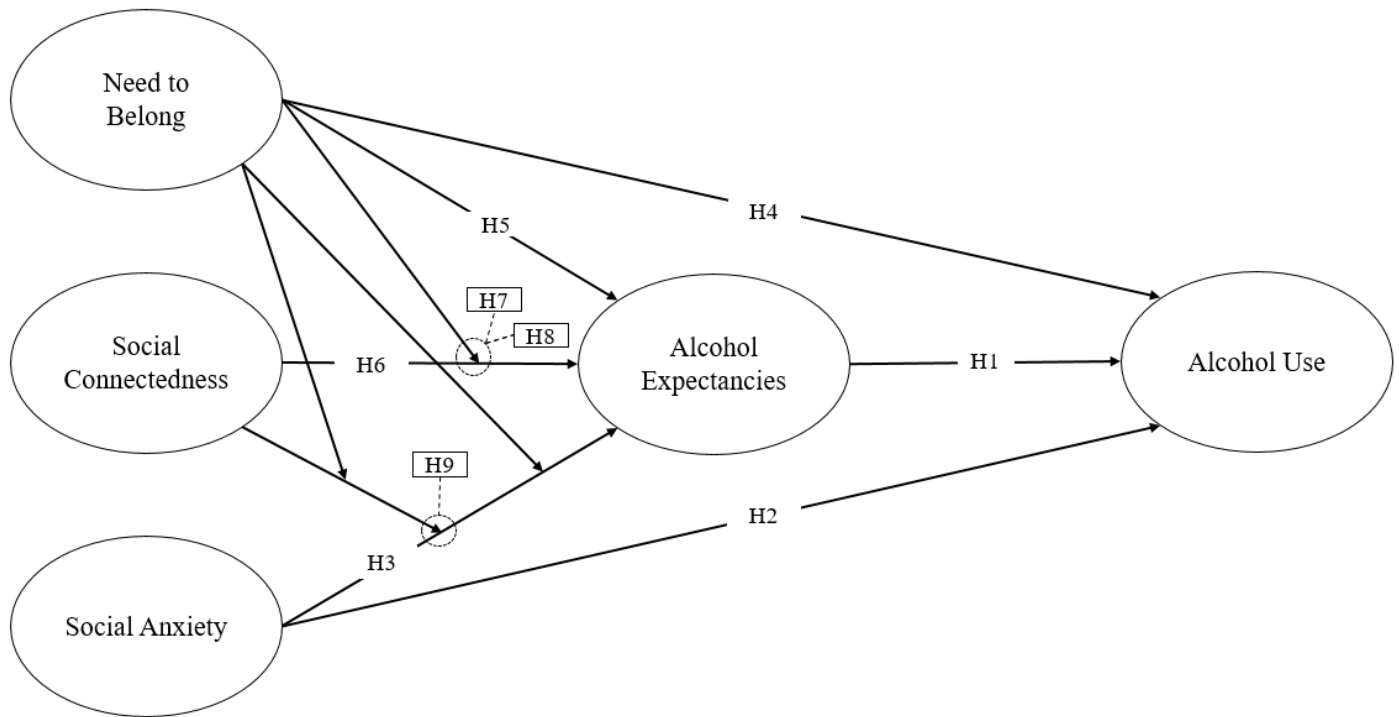
Figure 1: Hypothesized Model

METHOD

Participants

Participants were undergraduate students taking psychology classes at the University of Central Florida (UCF) and were recruited using the SONA research subject pool. Only students who were 18 years of age or older were allowed to participate. Of the 1,442 participants, 18 were removed for missing age data, 24 were removed for being duplicate cases, 10 participants did not complete any of the measures after the demographics, 12 were removed for failing to provide drinking data, and 4 participants had not completed 2 or more of the measures, resulting in incomplete data. Lastly, to confidently draw conclusions based on the race and ethnicity variables participants who selected more than one category ($n = 96$) were removed. The remaining 1,278 participants were included in the analyses. The mean age of the remaining sample ($n = 1,278$) was 19.65 ($SD = 3.62$), with a minimum age of 18, and a maximum age of 57. Of the participants included in the analyses, 514 identified as male (40.30%), and 763 identified as female (59.70%). The sample had representation from freshman ($n = 737$), sophomores ($n = 219$), juniors ($n = 209$), and seniors ($n = 113$). The majority of the sample identified as White/Hispanic ($n = 502$) or White ($n = 492$). Of the remaining participants, 104 (8.10%) identified as Asian, 87 (6.80%) identified as black/African-American, 46 (3.60%) identified as black/Hispanic, 41 (3.20%) identified as other, 5 (0.40%) identified as Native American/Alaskan Native, and 2 (0.20%) identified as Hawaiian.

Procedure

The study was approved by the university's IRB, and participants provided consent before participating. Participants completed a confidential online survey assessing SC, NTB, SA,

alcohol expectancies, and recent alcohol use. Participants were compensated with course credit upon completion of the survey.

Measures

Demographic Variables. Gender, race, age, and ethnicity were included in the model as observed variables to assess for any variance in alcohol use they may account for (see Appendix A).

Comprehensive Effects of Alcohol (CEOA; Fromme et al., 1993). The CEOA is a self-report measure that assesses alcohol expectancies on a Likert-type scale. The CEOA has been shown to account for as much variance as other expectancy measures (Fromme, & D'Amico, 2000). Unlike other expectancy measures the CEOA has positive and negative subscales. The positive subscales are: Sociability, Tension Reduction, Sexuality, and Liquid Courage. The negative subscales are: Cognitive Behavioral Impairment (CBI), Risk and Aggression, and Self-Perception. The CEOA has shown good psychometric properties including internal consistency, temporal consistency, and construct validity among college student samples ($r = .53$-$.81$; See Appendix B; Fromme et al., 1993).

Need to Belong Scale (NTBS). The NTBS is a scale that assesses an individual's desire for acceptance and belonging (Leary et al., 2013). The NTBS is a 10 item self-report measure utilizing a five point Likert-type scale. The NTBS has shown strong construct validity across several studies examining college students with good internal reliability with Cronbach's alphas ranging from .78-.87. It has also shown strong test-retest reliability with $r = .87$ at 10 weeks (See Appendix C; Leary et al., 2013).

Social Connectedness Scale - Revised (SCS-R). The SCS-R is a 20 item self-report measure of an individual's sense of connection to their social environment (Lee et al., 2008). The 20 items include 10 positively phrased items, and 10 negatively phrased items, to reduce response bias. The SCS-R has shown strong internal reliability among college student samples with Cronbach's alphas ranging from .92-.93 (See Appendix D; Lee et al., 2001, 2008).

Social Interaction Anxiety Scale (SIAS). The SIAS is a 19 item self-report measure. The SIAS is used to assess an individual's level of SA (Mattick & Clarke, 1998). The SIAS has shown good internal reliability with Cronbach's alphas ranging from 0.88-0.94. It has also shown good test-retest reliability with $r = .92$ at 4 and 12-weeks, and reliability has been examined with college student and community samples (Mattick & Clarke, 1998). Additionally, the SIAS has been used to assess SA in previous studies on alcohol use (See Appendix E; Gilles et al., 2006; Ham et al., 2007; Meade Eggleston et al., 2004; Tran, Haaga, & Chambless,1997).

Daily Drinking Questionnaire (DDQ). The DDQ is used to assess alcohol use over the past 30 days, asking participants to report typical and heaviest week use. Participants were provided with information on standard drinks for beer, wine, spirits, and the number of standard drinks in standard bottle sizes for wine, and spirits (See Appendix F). The DDQ has been found to be consistent with longer drinking measures (See Appendix F; Collins, Parks, & Marlatt, 1985). The DDQ was used to calculate quantity and frequency of alcohol use, as well as typical and heavy weekend use. Participants also completed a quantity/frequency index asking about the typical number of drinks they consume on the weekend, how often they drink, and their heaviest weekend drinking night (Appendix F).

Power Analysis

To ensure sufficient power to conduct analyses an *a-priori* Monte Carlo simulation was run in *M-plus* version 8. Effect sizes were pulled from the relevant literature, or were estimated based on similar variables and models (Gilles et al., 2006; Linden et al., 2014; Litt et al., 2012; Meade Eggleston et al., 2004). Results of the simulation indicated that a minimum of 727 participants were needed to sufficiently power the indirect and direct paths of the model.

RESULTS

Bivariate and Descriptive Statistics

Before analyzing the hypothesized model, descriptive (Table 1; Appendix H) and bivariate statistics (Table 2; Appendix H) were examined. Bivariate correlations were analyzed to examine associations between the variables. Scores on the NTB scale were significantly correlated with social connectedness , SIAS score, sociability, liquid courage, sexuality, risk and aggression, self-perception, and cognitive behavioral impairment expectancies, but was not significantly correlated with any drinking outcome variables. Social connectedness had significant positive correlations with sociability expectancies, frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption, and had significant negative correlations with SIAS score, risk and aggression, self-perception and CBI expectancies. SIAS score had a significant positive correlation with risk and aggression, self-perception, and CBI expectancies, and significant negative correlations with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption. The expectancy subscale of sociability was positively correlated with frequency of alcohol consumption, typical alcohol consumption and peak alcohol consumption. Tension reduction expectancies were positively correlated with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption. The subscale of liquid courage was positively correlated with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption. Sexuality expectancies were positively correlated with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption. Similarly, the risk and aggression subscale was positively correlated with frequency typical and peak alcohol consumption. The expectancy subscale of self-perception was negatively correlated with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption.

CBI was negatively correlated with frequency of alcohol consumption, typical alcohol consumption, and peak alcohol consumption.

Primary Analyses

After examining descriptive and bivariate statistics, primary analyses were conducted using *M-Plus* version 8.4. All items from the SIAS, with the exception of one item "I have difficulty talking to attractive persons of the opposite sex," were included as indicators for the latent variable SA. The removed item was not included in any analyses due to problematic language assuming heterosexual orientation. Similarly, in the first model, all expectancy subscales, all items on the NTBS, and all items from the SCS were included as indicators for the respective latent variables. For the alcohol use latent variable, indicators were frequency of alcohol use, reported peak drinks, heaviest weekend drinks, and typical weekend drinks. The first step was to create the measurement model, in the first model the variables were allowed to covary. The first model had poor fit statistics (*RMSEA* = .06, *CFI* = .81, *TLI* = .81, *SRMR* = .08), and one item "I seldom worry about whether other people care about me" did not load onto the need to belong latent variable, and Self-Perception did not load onto the expectancies latent variable. These items were removed as indicators. Considering theory, the CBI subscale was also removed as an indicator. The model without CBI and Self-Perception was compared with the previous model using a Satorra-Bentler scaled chi-square test to determine if removing these indicators significantly improved the model. The results suggested the model without CBI and self-perception was a significant improvement (*CD* = 1.34, *TRd* = 2219.54, *Δdf* = 49.00, *p* < .01). The next step was to iteratively free the correlated errors based on modification indices. Once all correlated errors with MI greater than 20 were removed the model had acceptable fit statistics (*RMSEA* = .04, *CFI* = .91, *TLI* = .90, *SRMR* = .06). Additionally, a Satorra-Bentler scaled chi-

square test was run to determine if this model was significantly better than the first model. Results indicated the final model was a significant improvement (CD = 1.34, TRd = 2219.54, Δdf = 49.00, $p < .01$).

Next, the hypothesized structural model was specified. In the first structural model the two-way interactions of SC x NTB, SC x SA, and NTB x SA were included to examine if there were any significant effects indicating moderation, as well as to test the main effects on the alcohol use and expectancies latent variables. The current sample was not large enough to detect the effects of the three-way interaction. Indirect paths indicating mediation were also included in this model. In the first model all demographic variables were dummy coded and included to examine if they accounted for significant variance. For race, the reference group was individuals who identified as white, and for ethnicity the reference group was non-Hispanic.

The results of this first model indicated several significant paths (see tables 3, 4, 5, 6, 7; Appendix H). Alcohol expectancies significantly predicted alcohol use (B = 0.29, $p < .01$), as did SA (B = -1.07, $p < 0.01$). The latent variables SC, and NTB, did not significantly predict alcohol use, nor did the interaction terms of SC x NTB, SC x SA, and NTB x SA. Additionally, the demographic variables academic standing (B = 0.37, $p < .01$), African American (B = -1.21, $p < .01$), Asian (B = -1.70, $p < 0.01$), and Other (B = 2.05, $p = .05$) significantly predicted alcohol use. NTB scores (B = 2.19, $p < .01$) significantly predicted alcohol expectancies, as did SA (B = -0.63, $p = 0.04$). SC scores, SC x NTB, NTB x SA and SC x SA did not significantly predict alcohol expectancies. Furthermore, Academic Standing (B = 0.24, $p = .03$) significantly predicted alcohol expectancies. SA was significantly predicted by NTB (B = 0.52, $p < .01$), SC (B = -0.91, $p < 0.01$), identifying as female (B = 0.10, $p < .01$), and age (B = -0.01, $p < .01$). SC x NTB (B = -0.12, $p = .06$) did not significantly predict SA. The indirect paths indicated

significant mediation effects. The indirect effects suggested that expectancies mediated the relationship between NTB and drinking ($B = 0.61$, $p < .01$), as well as the relationship between SA and drinking ($B = - 0.18$, $p = 0.05$). The total effects from NTB to alcohol use ($B = 0.94$, $p < .01$) and SA to alcohol use ($B = -1.23$, $p < .01$) were significant. SC did not appear to be mediated by alcohol expectancies in this model.

For the next model, insignificant demographic variables were excluded. For the race variables if any were significant all were included to maintain the dummy coding. Alcohol expectancies significantly predicted alcohol use ($B = 0.29$, $p < .01$), as did SA ($B = -1.05$, $p < 0.01$). The latent variables SC, and NTB, did not significantly predict alcohol use, nor did the interaction terms of SC x NTB, SC x SA, and NTB x SA. Additionally, the demographic variables academic standing ($B = 0.37$, $p < .01$), African American ($B = -1.21$, $p < .01$), Asian ($B = -1.70$, $p < 0.01$), and Other ($B = 2.05$, $p = .05$) significantly predicted alcohol use. NTB scores ($B = 2.10$, $p < .01$) significantly predicted alcohol expectancies, as did SA ($B = -0.61$, $p = 0.04$). SC scores, SC x NTB, NTB x SA and SC x SA did not significantly predict alcohol expectancies. Furthermore, Academic Standing ($B = 0.24$, $p = .03$) significantly predicted alcohol expectancies. SA was significantly predicted by NTB ($B = 0.52$, $p < .01$), SC ($B = -0.91$, $p < 0.01$), identifying as female ($B = 0.10$, $p < .01$), and age ($B = -0.01$, $p < .01$). SC x NTB ($B = -0.12$, $p = .07$) did not significantly predict SA. The indirect paths indicated significant mediation effects. The indirect effects suggested that expectancies mediated the relationship between NTB and drinking ($B = 0.61$, $p < .01$), as well as the relationship between SA and drinking ($B = - 0.18$, $p = 0.05$). The total effects from NTB to alcohol use ($B = 0.94$, $p < .01$) and SA to alcohol use ($B = -1.23$, $p < .01$) were significant. SC did not appear to be mediated by alcohol expectancies in this model.

Post-Hoc Exploratory Analyses

After analysis of the hypothesized model, post-hoc analyses to better understand how these variables may fit together were conducted. Due to the significant correlations between SC and drinking outcomes (see table 2), the lack of significant direct, indirect effect, or moderation effects required further analyses. Due to the strong correlation between SC scores and SA scores ($r = -.65$, $p < .01$), and no evidence of an interaction effect in the model, SA was included as a potential mediator in the relationship between SC and drinking. Similarly, SA was included as a mediator in the relationship between NTB and drinking due to a significant correlation ($r = .39$, $p < .01$). The first exploratory model added these indirect effects to the previously run model. Results indicated there were significant indirect paths through SA for both SC ($B = 0.95$, $p < .01$) and NTB ($B = -0.55$, $p < .01$). The total effect for SC ($B = 1.07$, $p < .01$) and SA ($B = -1.23$, $p < .01$) to alcohol use were significant. The total effect of NTB was not significant ($B = 0.39$, $p = .23$).

Next, to better understand these variables, and how they may relate to alcohol use, analyses with participants who identified as drinkers were completed. Participants who indicated they had not consumed alcohol in the past month were excluded from these analyses, resulting in a sample size of 822 participants. In the drinkers only sample, 302 participants identified as male (36.70%), and 520 identified as female (63.30).The sample had representation from freshman ($n = 413$), sophomores ($n = 150$), juniors ($n = 154$), and seniors ($n = 105$). The majority of the sample identified as white ($n = 340$) or white/Hispanic ($n = 334$). Of the remaining participants 65 (7.90%) identified as black/African-American, 56 (6.80%) identified as Asian, 40 (4.90%) identified as black/Hispanic, 33 (4.00%) identified as other, 10 (1.20%) identified as Native American/Alaskan Native, and 4 (0.50%) identified as Hawaiian.

First, the measurement model was specified. The latent variables were indicated by the same items and subscales as the previous models, but this resulted in poor model fit, even after iteratively freeing correlated errors with M.I. over 20 (*RMSEA* = 0.04, *CFI* = .89, *TLI* = .89, *SRMR* = .10). Additionally, several indicators did not load onto the variables. These items were removed but did not change model fit (*RMSEA* = 0.54, *CFI* = .83, *TLI* = .82, *SRMR* = .10). All latent variables were then removed and added back in one at a time, starting with the alcohol use variable. Results of the measurement model concluded SC being excluded from the model, produced slightly better model (*RMSEA* = .04, *TLI* = .92, *CFI* = .92, *SRMR* = .06), and results of a Satorra-Bentler adjusted chi-square indicated the model without SC was a better fit for the data (*CD* = 1.13, *TRd* = 2161, *Δdf* = 907, *p* < .01).

Next the structural model was specified, SA and expectancies were included as mediators based on results of previous models. SC was mean centered so it could be used to create interaction terms. All demographic variables were included in this first model to examine if they accounted for significant variance within this sample. For alcohol use, the variables of expectancies (*B* = 0.27, *p* < .01), SA (*B* = -0.78, *p* < .01), SC x SA (*B* = -0.02, *p* = .02), female (*B* = -0.61, *p* = .01), age (*B* = -.06, *p* = .02), Asian (*B* = -1.65, *p* < .01), Native American (*B* = 2.43, *p* = .03), other (*B* = -1.15, *p* = .01), and black/African-American (*B* = -0.90, *p* < .01) were significant predictors. NTB, and SC did not have significant relationships with alcohol use. Expectancies were significantly predicted by SA (*B* = -0.53, *p* = .03) and NTB (*B* = 2.62, *p* < .01). SA was significantly predicted by NTB (*B* = 0.71, *p* < .01), and SC (*B* = -0.03, *p* < .01), and Age (*B* = -0.02, *p* = .01). NTB was significantly predicted by identifying as female (*B* = 0.19, *p* < .01), age (*B* = -0.01, *p* = .01), black/African-American (*B* = -0.15, *p* < .01), and Hispanic (*B* =

-0.10, $p < .01$). SC was significantly predicted by grade ($B = -1.13$, $p = .04$), identifying as Asian

($B = -7.52$, $p < .01$), and identifying as black/African-American ($B = -4.17$, $p = .01$).

The next model excluded insignificant demographic variables, again keeping all race

variables if any were significant, and the interaction of SC x SA was examined at high and low

levels of both SC and SA. The indirect effects of NTB through SA and expectancies, and the

indirect effects of SC and NTB to alcohol use through expectancies and SA were also included.

Results indicated insignificant indirect effects for this model. Additionally, with the insignificant

demographic variables removed, the results suggested there was no significant interaction of SC

x SA on alcohol use ($B = -0.02$, $p = .54$). Similarly SA no longer predicted alcohol use ($B = -$

0.77, $p = .93$), but expectancies ($B = 0.27$, $p < .01$) were still a significant predictor of alcohol

use. Additionally, SA ($B = -0.55$, $p = .96$) and NTB ($B = 2.49$, $p = .92$) did not significantly

predict alcohol expectancies.

DISCUSSION

Despite decreases in college alcohol use in recent years, harms associated with alcohol use are still occurring at alarming rates (Hingson et al., 2017; Schulenberg et al., 2019). Currently available interventions for college students do not work as well as previously thought, but expectancy challenge interventions have shown promise in recent studies (Carey et al., 2012; Cole et al., 2018; Dunn et al., 2019; Fried & Dunn, 2012; Hennessy et al., 2019; Huh et al., 2015). The aim of the current study was to identify other variables, such as need to belong (NTB), social connectedness (SC), and social anxiety (SA), that could act as new targets in expectancy challenge interventions.

Results supported several of the hypothesized relationships, including the relationship between expectancies and alcohol use, consistent with previous research (Lac & Brack, 2018; Madden & Clapp, 2019; Patrick et al., 2010). A significant negative relationship between SA and alcohol use was found, also consistent with prior research (Brook & Willoughby, 2016; Ham, 2009; Ham et al., 2007, 2009, 2011; Ham & Hope, 2006; Meade Eggleston et al., 2004; Schry et al., 2016; Schry & White, 2013; Villarosa et al., 2014) . Results also add to previous literature by examining expectancies as a latent variable as a mediator in the relationship between SA and alcohol use. Results are consistent with partial mediation, suggesting expectancy subscales other than sociability play a role in this relationship, indicating the relationship between SA and alcohol use is more complex than just increasing sociability (Gilles et al., 2006; Ham, 2009).

NTB did not have a significant direct relationship with alcohol use, and these results do not support previous research on the topic (Hamilton & DeHart, 2017; Litt et al., 2012). Results did support the hypothesized relationship between NTB and expectancies, as well as a significant

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indirect path from NTB to alcohol use through expectancies. NTB could represent important individual differences that account for differences in expectancies, or in expectancy activation patterns. Results of the exploratory models shed further light on the relationship between NTB and alcohol use by revealing a significant indirect effect from NTB to alcohol use through SA. These results taken with the insignificant direct and total effects suggest the relationship between NTB and alcohol use is fully mediated by expectancies and SA, contradicting previous research (Dewit et al., 2013; Litt et al., 2012). Results suggest targeting NTB and SA may be a way to improve expectancy challenge interventions, and could strengthen the changes in expectancy activation patterns seen in previous studies (Dunn et al., 2000).

The results of the current study did not find any evidence to support a direct path from SC to alcohol use. Additionally, in the full dataset there was no evidence of significant interactions between SC and NTB or SC and SA. Thus, none of the hypotheses related to SC were supported by the current study. However, the relationship between SC and alcohol use was mediated by SA, suggesting SA fully mediates the relationship. The hypothesized model (figure 1) was not supported, but there was support for a different model (see figure 3; Appendix G).

There are several limitations to this study that should be noted. First, the version of the SIAS used contained problematic items, and more commonly used versions of the measure may have improved measurement of social anxiety within the sample. Similarly, the assessment of gender identity could have been more inclusive, and comprehensive. A major limitation of the study was the inability to analyze the hypothesized three-way interaction between SC x NTB x SA due to insufficient power. Another limitation was the diversity of the sample. The sample mostly identified as white, female, and were in their freshmen year, potentially limiting the generalizability of the results. However, harms associated with college alcohol use

disproportionately affect freshman females, making their over-representation in the sample a strength. Additionally, this study used cross-sectional data, limiting our ability to fully understand the relationships between these variables.

Despite the limitations the current study adds to the literature on social variables and alcohol use among college students. Previous research has found NTB to be a significant predictor of alcohol use, which was not supported by the results of this study. Additionally, the results suggest SA and expectancies play an important role as mediators, and these results should be further examined by future research. Similarly, the three-way interaction between SC, NTB, and SA should be examined, to better understand how these variables interact. Future studies should recruit more diverse samples, and assess race, ethnicity, and gender identity in more meaningful ways. Increasing the diversity of participants will help us better understand what impact these important characteristics play in alcohol use. The results support expectancies as an important construct in alcohol use models, as it not only acts as a predictor, but a mediator. The results of this study provide further evidence that expectancy challenge interventions could have large effects on alcohol use.

APPENDIX A: DEMOGRAPHICS QUESTIONNAIRE

DEMOGRAPHICS QUESTIONNAIRE

Age: _____ years old

Gender: Male   Female Trans

What year are you in school? FRESHMAN   SOPHOMORE JUNIOR SENIOR

Which answer best describes your ethnicity? (circle all that apply) White/Hispanic   Black/

Hispanic White/Non-Hispanic   Black/ Non-Hispanic Asian   American Indian or Alaskan

Native Native Hawaiian or other Pacific Islander   Other

APPENDIX B: COMPREHENSIVE EFFECTS OF ALCOHOL MEASURE

Comprehensive Effects of Alcohol Measure

The following section assesses what you would expect to happen <u>if you were under the influence of alcohol</u>.

If you do not drink alcohol, please answer questions based on your beliefs, knowledge, and understanding of the effects of alcohol.

Circle one option from disagree to agree – depending on whether you expect the effect to happen to you if you were <u>under the influence of alcohol</u>. These effects will vary, depending upon the amount of alcohol you typically consume.

<u>This is not a personality assessment</u>. We want to know what you expect to happen if you were to drink alcohol, not how you are when you are sober. Example: If you are always emotional, you <u>would not</u> circle agree as your answer unless you expected to become MORE EMOTIONAL if you drank.

<u>If I were under the influence of alcohol</u>:

1. I would be outgoing……………………….... Disagree	Slightly Disagree	Slightly Agree	Agree
2. My senses would be dulled……………………... Disagree	Slightly Disagree	Slightly Agree	Agree
3. I would be humorous……………………….... Disagree	Slightly Disagree	Slightly Agree	Agree
4. My problems would seem worse……………….. Disagree	Slightly Disagree	Slightly Agree	Agree
5. It would be easier to express my feelings……..... Disagree	Slightly Disagree	Slightly Agree	Agree
6. My writing would be impaired…………………… Disagree	Slightly Disagree	Slightly Agree	Agree
7. I would feel sexy…………………………………Disagree	Slightly Disagree	Slightly Agree	Agree
8. I would have difficulty thinking…………………… Disagree	Slightly Disagree	Slightly Agree	Agree
9. I would neglect my obligations……………………Disagree	Slightly Disagree	Slightly Agree	Agree
10. I would be dominant……………………………... Disagree	Slightly Disagree	Slightly Agree	Agree

11. My head would feel fuzzy…………………………Disagree	Slightly Disagree	Slightly Agree	Agree
12. I would enjoy sex more……………………………Disagree	Slightly Disagree	Slightly Agree	Agree
13. I would feel dizzy………………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
14. I would be friendly……………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
15. I would be clumsy……………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
16. It would be easier to act out my fantasies…….. Disagree	Slightly Disagree	Slightly Agree	Agree
17. I would be loud, boisterous, or noisy………….. Disagree	Slightly Disagree	Slightly Agree	Agree
18. I would feel peaceful……………………………. Disagree	Slightly Disagree	Slightly Agree	Agree
19. I would be brave and daring……………………. Disagree	Slightly Disagree	Slightly Agree	Agree
20. I would feel unafraid……………………………...Disagree	Slightly Disagree	Slightly Agree	Agree
21. I would feel creative…………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
22. I would be courageous………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
23. I would feel shaky or jittery the next day……….Disagree	Slightly Disagree	Slightly Agree	Agree
24. I would feel energetic…………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
25. I would act aggressively………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
26. My responses would be slow…………………….. Disagree	Slightly Disagree	Slightly Agree	Agree

27. My body will be relaxed…………………………Disagree	Slightly Disagree	Slightly Agree	Agree
28. I would feel guilty…………………………………Disagree	Slightly Disagree	Slightly Agree	Agree
29. I would feel calm………………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
30. I would feel moody……………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
31. It would be easier to talk to people……………..Disagree	Slightly Disagree	Slightly Agree	Agree
32. I would be a better lover………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
33. I would feel self-critical………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
34 I would be talkative………………………………. Disagree	Slightly Disagree	Slightly Agree	Agree
35. I would act tough…………………………………. Disagree	Slightly Disagree	Slightly Agree	Agree
36. I would take risks………………………………… Disagree	Slightly Disagree	Slightly Agree	Agree
37. I would feel powerful…………………………….. Disagree	Slightly Disagree	Slightly Agree	Agree
38. I would act sociable……………………………… Disagree	Slightly Disagree	Slightly Agree	Agree

APPENDIX C: THE NEED TO BELONG SCALE

The Need to Belong Scale

1. If other people don't seem to accept me, I don't let it bother me. (R)

 2. I try hard not to do things that will make other people avoid or reject me.

3. I seldom worry about whether other people care about me. (R)

4. I need to feel that there are people I can turn to in times of need.

5. I want other people to accept me.

 6. I do not like being alone.

7. Being apart from my friends for long periods of time does not bother me. (R)

 8. I have a strong "need to belong."

 9. It bothers me a great deal when I am not included in other people's plans.

10. My feelings are easily hurt when I feel that others do not accept me.

Note. Respondents indicate the degree to which each statement is true or characteristic of them on a 5-point scale (1 = not at all, 2 = slightly, 3 = moderately, 4 = very, 5 = extremely). (R) indicates that the item is reverse-scored.

APPENDIX D: SOCIAL CONNECTEDNESS SCALE AND COPYRIGHT
INFORMATION

TERMS OF CONDITION FOR USE OF SOCIAL CONNECTEDNESS SCALE

Thanks again for your interest in the Social Connectedness Scale (original, revised, and campus versions). You have my permission to use the scales. There is no cost to use the scales. However, I ask that the following terms be abided: (a) use only for stated research purposes; (b) do not distribute to others outside of your research team without permission; (c) do not make financial profit from its use; (d) notify me of any publications related to its use; and (e) provide me with access to only the social connectedness data, along with basic demographic information, for possible secondary data analysis. Please let me know if these terms are acceptable via email at richlee@umn.edu.

SCS-Original

Lee, R.M., & Robbins, S.B. (1995). Measuring belongingness: The Social Connectedness and the Social Assurance Scales. *Journal of Counseling Psychology, 42*, 232-241.

Lee, R.M., & Robbins, S.B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity. *Journal of Counseling Psychology, 45*, 338-345.

Lee, R.M., & Robbins, S.B. (2000). Understanding social connectedness in college women and men. *Journal of Counseling and Development, 78*, 484-491.

SCS-Revised

Lee, R.M., Draper, M., & Lee, S. (2001). Social connectedness, dysfunctional interpersonal behaviors, and psychological distress: Testing a mediator model. *Journal of Counseling Psychology, 48*, 310-318.

SCS-Campus

Lee, R.M., & Davis, C. III. (2000). Cultural orientation, past multicultural experience, and a sense of belonging on campus for Asian American college students. *Journal of College Student Development, 41*, 110-114.

Lee, R.M., Keough, K.A., & Sexton, J.D. (2002). Social connectedness, social appraisal, and perceived life stress in college women and men. *Journal of Counseling and Development, 80*, 355-361.

Lee, R.M. (2003). Do ethnic identity and other-group orientation protect against discrimination for Asian Americans? *Journal of Counseling Psychology, 50*, 133-141.

Lee, R.M. (2005). Resilience against discrimination: Ethnic identity and other-group orientation as protective factors for Korean Americans. *Journal of Counseling Psychology, 52,* 36-44.

Summers, J.J., Beretvas, S.N., Svinicki, M.D., & Gorin, J.S. (2005). Evaluating collaborative learning and community. *The Journal of Experimental Education, 73*, 165-188. [This is a psychometric evaluation of a 12-item variation of the Campus Connectedness Scale]

SOCIAL CONNECTEDNESS SCALE-REVISED

Directions: Following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the following scale (1 = Strongly Disagree and 6 = Strongly Agree). There is no right or wrong answer. Do not spend too much time with any one statement and do not leave any unanswered.

1= Strongly Disagree 2 = Disagree 3 = Mildly Disagree 4 = Mildly Agree 5 = Agree 6=Strongly Agree

1. I feel comfortable in the presence of strangers... 1   2   3   4   5   6

2. I am in tune with the world... 1   2   3   4   5   6

*3. Even among my friends, there is no sense of brother/sisterhood..........1   2   3   4   5   6

4. I fit in well in new situations.. 1   2   3   4   5   6

5. I feel close to people.. 1   2   3   4   5   6

*6. I feel disconnected from the world around me...................................... 1   2   3   4   5   6

*7. Even around people I know, I don't feel that I really belong................ 1   2   3   4   5   6

8. I see people as friendly and approachable.. 1   2   3   4   5   6

*9. I feel like an outsider.. 1   2   3   4   5   6

10. I feel understood by the people I know... 1   2   3   4   5   6

*11. I feel distant from people.. 1   2   3   4   5   6

 12. I am able to relate to my peers.. 1   2   3   4   5   6

*13. I have little sense of togetherness with my peers............................... 1   2   3   4   5   6

14. I find myself actively involved in people's lives............................... 1   2   3   4   5   6

*15. I catch myself losing a sense of connectedness with society........... 1   2   3   4   5   6

16. I am able to connect with other people... 1   2   3   4   5   6

*17. I see myself as a loner... 1   2   3   4   5   6

*18. I don't feel related to most people... 1   2   3   4   5   6

19. My friends feel like family... 1   2   3   4   5   6

*20. I don't feel I participate with anyone or any group.......................... 1   2   3   4   5   6

Strongly Disagree Agree * reverse score   Social connectedness scale-revised has two scoring options. The original scale consists of 8 items and the revised item consists of 20 items.   a) original = reverse score items 3,6,7,11,13,15,18,20 and sum 8 items.   b) revised scale = reverse score items 3,6,7,9,11,13,15,17,18,20 and sum all 20 items.

APPENDIX E: SOCIAL INTERACTION ANXIETY SCALE

Social Interaction Anxiety Scale (SIAS)

All items are answered on a 5 point Likert scale (0-4) with verbal indicators at each anchor: not at all, slightly, moderately, very, extremely. *Items are presented with the prompt of* "indicate the degree to which you feel the statement is characteristic or true of you*".*

1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.)
2. I have difficulty making eye-contact with others
3. I become tense if I have to talk about myself or my feelings
4. I find difficulty mixing comfortably with the people I work with
5. I tense-up if I meet an acquaintance in the street
6. When mixing socially I am uncomfortable
7. I feel tense if I am alone with just one other person
8. I am at ease meeting people at parties etc.*
9. I have difficulty talking with other people
10. I find it easy to think of things to talk about*
11. I worry about expressing myself in case I appear awkward
12. I find it difficult to disagree with another's point of view
13. I have difficulty talking to attractive persons of the opposite sex
14. I find myself worrying that I won't know what to say in social situations
15. I am nervous mixing with people I don't know well
16. I feel I'll say something embarrassing when talking
17. When mixing in a group I find myself worrying I will be ignored
18. I am tense mixing in a group
19. I am unsure whether to greet someone I know only slightly

* Indicates reverse scoring

APPENDIX F: DAILY DRINKING QUESTIONNAIRE

<div style="border: 1px solid black; text-align: center; font-weight: bold;">

STANDARD DRINK CONVERSION

</div>

When asked how much you drink in the following questions use this chart.

ONE STANDARD DRINK IS EQUAL TO:

Standard American BEER   12 oz. Can, Bottle or Glass
(3-5% alcohol)

Microbrew or European BEER   1/2 of a 12 oz. Can or Bottle
(8%-12% alcohol)

WINE (12 – 17% alcohol)   5 oz. Glass

WINE Cooler   10 oz. Bottle

HARD LIQUOR   1-1/2 oz. or One Standard Shot
(80-proof, 40% alcohol)

HARD LIQUOR   1 oz.
(100-proof, 50% alcohol)

WINE: 1 Bottle

25 oz. (12 – 17% alcohol)	=	5 standard drinks
40 oz. (12 – 17% alcohol)	=	8 standard drinks

HARD LIQUOR: 1 Bottle (80-proof)

6.8 oz. (Half-Pint)	=	4 standard drinks
12.7 oz. (Pint)	=	8 standard drinks
33.8 oz. (Liter)	=	22 standard drinks
59.2 oz (Handle)	=	39 standard drinks

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DDQ-R (Daily Drinking Questionnaire-Revised)

Gender: Male_____   Female_____   **Height** _____'_____"   **Weight**_____ lbs.
                                                    (Feet)   (Inches)

INSTRUCTIONS FOR RECORDING DRINKING DURING A <u>TYPICAL WEEK</u>

IN THE CALENDAR BELOW, PLEASE FILL-IN YOUR DRINKING RATE AND TIME DRINKING DURING A **TYPICAL WEEK** IN THE LAST **30 DAYS.**

First, think of a *typical week* in the last *30 days you.* (Where did you live? What were your regular weekly activities? Where you working or going to school? Etc.) Try to remember as accurately   as you can, *how much* and for *how long* you *typically drank* in a week during that one month period?

For each day of the week in the calendar below, fill in the **number of standard drinks typically consumed on that day** in the upper box and the **typical number of hours you drank** that day in the lower box.

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of *Drinks*							
Number of *Hours Drinking*							

INSTRUCTIONS FOR RECORDING DRINKING FOR YOUR <u>HEAVIEST DRINKING WEEK</u>

IN THE CALENDAR BELOW, PLEASE FILL-IN YOUR DRINKING RATE AND TIME DRINKING DURING YOUR **HEAVIEST DRINKING WEEK** IN THE LAST **30 DAYS.**

First, think of your *heaviest drinking week* in the last *30 days*. (Where did you live? What were your regular weekly activities? Where you working or going to school? Etc.)
Try to remember as accurately as you can, *how much* and for *how long* did you drink during your *heaviest drinking week* in that one month period?

For each day of the week in the calendar below, fill in the **number of standard drinks consumed on that day** in the upper box and the **number of hours you drank** that day in the lower box.

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of *Drinks*							
Number of *Hours Drinking*							

Drinking Quantity/Frequency Index (Cahallan's Q/F Index)

1. **How often did you drink during the last *month*?** (check one)

    a. I did not drink at all.

    b. About once a month.

    c. Two to three times a month.

    d. Once or twice a week.

    e. Three to four times a week.

    f. Nearly every day.

    g. Once a day or more.

2. **Think of a typical weekend evening** (Friday or Saturday) during the last *month*.. How **much** did you drink on that evening? (check one)

0 drinks	8 drinks	16 drinks	24 drinks
1 drinks	9 drinks	17 drinks	25 drinks
2 drinks	10 drinks	18 drinks	26 drinks
3 drinks	11 drinks	19 drinks	27 drinks
4 drinks	12 drinks	20 drinks	28 drinks
5 drinks	13 drinks	21 drinks	29 drinks
6 drinks	14 drinks	22 drinks	30 drinks
7 drinks	15 drinks	23 drinks	*More than* 30

3. **Think of the occasion** (any day of the week) **you drank the most** during the last *month*. How **much** did you drink? (check one)

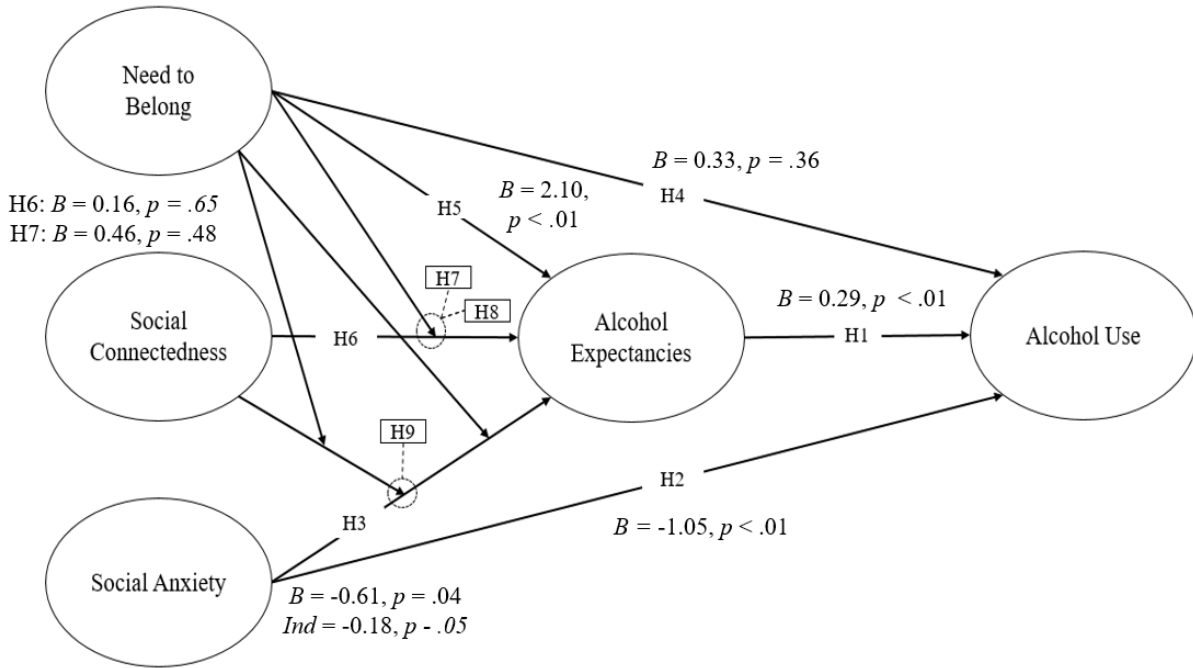|			
0 drinks	8 drinks	16 drinks	24 drinks
1 drinks	9 drinks	17 drinks	25 drinks
2 drinks	10 drinks	18 drinks	26 drinks
3 drinks	11 drinks	19 drinks	27 drinks
4 drinks	12 drinks	20 drinks	28 drinks
5 drinks	13 drinks	21 drinks	29 drinks
6 drinks	14 drinks	22 drinks	30 drinks
7 drinks	15 drinks	23 drinks	*More than* 30

APPENDIX G: FIGURES

Figure 2: Hypothesized Model Results
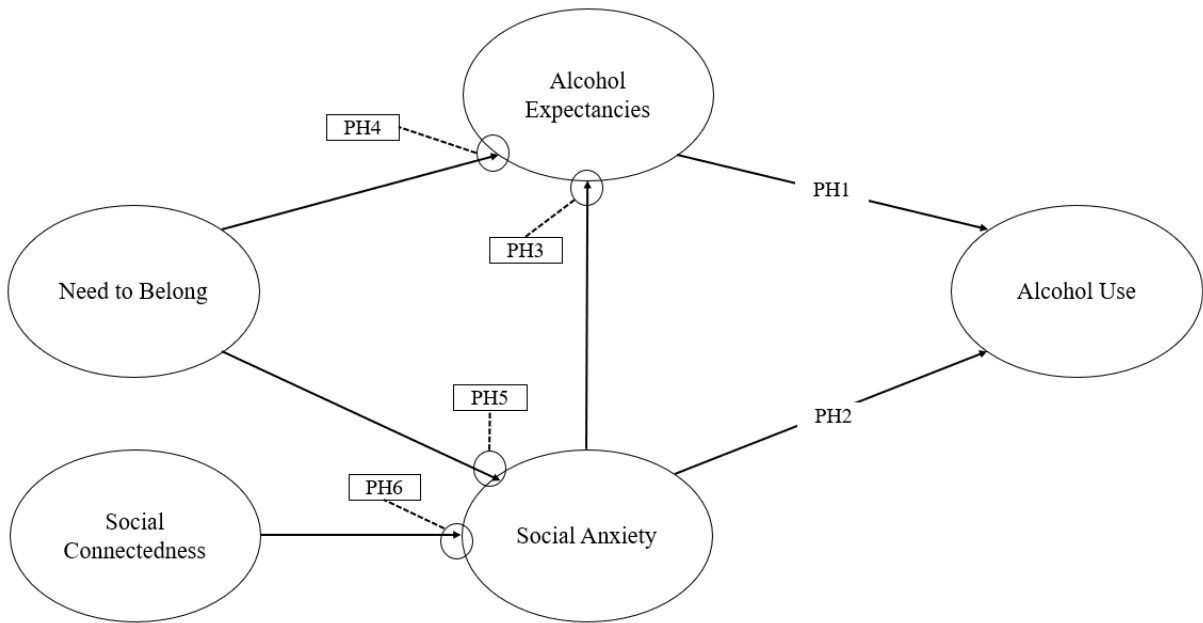
Figure 3: Model (Full Sample)

APPENDIX H: TABLES

Table 1: Descriptive Statistics

Variables	Mean	SD	Skew	Range	
Age	19.67	3.66	5.48	18.00	57.00
Social Connectedness	83.86	16.70	-0.33	24.00	120.00
Need to Belong	31.10	6.99	0.05	10.00	50.00
SIAS	27.52	15.26	0.35	0.00	70.00
Sociability	25.83	4.74	-1.09	8.00	32.00
Tension Reduction	8.04	2.20	-0.36	3.00	12.00
Liquid Courage	14.04	3.61	-0.41	5.00	20.00
Sexuality	9.85	3.13	-0.04	4.00	16.00
Risk and Aggression	12.13	3.29	0.06	5.00	20.00
Self-Perception	8.78	3.11	0.29	4.00	16.00
CBI	27.56	5.36	-0.59	9.00	36.00
Frequency	2.31	1.33	0.58	0.00	6.00
Typical	3.01	2.91	2.69	0.00	31.00
Peak	4.22	4.16	1.82	0.00	31.00

Table 2: Bivariate Correlations

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1.SC	1.00	-.11*	-.65*	.11*	.02	.03	.00	-.09*	-.25*	-.13*	.17*	.14*	.18*
2. NTB		1.00	.39*	.21*	.03	.13*	.13*	.14*	.17*	.19*	.02	-.03	-.04
3. SIAS			1.00	.03	-.02	.04	.03	.10*	.28*	.22*	-.16*	-.17*	-.20*
4.Sociability				1.00	.37*	.66*	.57*	.42*	-.17*	.06	.30*	.25*	.27*
5. TR					1.00	.36*	.36*	.12*	-.22*	-.09*	.16*	.08*	.10*
6. LC						1.00	.60*	.65*	.00	.16*	.16*	.20*	.16*
7. Sexuality							1.00	.46*	-.03	.06	.23*	.21*	.18*
8. RA								1.00	.23*	.34*	.08*	.14*	.10*
9. SP									1.00	.48*	-.30*	-.22*	-.27*
10. CBI										1.00	-.23*	-.17*	-.17*
11. Frequency											1.00	.68*	.72*
12. Typical												1.00	.81*
13. Peak													1.00

*Note: *= p < .01*

Table 3: Direct Effects on Alcohol Use

Variable	B	p
Expectancies	0.29	.00**
SA	-1.07	.00**
SC	0.20	.57
NTB	0.39	.29
SC x NTB	0.50	.44
SC x SA	-0.47	.13
NTB x SA	0.43	.35
Age	-0.03	.27
Grade	0.36	.00**
Female	-0.34	.25
African American/Black	0.60	.00**
Asian	0.92	.00**
Native American	-0.03	.29
Hawaiian	-0.97	.59
Other	-0.90	.07
Hispanic	0.21	.37

Table 4: Direct Effects on Expectancies

Variable	B	p
SA	-0.63	.04*
SC	-0.14	.73
NTB	2.19	.00**
SC x NTB	-0.85	.28
SC x SA	0.06	.86
NTB x SA	-0.96	.09
Age	-0.02	.59
Grade	0.24	.04*
Female	0.18	.48
Black	0.57	.16
Asian	-0.27	.50
Native American	2.33	.30
Hawaiian	0.69	.61
Other	0.52	.36
Hispanic	0.31	.21

Table 5: Direct Effects on Social Anxiety

Variable	B	p
SC	-0.90	.00**
NTB	0.52	.00**
SC x NTB	-0.12	.06
Age	-0.02	.00**
Grade	0.01	.50
Female	0.10	.00**
Black	-0.03	.54
Asian	0.10	.10
Native American	0.31	.38
Hawaiian	0.63	.00**
Other	0.12	.18
Hispanic	0.01	.72

Table 6: Direct Effects on NTB

Variable	B	p
Age	-0.01	.01**
Grade	-0.02	.31
Female	0.15	.00**
African American/Black	-0.22	.00**
Asian	-0.03	.56
Native American	-0.51	.00**
Hawaiian	0.60	.00**
Other	-0.18	.02*
Hispanic	-0.08	.01**

Table 7: Direct Effects on SC

Variable	B	p
Age	-0.00	.79
Grade	-0.02	.36
Female	0.02	.61
African American/Black	-0.15	.00**
Asian	-0.28	.00**
Native American	-0.38	.38
Hawaiian	0.17	.44
Other	-0.06	.56
Hispanic	-0.07	.06

APPENDIX I: IRB APPROVAL

Institutional Review Board
FWA00000351
IRB00001138
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

<u>EXEMPTION DETERMINATION</u>

April 17, 2019

Dear Mark Crisafulli:

On 4/17/2019, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Exempt Category
Title:	Examining Social Drinking: A Theoretical Model of College Alcohol Use
Investigator:	Mark Crisafulli
IRB ID:	STUDY00000329
Funding:	None
Grant ID:	None

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Kamille Chaparro
Designated Reviewer

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