# PSYCHOLOGICAL ANTECEDENTS OF BINGE DRINKING AMONG COLLEGE STUDENTS

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Abstract: Binge drinking is often studied among college students because they have the highest alcohol consumption rate relative to any other group in the nation. The present study examines nine predictor variables to determine which psychological antecedents influence why some students are more likely to participate in binge drinking practices than others. For cross-validation purposes, after administering an online questionnaire to 1,786 college students, the sample was split into two groups. A multi-staged path analysis model was tested to explore factors that influence binge drinking, including: depression, worry, social isolation, social interaction anxiety, and five different time perspective dimensions. Only 7% of the variance in binge drinking could be accounted for on the basis of the predictor set. The amount of variance captured suggests that the set of predictors effective at explaining binge drinking among middle-aged adults is not consistent with what was found among college students in this study. Fully 33% of the variability in depression scores was captured on the basis of the antecedent predictors, and 29% of the variability in worry scores was explained. One novel aspect of this investigation is that time perspective had not previously been examined in relation to social isolation. Notably, this study revealed that four of the five time perspective dimensions were significant predictors of both social isolation and social interaction anxiety. The findings from this study suggest that it would be beneficial to explore other predictor variables in order to better explain binge drinking among college students.

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# CHAPTER I

## INTRODUCTION

### Overview

What is it that leads some people to drink too much alcohol and others not? What is considered too much drinking? To what extent does one's psychological makeup predispose a person to drink? These are important questions when looking at college student samples because so many students have been found to abuse alcohol (Knight, Wechsler, Kuo, Seibring, Weitzman, & Schuckit, 2002; Wechsler, Lee, Kuo, & Lee, 2000). Since the first large-scale epidemiologic study of student drinking was published by Straus and Bacon (1953), the publicly noted negative consequences of drinking practices on college campuses has made student drinking a widely studied topic. This topic is critically important to study because alcohol consumption rates are higher among college students than any other age group in the nation (McBride, Barrett, Moore, & Schonfeld, 2014, O'Malley & Johnston, 2002). Among college-age individuals (18-24 years), students have significantly higher alcohol consumption rates than that of their age-mates who do not attend college, leading to the conclusion that being on a college campus puts students at higher risk for heavy levels of drinking (O'Malley & Johnston,

2002). The present study examines the reasons why some students drink to excess, whereas others limit themselves to a reasonable level of alcohol consumption. The likelihood of individuals to binge drink is explored, as well as the clinical conditions and personality dimensions that underlie alcohol abuse.

The overarching goal of this study was to examine the psychological and individual difference dimensions that underlie binge drinking practices. Nine different predictor variables were included in this investigation, cast into a conceptual model designed to predict the likelihood of binge drinking among members of a college student sample. Depression and worry are specified to be proximate predictors of binge drinking in the model, whereas other variables, including feelings of social isolation, social interaction anxiety, and one's psychological time perspective (measured across five different dimensions), round out the remainder of the model. Each of these underlying constructs are further discussed below, but first, a brief introduction to the issues surrounding binge drinking is presented.

## Literature Review

**Determinants of binge drinking.** Binge drinking is a widely used term to describe the type of drinking that is harmful to one's health (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). After the term was first introduced in Wechsler and Isaac's 1992 study, The Harvard School of Public Health College Alcohol Study used binge drinking as a way to identify drinking to excess on a single occasion. According to the College Alcohol Study, binge drinking was defined as five or more drinks (for males) or four or more drinks (for females), consumed on at least one occasion during a two-week period. After criticism was raised regarding the ambiguity of

the term “one occasion” in the definition of binge drinking, in 2004 the National Advisory Council of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) defined “one occasion” as a two-hour period. In 2007, the United States (U.S.) Department of Health and Human Services added to that definition by describing what typically happens to an individual after consuming that level of alcohol during the specified two-hour period of time. They indicated that a binge episode is when a person brings their blood alcohol concentration to 0.08 percent or higher.

From a societal perspective, binge drinking is an important issue because it not only affects individuals, but others around them as well. A landmark study by Hingson, Zha, and Weitzman (2009) surveyed college students between 1998 and 2005. That study found that during that time frame, binge drinking increased from 41.7 to 44.7 percent. Over this seven-year period, binge drinking resulted in an increase in unintentional alcohol-related deaths among college-age students 21-24 years of age (1,440 deaths in 1998; 1,825 in 2005, per 100,000 student respondents). There was also an increase in the percentage of students who were found to have operated a motor vehicle while under the influence (26.5% and 28.9%) in 1998 and 2005, respectively. Moreover, the same 2009 publication, data from students from 2001 indicated that 10 percent of respondents had been injured due to drinking and 12 percent (or nearly 700,000 students based on U.S. college enrollment figures) reported being hit or assaulted by another college student under the influence of alcohol. The Hingson et al. investigation also revealed that some 2 percent (nearly 100,000 college students in the U.S. population) reported being victims of either alcohol-related sexual assault or date rape.

Intoxicated individuals are not only at an increased risk of engaging in criminal behavior, but they are also more likely to go along with others who commit criminal acts. Hingson, Heeren, Winter, and Wechsler (2005) found that in 1998, of the eight million students attending colleges in the U.S., more than two million (> 25 percent) drove under the influence of alcohol. Furthermore, more than three million students rode in an automobile with a driver who had been drinking. In a different investigation carried out in 2001, more than 1,700 students aged 18-24 who were enrolled in 2- and 4-year colleges died from unintended alcohol-related injuries (Hingson, 2010). The National Survey on Drug Use and Health, which is carried out annually by the Substance Abuse and Mental Health Services Administration, reported that during 2011 the number of college students who engaged in binge drinking (44%) had remained relatively stable since 2002 (SAMHSA, 2011). Age-mates not enrolled in college from 2002 to 2010 showed a small but statistically significant decrease in binge drinking, from 39 to 36 percent during the eight-year period.

If binge-drinking rates are remaining stable among college students, one important question becomes, what is it about students who consume alcohol to excess that makes them more likely to engage in risky drinking-related behaviors? The answer may, in part, lie within sex differences among drinkers. Although the percentage of binge drinkers has remained relatively stable, the ratio of males to females who engage in binge drinking has significantly changed in recent years. From the first published study on college drinking, Straus and Bacon (1953) found that 80% of males and 49% of females admitted to having been intoxicated. By 2011, however, the Monitoring the Future study (an investigation sponsored by the National Institute on Drug Abuse) found that the

number of college males who had been drunk decreased to 68 percent, whereas among females the incidence of drunkenness increased to 68 percent. The consequences suffered from these behaviors—in the form of injuries and deaths—did not statistically differ among men and women (Johnston, O'Malley, Bachman, & Schulenberg, 2011). The reason why more women are getting intoxicated on campus in recent years is unknown, but an increase in women taking up drinking has definitely had an impact on the overall increase of college students drinking.

The consequences of binge drinking among college students can be either short-term (such as missing a class), or long-term, (such as experiencing liver disease). The incidence of short-term memory loss, also known as blackouts, has been stable for members of both sexes, and it too can have both long-term and short-term consequences. Wechsler and colleagues (2000) define a blackout as a period of intoxication in which an individual has forgotten where or what they did during that time. In 2009, White and Swartzwelder found that 12 percent of both male and female college students who drank during the preceding two weeks had experienced a blackout. Wechsler and colleagues found that 54 percent of frequent binge drinkers on college campuses reported blacking out at least once during the preceding year. Troublingly, binge drinking can cause an alcoholic overdose, which may result in hospitalization or even death. And in terms of academic performance, students who binge drink frequently are at a higher risk of becoming college drop-outs (Jennison, 2004), and Powell, Williams, and Wechsler (2004) found that frequent college binge drinkers were six times more likely to miss class and five times more likely to fall behind in their classes.

**Causes of Binge Drinking**

There are certain factors and environments that can lead individuals to being at an increased risk for binge drinking. As suggested above, being on a college campus is one such risk factor. In addition, being a member of a fraternity or sorority puts individuals at a higher risk of participating in binge drinking behaviors (Borsari & Carey, 1999; McBride et al., 2014). Members of these student organizations have been found to drink more per week and to have more drinks per occasion than non-members. This may be due, in part, to the social aspects of drinking among members of these groups. Drinking games are frequently found at social events, and such games often encourage individuals to drink large amounts of alcohol during a short period of time.

Not all college students are equally likely to participate in drinking games, however. Whites are more likely than non-Whites to engage in drinking games, and they are also likely to consume more drinks during such games (Pedersen & LaBrie, 2006). Martens, Rocha, Martin, and Serrao (2008) found that minority students who drink often seek out those opportunities in order to keep up with White social norms on campus. The National Survey on Drug Use and Health (2009) found that alcohol use is most prevalent among Whites, accounting for 60 percent of alcohol use in adults among members of the general population (Aldworth, 2009). Furthermore, children whose parents abuse alcohol are four times more likely to develop an alcohol-related problem themselves (American Psychiatric Association, 2013). In a 1993 study by Kushner and Sher, children whose parents had an alcohol problem were found to be twice as likely to show symptoms of an alcohol use disorder compared to children whose parents did not have an alcohol problem.

As indicated in the preceding two paragraphs, a variety of factors have been shown to influence binge-drinking practices. Another notable factor related to binge drinking is one's socioeconomic status (SES), with lower SES individuals being more likely to binge drink than those who are considered to be high SES (Jang, Patrick, Keyes, Hamilton & Schulenberg, 2017).

The present study was designed to explore the precursors of binge drinking by examining a variety of different individual difference dimensions believed to underlie the tendency to drink to excess. The remainder of the introduction begins by reviewing the literature on the effects of depression and worry on the tendency to overdrink. This is followed by a review of the literature on social isolation, social anxiety, and time perspective, each of which are believed to be distal precursors of binge drinking.

**Impact of depression and worry on binge drinking.** Depression and worry are two constructs used in the present investigation as proximate predictors of binge drinking behavior. Depression has been positively linked to binge drinking, with low-level drinkers being shown to have relatively few depressive symptoms, more serious drinkers having a moderate number of depressive symptoms, and hazardous/harmful drinkers typically have the most serious depressive symptom profile (Rodgers, Korten, Jorm, Christensen, Henderson, & Jacomb, 2000). One possible explanation for this general relationship is that individuals who experience high levels of depression may be more likely to binge drink in order to cope with the negative emotions they experience. In a study that followed diagnosed alcoholics who were hospitalized due to hazardous drinking practices, patients with higher depression scores returned to drinking faster than those with lower scores (Greenfield, Weiss, Muenz, Vagge, Kelly, Bello, & Michael,

1998). Consistent with that finding, Stewart and Devine (2000), found that students who use drinking as a mechanism to cope with life stressors tend to have higher levels of depression than those who do not.

Another contributing factor to alcohol abuse is that college students are more likely to be involved in situations where they find themselves among people who are binge drinking. This makes it hard for some students to distinguish the difference between unhealthy drinking and purely social drinking behaviors. Eshbaugh (2008) found that individuals who acknowledge their drinking is a problem tend to have higher scores on a measure of depression than those who do not. This could lead researchers to conclude that individuals who recognize they have a drinking problem binge drink more frequently than individuals who do not acknowledge a problem exists.

Worry is a construct that can be meaningfully differentiated from clinical conditions such as anxiety and depression (Hazlett-Stevens, Ullman, & Craske, 2004). Worry is the anticipation of possible future negative events (Nolen-Hoeksema, Wisco, & Lyumbomirsky, 2008), which may promote certain avoidance behaviors in order to decrease worry levels. But at the same time, worry itself can lead to an increase in levels of anxiety. Researchers have suggested that binge drinking and worry are two different types of strategies used to cope with life's challenges, and that is why they are not commonly seen to co-occur among individuals (Ciesla, Dickson, Anderson, & Neal, 2011; Shoal, Castaneda, & Giancola, 2005). Unlike depression, worry has been found to have a negative relationship with alcohol consumption (Ciesla et al., 2011; Shoal et al., 2005) and more infrequent episodes of binge drinking (Ciesla et al., 2011). This may have to do with a worrier's need to try to control future events; being intoxicated results

in one giving up a degree of control.

**Social isolation.** In addition to depression and worry, social isolation has been included in this investigation as a possible precursor to binge drinking. Social isolation has become a prominent topic in the psychological literature lately, due to recently identified information regarding its harmful effects on individuals' physical and mental health. Being socially isolated does not necessarily mean that individuals are lonely or alone (which they may be), but it can also stem from negative *perceptions* of the quality of one's interactions with others. But most frequently, for socially isolated individuals, social connections are either limited or absent (Matthews, Danese, Wertz, Odgers, Ambler, Moffitt, & Arsenaeult, 2016). In an analysis by Matthews and colleagues (2016), higher levels of social isolation tended to be positively correlated with the symptoms of depression. Yadegarfard, Meinhold-Bergmann, and Ho (2013) found that being socially isolated increases individuals' risk of emotional and mental problems, such as depression. In their study, social isolation was a significant predictor of depression among Thai adolescents. In a different investigation that examined older adults (ages 40-69), social isolation was found to be significantly associated with high levels of depression (Dawes et al., 2015). A structural equation model from that investigation revealed that 24 percent of the variability in depression could be explained by social isolation scores.

Social isolation is associated with not only depression, but also other forms of mental disorders. A meta-analysis of over 300,000 patients led to the conclusion that social isolation is as unhealthy as smoking, in light of the fact that perceived isolation leads to an increased risk of morbidity (Holt-Lunstad, Smith, & Layton, 2010). Moreover, among individuals who experience social isolation, Holt-Lunstad et al. found

an increased incidence of depressive disorders and general anxiety disorder—both of which are related to increased worry levels.

**Social interaction anxiety.** In addition to examining social isolation in this investigation, respondents were asked to report on the extent to which they experience social interaction anxiety. It is plausible that socially anxious individuals are at an increased risk of binge drinking as a way of coping with their anxious feelings. Social interaction anxiety is distinguishable from other forms of anxiety disorders, such as general anxiety disorder (Brown, Turovsky, Heimberg, Juster, Brown, & Barlow, 1997), and it is also known to be a form of social phobia. Relatively little work has been conducted on the impact of social anxiety on social isolation, but one study found that individuals who report feeling socially anxious were significantly more likely to have feelings of social isolation relative to those who were not socially anxious (Olfson, Guardino, Struening, Schneier, Hellman, & Klein, 2000). Social anxiety has also been found to be highly comorbid with depression (Ohayon & Schatzberg, 2010; Stein, Fuetsch, Muller, Hofler, Lieb, & Wittchen, 2001), with individuals who suffer from high levels of social phobia to experience high levels of depression. Grant, Judah, Mills, Lechner, Davidson, and Wingate (2014) found that the onset of anxiety symptoms precedes depressive symptoms, and that social anxiety can predict depression, but not the other way around. That being the case, in the present study social interaction anxiety is predicted to have an impact on depression, based on the assumption that the relationship between these two constructs is mediated by feelings of social isolation.

**Time perspective.** Time perspective is a theoretical construct that purportedly captures an individual's perceptions of time, as well as the way in which those

perceptions influence behavior. The purpose of administering a time perspective measure is to determine the extent to which individuals focus their attention on the past, present, or future. According to theory, most individuals are rooted in one of five different time perspectives (Keough, Zimbardo, & Boyd, 1999; Zimbardo & Boyd, 1999), each of which is described below. When one of the five overshadows all others, the individual is said to have a "dominant" time perspective (Mooney, Earl, Mooney, & Bateman, 2017). In broader theoretical terms, time perspective can be thought of as a personality trait that remains relatively stable in individuals over time (Earl, Bednall, & Mutatore, 2015).

Zimbardo and Boyd (1999) created a 56-item inventory to assess individuals' time perspectives across five different dimensions. Those five dimensions are: past-negative, past-positive, present-fatalistic, present-hedonistic, and future-orientation. A description of each of the five dimensions can be found in Table 1, which was drawn from a paper by Gupta, Hershey, and Gaur (2012). None of the five dimensions have been studied in relation to their effect on social isolation, which is a novel empirical goal of the present investigation. Research has shown, however, that certain time perspective dimensions are linked to worry, depression, and binge drinking, as described below.

Among the five types of time perspectives outlined in Table 1, two in particular have been shown to be related to drinking behavior. Individuals who are present hedonist take a risk-heavy approach toward life, based on the high degree of pleasure drinking gives them. Present hedonists have been shown to live in the moment, and not worry much about future consequences. Indeed, individuals with this dominant form of time perspective have been shown to exhibit a strong positive relationship with substance use (Chavarria, Allan, Moltisanti, & Taylor, 2015; Henson, Carey, Carey, & Maisto, 2006).

Table 1

*Five Time Perspective Dimensions as Posited by Zimbardo and Colleagues*

| | |
|---|---|
| Past-Positive Orientation | These individuals construct their view of the past as glowing, positive, and nostalgic. Past-positive individuals tend to exhibit high levels of self-esteem and happiness, and they tend to have a healthy outlook on life. This orientation is generally thought of as the opposite of the past-negative orientation. |
| Past-Negative Orientation | These individuals tend to have a pessimistic, negative, or aversive attitude toward the past. It is associated with feelings of depression, anxiety, low self-esteem, self-reported unhappiness and aggression. |
| Present-Hedonistic Orientation | These individuals are oriented toward enjoyment, pleasure, and excitement in the present. They do not believe in making sacrifices in the present for rewards that may be earned in the future. They show a low preference for consistency, low levels of impulse control, and they often search for novelty in their lives by engaging in sensation seeking activities. |
| Present-Fatalistic Orientation | These individuals believe that the future is predestined; that is, it cannot be changed on the basis of our actions. They believe fate plays a major role in determining our experiences, and thus, they rarely tend to think far beyond the present. Moreover, they tend to score high on measures of depression, anxiety and aggression. |
| Future-Orientated | These individuals actively plan for and strive to meet future goals. They see themselves as achievers. Individuals with this orientation tend to be conscientiousness, have a preference for consistency, and they are reward dependent. Future-oriented individuals generally avoid novelty, sensation seeking, aggression, impulsivity, and risk taking, as such behaviors are antithetical to future success. |

*Source:* Time perspective and procrastination in the workplace: An empirical investigation (Gupta, Hershey, & Gaur, 2012).

Individuals who score high on the past-negative time perspective dimension tend to have a negative view of their past experiences, and they also tend to perseverate on past events. Those who are rooted in a past-negative time perspective have also been found to engage in excessive alcohol consumption (Chavarria, et al., 2015). Although not related to alcohol use per se, having a past-negative or present-fatalistic time perspective has been shown to be positively linked to depression (Anagnostopolos & Griva, 2012). Moreover, present fatalists, who tend to believe their life is dictated by fate, are likely to exhibit increased feelings of worry (Zimbardo & Boyd, 1999).

The present investigation tests a conceptual model of psychological variables believed to underlie binge-drinking behavior. Some predictor variables were posited to have a direct effect on binge drinking, whereas others were expected to have an effect mediated through other constructs. A full rationale for the proposed model is provided in the following section of this proposal.

**Present Study**

This investigation is designed to address three gaps in the existing literature. First,time perspective has previously been linked to binge drinking, but only two of the dimensions were shown in the literature to predict alcohol abuse. In this study, all five time perspective dimensions will be examined in relation to binge drinking. Second, this study will examine the extent to which the five time perspectives are precursors to social isolation. This is not something that has been explored in the literature, and could potentially be an important extension to Zimbardo's theory of time. The third gap this study is designed to fill will be based on the examination of the five time perspectives in relation to social interaction anxiety.

A graphic representation of the path model that will be tested in this study is shown in Figure 1. As seen in the figure, 21 separate hypotheses will be evaluated, each of which is formulated on the basis of previous research findings. All hypotheses are specified in terms of a hierarchically-organized four-level partial mediation path model, with expected relationships identified between constructs at adjacent hierarchical levels, and in some cases, across levels. The set of hypothesis shown in Figure 1 will be evaluated through the use of a path analytic computational approach based on the recommendations of Olobutuyi (2006). Specifically, separate regression models will be estimated for each endogenous construct contained in the model. In addition to the 21 hypothesized effects, other non-hypothesized effects that emerge as statistically significant will be added to the model, as long as they are not theoretically unreasonable. The path analysis model to be tested is designed to explore how the different explanatory constructs in the study are interrelated, and ultimately, related to binge drinking behavior.

The discussion of hypotheses begins by focusing on the relationships between depression, worry, and the criterion measure (binge drinking). It is expected that as symptoms of depression increase, the likelihood of binge drinking will also increase (Greenfield et al., 1998; Rodgers et al., 2000; hypothesis a), as indicated by the positive valence for this hypothesis in the figure (paths with a positive anticipated valence are marked with a plus sign, whereas those with a negative expected valence are marked with a minus sign). This effect is in contrast to worry, which is predicted to be negatively related to binge drinking. That is, as worry levels increase, the likelihood of binge drinking is expected to decrease (Ciesla et al., 2011; Shoal et al., 2005; hypothesis b).

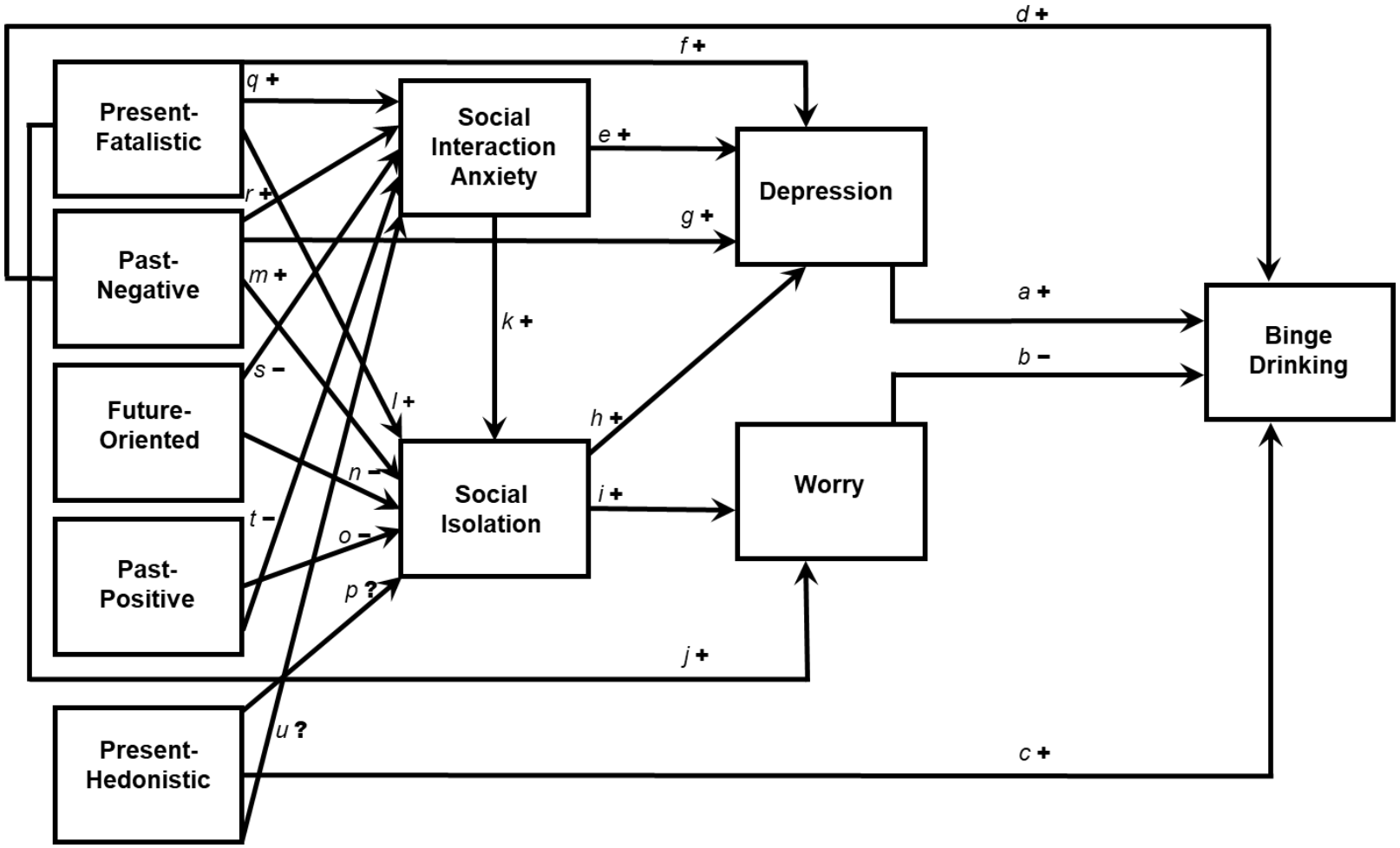


*Figure 1.* Hypothesized model of the psychological predictors of binge drinking

Moreover, on the basis of previous research findings, individuals with either a present-hedonistic or past-negative time perspective are also expected to be more likely to be binge drinkers (Chavarria et al., 2015; Henson et al., 2006; hypotheses c and d, respectively).

Social interaction anxiety has previously been shown to be positively related to depression among individuals (Ohayon & Schatzberg, 2010; Stein et al., 2001), thereby leading to hypothesis e in the second hierarchical level of the model. It is also expected that individuals with either a present-fatalistic or past-negative dominant personality type will be more likely to be depressed (Anagnostopolos & Griva, 2012; hypotheses f and g, respectively). Also, on the basis of previous research findings on social isolation, it is expected that as social isolation scores increase, depression and worry levels will increase accordingly (Dawes et al., 2015; Holt-Lunstad et al., 2010; Matthews et al., 2016, Yadegarfard et al., 2013; hypotheses h and i, respectively). Present fatalists are also expected to be more likely to show increased levels of worry (Zimbardo & Boyd, 1999; hypothesis j).

At the third hierarchical level in the model, social interaction anxiety is predicted to be positively related to social isolation (Olfson et al., 2000; hypothesis k). Investigators have not yet explored the relationships between time perspective dimensions and social isolation or social interaction anxiety, making unambiguous a priori predictions difficult. However, it is not unreasonable to expect that individuals with either a present-fatalistic or past-negative time perspective will be more likely to experience social isolation (hypotheses l and m, respectively) due to the generally negative world view individuals with these two perspectives tend to create for themselves. Furthermore, both future and

past-positive orientations are expected to be negatively related to social isolation (hypotheses n and o, respectively), for just the opposite reason. It is unclear how the present-hedonistic time perspective will be related to social isolation, thus, a question mark is shown in Figure 1 to indicate an unspecified valence for path p. The five paths (hypothesis q, r, s, t, and u) from the five time perspectives to social interaction anxiety have similar a priori expected valences as the paths from the time perspectives to social isolation, due to the fact that the Social Isolation Anxiety Scale and the Social Isolation Scale are conceptually similar constructs.

Although the five regression models that will be calculated to test the path configuration shown in Figure 1 will examine numerous relations among variables in the model, only the 21 labeled a priori paths are expected to emerge as statistically significant. When testing the model, if all pathways emanating from a particular construct are found to be non-significant, then that construct will be eliminated from the model. If additional (non-hypothesized) paths emerge as statistically significant when estimating the model, then they will be incorporated into the model as long as they are not theoretically unreasonable.

# CHAPTER II

# METHOD

## Sampling and Participants

A questionnaire was administered to 1,786 students enrolled in various introductory psychology courses at a large Midwestern university. Students were required to complete the questionnaire within the first two weeks of the semester in order to receive partial course credit. Participants were given the option to not respond to any question(s) they did not feel comfortable answering. For cross validation purposes, the sample was divided in half using the random case selection function in SPSS (IBM, 2018), to create what will hereafter be referred to as an initial dataset ($N$ = 890) and a validation dataset ($N$ = 890). The descriptive information provided immediately below applies exclusively to members of the initial sample. The majority of participants were college freshman (36.9%) and sophomores (34.7%). The age range of the sample was 18-42 years ($M$ = 19.50, $SD$ = 2.15), with almost twice as many females in the sample (62.9%) than males (37.1%). The majority of participants self-identified as being White (74.8%), with the remaining members of the group being 9.0% African American, 5.5%

Native American, 4.9% Hispanic[1], 2.0% Asian-American, and 3.7% other.

**Procedure**

The questionnaire took respondents an average of 24 minutes to complete (*SD* = 10.64). Participants were able to complete the online questionnaire at any location they chose (e.g., at home; on campus; elsewhere). Access to the internet was needed to participate in the investigation.

The process of collecting the data was done through the SONA Systems data management platform, which is the university's online research data collection system. When a participant logged into to the system, he or she was presented with an informed consent form (see Appendix A) and asked to click on an electronic "signature" button to provide their written consent. Once the individual electronically provided consent for the study, the participant was then able to move on to the first page of the online questionnaire (see Appendix B).

When students finished answering the entire set of items, they were shown a summary of their responses and asked whether they would like to make any changes. If no changes were deemed necessary, they were asked to click the "Submit" button at the bottom of the screen. Once an individual submitted the questionnaire, the answers he or she provided were unable to be changed.

**Scales and Measures**

The present study asked students a number of different questions taken from

[1] It is recognized that official organizations such as the U.S. Census Bureau that measure racial identity in categories (e.g., White, Black, Asian, Native American) make a distinction between those racial categories and ethnicity, which they define as either being Hispanic or non-Hispanic. In the present investigation, the Investigator was not involved in the construction of the portion of the questionnaire that assessed racial identity, and she acknowledges that the category "Hispanic" included as a race category is problematic.

existing scales and measures, each of which have been demonstrated to have sound psychometric properties. For the purposes of this study, the questionnaire contained six measures designed to tap the following constructs: (i) five different time perspective dimensions, (ii) social interaction anxiety, (iii) social isolation, (iv) depression, (v) worry, and (vi) binge drinking behaviors that had occurred during the past month. The response formats used for the various scales appeared in a variety of formats, including 5-point Likert-type scales, 4-point Likert-type scales, and drop-down menu response options. Participants began the questionnaire by answering a set of demographic questions, after which they were asked to respond to the various psychological and behavioral scales and measures. Each of the measures is described in detail, below.

**Excessive alcohol consumption.** The question the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2004) recommends using to screen for an alcohol use disorder is the one question used in this study to tap individuals' binge drinking behavior: "*How many times in the last month have you had 4 or more drinks on one occasion (for a female, or 5 or more for a male)*?" For statistical analysis purposes, due to a positively skewed distribution of scores on this measure, the 0-30 (times per month) response distribution was recoded into four levels: individuals who had not participated in binge drinking behavior whatsoever (i.e., 0 days), which was coded with a value of 0 (61.0% of the sample);individuals who participated in binge drinking on one occasion, which was coded with a value of 1 (17.3%); individuals who participated in binge drinking behavior two or three times during the past 30 days, which was coded with a value of 2 (11.2%); and individuals who reported binge drinking once a week or more (i.e., 4 or more times during the past 30 days), which was coded with a value of 3 (10.4%). Because this

question often has a skewed response pattern it is often recoded by researchers (e.g., McBride, Barret, Moore, & Schonfeld, 2014; Simons, Lantz, Klichine, & Ascolese, 2005; Strano, Cuomo, & Venable, 2004; Theunissen, Jansen, & Van Gestel, 2011; Tucker, Orlando, Ellickson, 2003; Wechsler & Nelson, 2001). In most cases, the variable is dichotomized into whether an individual does or does not routinely participate in binge drinking behavior. In this study, given the distribution of scores, the investigator found it more advantageous to separate the variable into 4 categories.

**Depression.** Depressive symptoms were assessed using a set of items drawn from the Patient Health Questionnaire-Short Form (PHQ-9), which was developed by Kroenke, Spitzer, and Williams (2001). The PHQ-9 is a self-administered version of the PRIME-MD diagnostic instrument (Spitzer, Kroenke, & Williams, 1999), which in previous work has effectively been used to detect mental disorders. Three of the items from the PHQ-9 were used to develop a short depression scale for participants, which will be referred to in this thesis as the PHQ-3. Only three of the items were employed in the present study due to the fact that this questionnaire was part of a larger data collection in which researchers had to limit the number of questions they asked each participant. Researchers have found that using only two items from the PHQ is sufficient to screen for depression severity (Arroll, et al., 2010; Kroenke, Spitzer, & Williams, 2003). An example of one of the three items used was: "*I have little interest or pleasure in doing things.*" Items for the PHQ-3 were scored using a 4-point Likert-type response format that ranged from 0 (*not at all*) to 3 (*nearly every day*). The PHQ-9 has been shown to have a single factor structure with an acceptable coefficient alpha value (Kroenke et al., 2001). Analyses in the present investigation revealed that the PHQ-3 had a Cronbach's alpha of .795 and a single factor

structure. The PHQ-3 depression score for each participant was recorded as the sum of the three items, with higher summed scores indicating a higher level of depression.

**Worry.** Respondent worry levels were assessed using the Revised Penn State Worry Questionnaire (PSWQ-A; Hopko, Reas, Beck, Stanley, Wetherell, Novy, & Averill, 2003). Originally a 16-item questionnaire developed by Meyer, Miller, Metzger, and Borkovec (1990), the revised version of the measure uses eight items that were found by Hopko et al. (2003) to be highly correlated with scores on the full-length PSWQ. An example of a question from this scale is: "*My worries overwhelm me*." Items are scored using a 5-point Likert-type response scale (1 = *not at all typical of me;* 5 = *very typical of me*). The scale has been demonstrated to have a single factor structure and an acceptable coefficient alpha value as reported by Hopko et al. (2003). In the present study, the scale was found to have a single factor structure and a Cronbach's alpha value of .952. The Revised Penn State Worry score for each participant is the sum of the eight items, with higher summed scores indicating a greater degree of worry.

**Social isolation.** The 6-item Friendship Scale is a self-administered measure of social isolation. It has been reported by Hawthorne (2006) to have sound psychometric properties, including reasonable item-rest-of-test correlations (IRTC) and internal consistency levels (i.e., Cronbach's alpha). Each item on the Friendship Scale is designed to assess a different dimension thought to be related to social isolation, including: (1) ease with which one relates to others; (2) the extent to which one feels isolated from others; (3) whether one has someone to share with; (4) whether it is easy to get in touch with others; (5) feeling separate from others; and (6) feeling alone and friendless. An example of a question on this scale is, "*I feel alone and friendless*." All questions for this

scale are answered using a 5-point Likert-type response format that ranges from 1 (*strongly disagree)* to 5 (*strongly agree*). Three of the six items on the Friendship Scale are reverse coded. In the present investigation, this scale demonstrated a single factor structure with a coefficient alpha value of .798. The social isolation score for each participant is the summed score for the six items, with higher scores indicating a greater degree of social isolation.

**Social interaction anxiety.** Anxiety about interacting with others was assessed using the 6-item Social Interaction Anxiety Scale−Short Form (SAIS-6; Peters, Sunderland, Andrews, Rapee, & Mattick, 2012). Derived from a measure originally created by Mattick and Clarke (1998), the Social Interaction Anxiety Scale was developed to measure the level of anxiety individuals typically experience during social interactions. The short form of this scale focuses on the core features of social interaction anxiety, which is considered to be a more generalized form of social phobia. A sample item from this scale is: "*I have difficulty making eye contact with others*." Responses are scored using a 5-point Likert-type response scale (0 = *not characteristic or true of me*; 4 = *extremely characteristic or true of me*). The scale has previously been demonstrated to have a unitary factor structure (Peters et al., 2012), and the 6-item SIAS-6 has been shown to be positively correlated with the original 19-item version of the measure (Mattick & Clarke, 1998; Peters et al., 2012). In the present investigation, the scale showed a single factor structure with a Cronbach's alpha of .820. The social interaction anxiety score for each participant is the sum of the six items, with higher scores indicating a greater degree of social interaction anxiety.

**Time perspective.** Time perspective was assessed using the 15-item Gupta et al. (2012) short form of the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999). The Gupta et al. scale is designed to measure the extent to which a person differentially focuses on the future, the past, or the present. Zimbardo and Boyd's original version of the questionnaire contained 56 different time perspective items, which were reduced to a shorter 15-item version of the inventory by Gupta et al. (2012). All 15 items on the scale are written in the form of a statement, and respondents' task is to indicate—using a 5-point Likert-type response format—the extent to which each statement accurately describes them (1 = *strongly disagree;* 5 = *strongly agree*). This scale is designed to independently tap each of the ZTPI's five dimensions of time perspective, including: past-positive, past-negative, present-hedonistic, present-fatalistic, and future-oriented. Thus, five different subscale scores were arrived at using the Gupta et al. measure, using three items to determine each time perspective dimension. A sample item from the measure is: "*I think about the bad things that have happened to me in the past*" (past-negative dimension). Individuals' scores for each of the five subscales are calculated as the mean of the three items for each dimension. Factor analytic work by Gupta et al. (2012) has shown that the scale has five independent factors that correspond to the five hypothesized dimensions. The internal consistency reliability for the scales used in this study are as follows: past-positive = .81, past-negative = .68, future-oriented = .71, present-fatalistic = .61, and present-hedonistic = .65. Higher scores on each subscale indicates a greater degree of orientation to time on that dimension.

**Infrequency scale.** In addition to the scales and measures related to the conceptual model tested in Figure 1, eight additional items were used to measure

students' level of attentiveness while taking the questionnaire. The Infrequency Scale, created by Lynam, Gaughan, Miller, Mullins-Sweatt, and Widiger (2011), is designed to identify individuals who respond to questionnaire items in an inattentive manner (as opposed to carefully reading each question and answering it conscientiously). A sample item is: *"I never speak to anyone during the day."* All "catch questions" are written in the form of a statement and respondents' task is to indicate—using a 5-point Likert-type response format—the extent to which each statement accurately describes them (1 = *disagree strongly;* 5 = *agree strongly*). Individuals who endorsed four or more of the eight items in such a way as to suggest inattention were excluded from the investigation. Of the original 1,850-member sample, 12 individuals were eliminated from the study on the basis of failing four or more of the attention check questions, resulting in a revised overall sample size of 1,838 persons.

**Demographic Variables.** A set of socio-demographic variables were also administered as part of this investigation. Race was assessed using six response options (1 = *White/Caucasian*; 2 = *Black/African-American*; 3 = *Hispanic/Latino*; 4 = *Asian/Asian-American*; 5 = *American Indian/Alaskan Native or First Nation*; 6 = *Other*); age was coded in years; gender was coded dichotomously (0 = *female*, 1 = *male*); and education was coded as one's year in undergraduate studies (1 = *freshman*; 2 = *sophomore*; 3 = *junior*; 4 = *senior*; 5 = *other*).

# CHAPTER III

# RESULTS

## Data Cleansing and Descriptive Analyses

All data entry took place automatically as part of the SONA Systems data management processes. As an initial step in the data analysis process, frequency distributions were generated and descriptive statistics were computed for each variable, scale, and measure. All variables were checked to ensure their distributional characteristics were reasonable, and to make sure that there were no outliers, unreasonable skew, or kurtosis that would violate the assumptions of parametric-level statistics. In addition to the 12 individuals who were removed from the initial dataset due to failing the validation check questions, 58 other individuals (3.1% of the sample) were eliminated from the participant pool because they answered the survey in fewer than 12.0 minutes. Individuals with minimal missing data were kept in the dataset and in those cases, mean scores were imputed as needed for individual items. The dataset had fewer than .05% of mean scores imputed.

The incidence of binge drinking was skewed across members of the sample, with most individuals (61.0%) reporting to have engaged in binge drinking zero times during the past 30 days. Individuals who participated in binge drinking one time during the past 30 days was 17.3% of the sample, and individuals who had participated two or three time

during the past 30 days made up 11.2% of the sample. Respondents who participated in binge drinking four or more times during the past month made up 10.4% of the sample. As mentioned in the method, the creation of a smaller number of categories of binge drinking was necessary due to the large number of individuals who did not partake in binge drinking during the past 30 days. The PHQ-3 measure of depression was also positively skewed, with most individuals (47.80%) scoring a zero on a scale that ranged from 0−9 points. The mean summed score for the scale was 1.41, with a standard deviation of 1.83. The RPSWQ measure of worry was found to have a relatively normal distribution with a mean summed score of 22.48 (*SD* = 9.13), based on a scale with a range of 8−40 points. Individuals had a mean social isolation score of 13.20, based on a scale with a range of 6−30 points. The social interaction anxiety mean score was 4.12 (*SD* = 4.01), based on a scale that ranged from 0−22 points. The two time perspective dimensions with the largest mean scores (based on a possible range of 0−4) were past-positive (*M* = 3.50) and future-orientation (*M* = 3.47), which were followed by present-hedonistic (*M* = 3.13) and past-negative (*M* = 2.95). The time perspective dimension with the smallest mean score was present-fatalistic (*M* = 2.42). Table 2 shows correlations, mean scores, and standard deviations for each of the constructs in the study.

**Inferential Analyses**

The overarching objective of the inferential analyses was to examine the extent to which the set of psychological predictors outlined in the introduction predict binge-drinking behavior among college students. A related goal was to examine the predictability of the other four endogenous constructs that appear in Figure 1. Toward this end, a multi-stage (i.e., layered) path analysis (Ahn, 2002; Streiner, 2005) was used

Table 2

*Pearson Correlation Matrix, Mean Scores, and Standard Deviations for Constructs Included in the Study*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Binge drinking | -- | | | | | | | | | |
| 2. Depression | .03 | -- | | | | | | | | |
| 3. Worry | -.05 | .45** | -- | | | | | | | |
| 4. Social isolation | -.05 | .49** | .33** | -- | | | | | | |
| 5. Social interaction anxiety | -.09** | .43** | .42** | .53** | -- | | | | | |
| 6. Past-positive | -.01 | -.29** | -.22** | -.45** | -.23** | -- | | | | |
| 7. Past-negative | .04 | .38** | .43** | .33** | .33** | -.27** | -- | | | |
| 8. Future-oriented | -.14** | -.21** | .02 | -.22** | -.06 | .18** | -.01 | -- | | |
| 9. Present-fatalistic | -.00 | .10** | .12** | .08* | .12** | .00 | .10** | -.06 | -- | |
| 10. Present-hedonistic | .21** | -.03 | -.12** | -.15** | -.14** | .21** | .09** | .02 | .10** | -- |
| Mean Score: | 0.71 | 1.41 | 22.48 | 13.20 | 4.12 | 3.50 | 2.95 | 3.47 | 2.42 | 3.13 |
| Standard Deviation: | 1.03 | 1.83 | 9.13 | 4.61 | 4.01 | 0.94 | 0.96 | 0.89 | 0.83 | 0.84 |

*Note:* *$p < .05$, **$p < .01$.

to test hypotheses for both adjacent predictors and predictors at different hierarchical levels in the model using SPSS version 25 (IBM, 2018). Computationally, this was achieved by calculating a separate hierarchical regression model for each of the five endogenous variables. In addition to reporting $R^2$ values for each criterion, standardized beta weights ($\beta$) are reported for each hypothesized path in the model, as well as their corresponding *p*-levels.

For the first hierarchical regression model, scores on binge drinking served as the criterion. Specifically, binge drinking was regressed on depression and worry scores (stage 1), social isolation (stage 2), social interaction anxiety (stage 3), and time perspective scores across the five different dimensions (stage 4). The second hierarchical model took a similar form, with depression scores (the criterion) regressed on social isolation (stage 1), social interaction anxiety (stage 2), and time perspective scores (stage 3). The third model used worry scores as the criterion, which was regressed on social isolation (stage 1), social interaction anxiety (stage 2), and time perspective scores (stage 3). In the fourth regression model social isolation was regressed on social interaction anxiety (stage 1) and time perspective (stage 2). And the final (flat) multiple regression model involved regressing social isolation anxiety on each of the five time perspective dimensions.

The observed path model is shown in Figure 2. To improve the overall clarity of the diagram while at the same time highlighting statistically meaningful relationships, paths with small standardized beta weights of less than .15 have been omitted from the figure (even if they were statistically significant). Despite these small parameters being

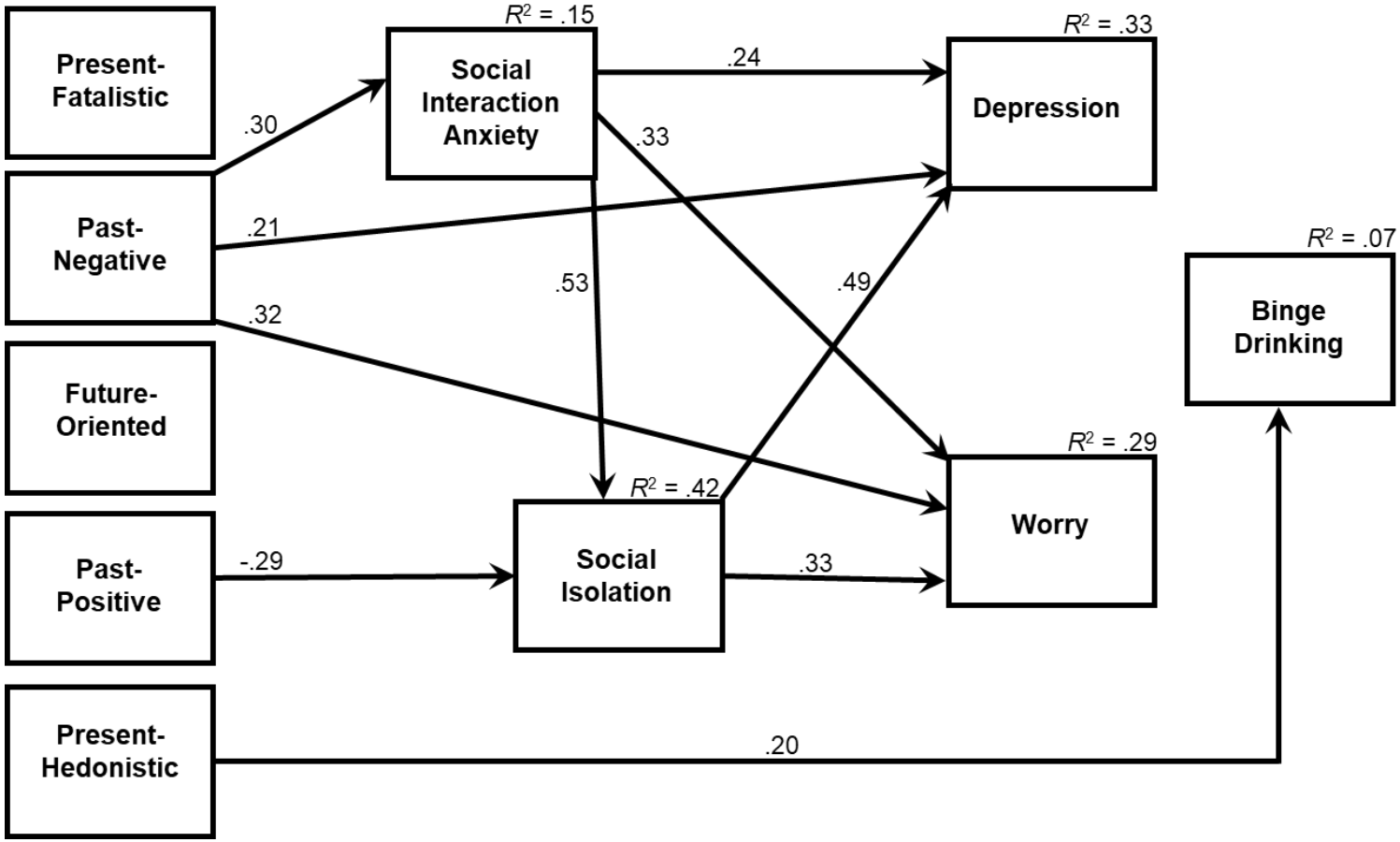


*Figure 2.* Observed model for psychological predictors of binge drinking. Paths of +/- 0.15 have been omitted from the figure in order to improve the overall clarity of the diagram.

omitted from the diagram, for completeness, *all* statistically significant effects are reported in text below, irrespective of their magnitude.

The overall hierarchical regression predicting binge drinking was found to be statistically significant, $F(9, 880) = 8.47$, $p < .01$, $R^2 = .07$. The observed effects ran contrary to expectations, with neither worry nor depression being found to be related to binge drinking. Only 7 percent of the overall variance was explained in binge drinking behavior. Hypotheses a and d failed to receive support, but hypotheses b and c were confirmed, with binge drinking shown to be negatively related to worry scores ($ß = -.09$) and positively related to present-hedonistic ($ß = .20$). That is, the more individuals worried, the less likely they were to binge drink. Furthermore, the greater one's present-hedonistic score, the more likely the individual was to binge drink. Two other non-hypothesized paths were found to emerge: binge drinking and having a strong future-orientation ($ß = -.14$), and binge drinking and feeling socially isolated ($ß = -.08$). These two effects suggest that individuals who are more likely to think about the future are less likely to binge drink, and those who are more socially isolated are less likely to binge drink.

The second hierarchical regression—in which depression scores served as the criterion—also revealed a significant overall effect, $F(7, 882) = 64.48$, $p < .01$, $R^2 = .33$. This *r*-squared value reflects the fact that fully one-third of the variation in depression scores was captured. The present-fatalistic orientation was hypothesized to predict depression (hypothesis f), however it did not emerge as statistically significant. In support of hypothesis h, social isolation scores were strongly positively related to depression ($ß = .49$), with more socially isolated individuals being found to be more depressed. Social

interaction anxiety was also predictive of depression (hypothesis e; ß = .24), as was having a past-negative orientation to time (hypothesis g; ß = .21). That is, the more social interaction anxiety an individual has, the more likely they are to binge drink, and individuals with large past-negative scores are also more likely to binge drink. The only non-hypothesized significant predictor of depression to emerge was having a future-orientation time perspective (ß = -.13). That is, those who were more future oriented tended to have smaller scores on the measure of depression.

The third hierarchical regression model—in which worry scores served as the criterion—also revealed a significant overall effect, $F(7, 882) = 51.59$, $p < .01$, $R^2 = .29$. An appreciable amount of variance was also captured for worry scores, with 29% of the variability explained in the construct. In support of hypotheses i and j, social isolation scores and present-fatalistic orientations to time were positively related to worry (ß = .33 and ß = .06, respectively). In other words, the more socially isolated one is, the more likely that individual is to worry. Similarly, the larger an individual's score on the present-fatalistic dimension, the more likely he or she is to worry. Four paths emerged in the prediction of worry that were not originally hypothesized, including paths emanating from social interaction anxiety (ß = .33), past-negative time perspective (ß = .32), future-oriented time perspective (ß = .06), and present-hedonistic time perspective (ß = -.10). In other words, individuals with more in the way of social interaction anxiety are more likely to worry, those with larger scores on the past-negative and future-oriented dimensions are more likely to worry, and individuals with larger scores on the present-hedonistic time perspective dimension were less likely to worry.

The fourth hierarchical regression model—in which social isolation served as the criterion—also revealed a significant overall effect, $F(6, 883) = 105.99$, $p < .01$, $R^2 = .42$. Inspection of path parameters revealed that social isolation scores were significantly linked to social interaction anxiety (hypothesis k; ß = .53), past-positive time perspective scores (hypothesis o; ß = -.29), past-negative scores (hypothesis m; ß = .12), and scores on the future-orientation dimension (hypothesis n; ß = -.14). Relationships between social isolation scores and the present-fatalistic (hypothesis l) and present-hedonistic orientations (hypothesis p) did not emerge as statistically significant.

The flat regression model in which social interaction anxiety served as the criterion also revealed a significant overall effect, $F(5, 884) = 33.30$, $p < .01$, $R^2 = .15$. Collectively, the five time perspective orientations did not account for much of the variation in social interaction anxiety scores, capturing only 15% of the variability for this criterion. The past-positive, past-negative, future-oriented, present-fatalistic, and present-hedonistic time perspectives were hypothesized to be the sole predictors of social interaction anxiety, with the expectation that the present-fatalistic and past-negative dimensions would be positivity related to social interaction anxiety, and the future-orientation and past-positive dimensions would be negatively related to anxiety. No a priori hypothesis was made with regard to the relationship between present-hedonistic and social interaction anxiety. As predicted, past-negative and present-fatalistic dimensions were positively related to social interaction anxiety scores (hypotheses r and q, with beta weights of .30 and .11, respectively). Furthermore, social interaction anxiety scores were found to be negatively related to the past-positive and present-hedonistic dimensions (hypotheses t and u, with beta weights of -.11 and -.15, respectively). Finally,

contrary to expectations, the future-oriented time perspective dimension (hypothesis s) did not emerge as a significant negative predictor of social interaction anxiety.

**Cross-validation Analysis**

As indicated in the method section, a holdout sample was created after collecting the data in order to have the opportunity to cross-validate the model developed using the initial dataset. As a preliminary step in this process, four *t*-tests were computed to determine whether the validation sample and initial sample differed in terms of gender, age, class standing, and parental income. None of the four demographic variables were found to show statistically significant differences across samples, which set the stage to compare the final observed model (shown in Figure 2) against a comparable model constructed using data from members of the validation sample. If no appreciable differences are observed across path parameters for the two models, then it increases confidence in the reliability of the initial findings. This comparison was done by subtracting the set of cross-validated standardized beta weights from the set of initial beta weights. This difference was taken for each hypothesized parallel path (i.e., 21 paths in all) as well as for parallel paths that were not originally hypothesized but emerged as statistically significant in the evaluation of the model for the initial sample (i.e., 9 additional paths).

The results of the cross-validation analysis are shown in Table 3. This table shows path parameters for all hypothesized and non-hypothesized significant paths, r-squared values for endogenous variables, difference scores between the initial and validation samples, and a four-level characterization of the magnitude of the difference between samples (i.e., none, small, moderate, or large difference). Comparisons between samples

that resulted in a difference in beta weight values of .035 or less were not considered to be meaningfully different from one another. Standardized beta weight differences of .036–.084 were considered small. And standardized beta weight difference of .085–.13 were considered moderate. A large difference was considered to be a beta weight difference of .13 or more. The same nominal magnitude difference characterizations (none, small, moderate, large) were used for *r*-squared values for each of the five endogenous variables across the two models.

Overall, 35 comparisons were computed as part of the cross validation analysis. The majority of comparisons revealed essentially no difference in magnitude across models (19 instances), some 13 comparisons revealed a small difference, and 3 comparisons revealed a moderate difference. No differences of a large magnitude were observed across models either for path parameters or *r*-squared values. In sum, the test of cross validation demonstrated very few differences across models, and those that emerged were found to be quite small, which serves to increase confidence in the reliability of findings from the initial model shown in Figure 2.

Table 3

*Test of Cross Validation Examining Beta Weight and $R^2$ Comparisons*

| Path | Hypothesis | Initial Study Beta Weight | Validation Study Beta Weight | Difference Value | Difference Magnitude |
|---|---|---|---|---|---|
| Depression→Binge Drinking | a | .071 | .086* | .015 | none |
| Worry→Binge Drinking | b | -.086* | -.036 | .05 | small |
| Present-Hedonistic→Binge Drinking | c | .204** | .210** | .006 | none |
| Past-Negative→Binge Drinking | d | .050 | .074 | .024 | none |
| Social Isolation→Binge Drinking | N/A | -.079* | -.082* | .003 | none |
| Social Inter Anxiety→Binge Drinking | N/A | -.096* | -.115** | .019 | none |
| Future-Oriented→Binge Drinking | N/A | -.141** | -.105** | .036 | small |
| Social Interaction Anxiety→Depression | e | .244** | .233** | .011 | none |
| Present-Fatalistic→Depression | f | .022 | .030 | .008 | none |
| Past-Negative→Depression | g | .205** | .233** | .028 | none |
| Social Isolation→Depression | h | .488** | .522** | .034 | none |
| Future-Oriented→Depression | N/A | -.125** | -.021 | .099 | moderate |
| Social Isolation→Worry | i | .333** | .365** | .032 | none |
| Present-Fatalistic→Worry | j | .060* | .045 | .015 | none |
| Social Interaction Anxiety→Worry | N/A | .333** | .264** | .069 | small |
| Past-Negative→Worry | N/A | .316** | .266** | .05 | small |
| Future-Oriented→Worry | N/A | .062* | .134** | .072 | small |
| Present-Hedonistic→Worry | N/A | -.101** | -.107** | .006 | none |
| Past-Positive→Worry | N/A | -.028 | -.081* | .053 | small |

| | | | | | |
|---|---|---|---|---|---|
| Social Inter Anxiety→Social Isolation | k | .528** | .554** | .026 | none |
| Present-Fatalistic→Social Isolation | l | .018 | .016 | .002 | none |
| Past-Negative→Social Isolation | m | .115** | .166** | .051 | small |
| Future-Oriented→Social Isolation | n | -.137** | -.048 | .089 | moderate |
| Past-Positive→Social Isolation | o | -.286** | -.284** | .002 | none |
| Present-Hedonistic→Social Isolation | p | -.046 | -.127** | .081 | small |
| Present-Fatalistic→Social Inter Anxiety | q | .106** | .061* | .045 | small |
| Past-Negative→Social Interaction Anxiety | r | .298** | .276** | .022 | none |
| Future-Oriented→Social Inter Anxiety | s | -.026 | .014 | .040 | small |
| Past-Positive→Social Interaction Anxiety | t | -.113** | -.191** | .078 | small |
| Present-Hedonistic→Social Inter Anxiety | u | -.152** | -.184** | .032 | none |

| $R^2$ Values | Initial Study | Validation Study | Difference Value | Difference Magnitude |
|---|---|---|---|---|
| Binge Drinking | .070 | .073 | .003 | none |
| Depression | .333 | .371 | .038 | small |
| Worry | .285 | .263 | .022 | none |
| Social Isolation | .415 | .450 | .035 | none |
| Social Interaction Anxiety | .154 | .193 | .039 | small |

*Note.* *$p < .05$, **$p < .01$. Paths marked as not applicable (N/A) were paths that were not originally hypothesized.

# CHAPTER IV

## DISCUSSION

The purpose of this investigation was to examine the psychological antecedents of binge drinking in a college population. Toward that end, 21 hypotheses were tested in the context of a hierarchical path model, and it was found that majority of the predictions were supported. Despite the fact that participants from this sample were college students, many of the relationships that were found were consistent with the literature based on middle-aged adults. Although many of the relationships were significant, they were not always of a magnitude that would allow one to reach a conclusion that they were statistically meaningful. Many non-hypothesized paths were also observed, which will be a contribution to the literature on binge drinking.

Findings revealed that the number of students who reported participating in binge drinking behavior was lower than expected for a college student sample, with more than half of respondents reporting that they had not participated in *any* drinking of this type during the past month. This is in contrast to data from the 2011 National Survey on Drug Use and Health (NSDUH), which found that 60.8 percent of college students aged 18-22 reported alcohol use within the past 30 days. Only about 10 percent of respondents in the present sample had claimed to have participated in heavy binge drinking behavior (i.e.,

between four and thirty times) during the past month, which can be interpreted as risky drinking about once or more each week. The data from this study also stand in contrast to the 2011 NSDUH survey cited above, which reported 39.1 percent of students engaged in binge drinking behavior during the past 30 days. Perhaps this difference is due to the fact that in the present investigation, the college campus where data were sampled was located in a rural town in the Midwest, where arguably less drinking goes on compared to urban campuses. Another possible explanation for why the incidence rate of binge drinking was so low in this study, could be due to the fact that the data collected were drawn primarily from freshman during their first month of college. In other words, respondents may not have had time to become fully socialized into the college drinking "scene."

Other variables beyond binge drinking also demonstrated a skewed response pattern. Specifically, 48.2 percent of the individuals in the study scored a zero on the depression inventory (PHQ-3); that is, they reported having no depressive symptoms. Those who had depression scores that indicated minimal depressive severity made up 40.1 percent of the sample, and the remaining 11.7 percent of respondents were found to have mild to severe levels of depressive symptoms. Worry scores (RPSWQ) were found to have a more normal distribution, which suggests that more students struggle with worry issues than symptoms of depression, at least in the present sample.

**Prediction of Binge Drinking**

Beyond examining incidence rates of binge drinking, one of the primary goals of this investigation was to test a psychological model of the factors that underlie the tendency to binge drink. In terms of the observed path model, binge drinking was poorly

predicted on the basis of the set of psychological antecedents. This was surprising in light of the fact that previous research has shown that binge drinking has effectively been predicted on the basis of one's level of depression (Rodgers, et al., 2000), worry (Ciesla, et al., 2011), and at least two different time perspective dimensions (Chavarria, et al., 2015; Henson, et al., 2006). In this investigation, beta weights for the antecedents of binge drinking were found to be quite small. Collectively, the predictor variables in the initial dataset accounted for an unimpressive 7 percent of the variance in the criterion.

Depression was expected to be positively related to binge drinking (hypothesis a). However, this hypothesis was not supported. One reason this might have been the case, was that much of the sample was under the legal drinking age of 21 years old, making it harder for those individuals to obtain alcohol on their own (i.e., without older friends, or a fake ID). So, although those individuals may have been depressed and therefore wanting to drink, alcohol may not have been available to them. Another possible explanation for the reason hypothesis a failed to emerge, is that the baseline number of individuals who were depressed in this study was small relative to incidence rates in larger, national epidemiological studies. Therefore, there may not have been sufficient statistical power to find an effect of depression on drinking practices.

Worry was also expected to be related to binge drinking, however, showing a negative valance (hypothesis b). Although this effect was supported in the initial dataset, the effect was quite small and of minimal impact. One reason worry might not have been related to binge drinking is that individuals who worry in college may be more likely to participate in binge drinking in order to fit in with their peers on campus. Although worrying previously has been previously linked to binge drinking as a protective factor, it

may be that on a college campus, fitting in is more important than avoiding drinking in order to decrease worry levels. Another possible explanation for why hypothesis b failed to emerge is because the individuals in the sample are still relatively young, in a transitional stage with potentially fewer responsibilities that are not typical of adult responsibilities. This may mean that their worries are not as severe as adults in a nationally representative sample.

Stepping back one layer deeper into the model, neither social isolation nor social interaction anxiety were hypothesized to be related to binge drinking. Although studies have found that individuals with high levels of social anxiety were more likely to binge drink than those who were not socially anxious (Gilles, Turk, & Fresco, 2006), a path to that effect was not originally hypothesized when the conceptual model was initially drafted. Both constructs, as it turned out, were significantly negatively linked to alcohol abuse. However, in both instances, the beta weights—although significant—were quite small.

Time perspective has previously been shown to be linked to binge drinking (Chavarria, et al., 2015; Henson, et al., 2006). To date, however, only the present-hedonistic and past-negative dimensions have been examined in relation to excessive alcohol use. That being the case, the relationship between all five time perspective domains and binge drinking was a gap in the literature this study was designed to address. The model shown in Figure 2 was novel in that it examined each of the time-based dimensions, as well as the extent to which they were related to excessive alcohol use. By looking across all five time perspective dimensions, it was found that two were predictive of binge drinking behavior. As pointed out in the introduction, certain time perspective

dimensions (i.e., past-negative and present-hedonistic, hypothesis c and d) were expected to be positively related to binge drinking. However, only hypothesis c was supported; the past-negative orientation was not found to be related to alcohol abuse. Surprisingly, having a future-orientation was found to be negatively related to drinking to excess—which was an unexpected result. In other words, having a strong future-orientation appears to serve as a protective factor against binge drinking. Perhaps this is the case because individuals who have a clear view of the future can foresee the negative impact excessive drinking might have on one's health, social relationships, and productivity (both professional and personal).

**Prediction of the Clinical Conditions of Depression and Worry**

In testing the conceptual model, it also was hoped to determine the extent to which the clinical conditions of depression and worry are affected by feelings of social isolation, social interaction anxiety, and time perspective. With respect to the former clinical condition, fully 33 percent of the variability in depression scores was captured on the basis of antecedent predictors. Empirically, social isolation scores were found to be good predictors of depression, with socially isolated individuals more likely to be depressed than those who were not. This effect provides support for hypothesis h. This positive link is consistent with findings from the work of Matthews et al. (2016) and Yadegarfard et al. (2013). Indeed, it makes a great deal of sense that to the extent one feels isolated from others, depression might be increasingly likely to ensue. Social interaction anxiety was also hypothesized to predict depression—path e—which is a finding that was supported. That is, socially anxious individuals were more likely to be depressed, a finding that is consistent with the work of Ohayon and Schatzberg (2010).

Not inconsistent with the way in which social isolation affects depression, the negative psychological state of brought about by having social interaction anxiety also leads individuals to be increasingly depressed. One interpretation of this effect is that socially anxious individuals presumably understand that they can expect to have either limited or unsatisfying interactions with others, therefore, conceivably leading the individual to become depressed.

Next, attention is turned to the impact of time perspective on depression. Two dimensions—past-negative and present-fatalistic—were hypothesized to be positively related to depression scores. Having a past-negative orientation was found to be linked to depression—hypothesis g—which is consistent with the findings of Anagnostopolos and Griva (2012). Gupta et al. (2012), explained this effect as stemming from past-negative individuals dwelling on negative events from the past, which then color their present perceptions of life. The author concurs with this interpretation. The link between the present-fatalistic orientation and depression (hypothesis f), which was based on the previous findings of Anagnostopolos and Griva (2012), failed to emerge. In fact, the beta weights for path f in both the initial and the validation studies were abysmally small. That said, however, the magnitude of the correlation between the present-fatalistic time perspective and depression in the Anagnostopolos and Griva study was relatively small at $r = .26$, which makes the lack of support for hypothesis f not completely unexpected. One non-hypothesized effect identified in this investigation was a negative link between future-orientation and depression (in the initial study), which indicated that individuals who focus more about the future tend to be less depressed. That is, it could be that the types of planning required to achieve future-oriented goals may serve as a protective (i.e.,

preventative) factor when it comes to the development and/or ongoing maintenance of depression. In the following paragraphs, attention is turned from the prediction of depression in the path model, to the prediction of worry.

The set of regression analyses designed to predict worry scores revealed that 29 percent of the variability was accounted for in the construct. Social isolation scores were found to be good predictors of worry, thereby providing support for hypothesis i. This positive effect between the two constructs is consistent with findings from the work of Holt-Lunstad et al. (2010). This effect is not particularly surprising, given that in cases in which an individual feels socially isolated, he or she may worry about living an unfulfilled life alone. Furthermore, social interaction anxiety was not hypothesized to predict worry, but it was a path that emerged with a positive valence in the model. In retrospect, it should not be particularly surprising that anxiety surrounding social interactions manifests itself as worry, because interactions with others is a normal and necessary part of everyday life. This path was originally not included the model because no literature had been found to suggest that scores on the Peters et al. (2012) Social Interaction Anxiety Scale were capable of predicting worry. Although studies have found that social anxiety scores are highly correlated with having symptoms of worry (Bruce et al., 2005; Tahmassian & Moghadam, 2011), in the absence of data suggesting the Peters et al. scale would be predictive of worry, that path was not hypothesized.

Each of the five time perspective dimensions were found to be predictive of worry, either in the path model for the initial sample, or in the cross-validation model. This was truly an unexpected finding, as only the present-fatalistic time perspective had been hypothesized to predict worry (cf., Zimbardo & Boyd, 1999; hypothesis j). And

although the other four time perspective dimensions were shown to be linked to worry scores, only the past-negative dimension had a beta weight that carried an appreciable magnitude. Why this effect emerged is unclear. Perhaps future investigations could further explore the dynamics between the various time perspective dimensions and worry. In the following paragraphs, attention will be turned to prediction of social isolation and social interaction anxiety.

**Prediction of the Two Social Constructs**

The path model also accounted for much of the variability in social isolation—42 percent, in fact—on the basis of prediction from the social interaction anxiety scores and the time perspective dimensions. It is worth noting that prior to this study, none of the time perspective dimensions had been examined in relation to social isolation. As hypothesized (cf., Olfson, et al., 2000), social interaction anxiety scores were positively linked to social isolation, which makes sense, because individuals with high levels of social interaction anxiety would be likely to isolate themselves from others in order to avoid feeling anxious. Furthermore, across the two path models tested, four of the time perspective dimensions (past-negative, future-orientation, past-positive, and present-hedonistic) were shown to be significant predictors of social isolation. The only time perspective dimension that was positively related to social isolation was the past-negative orientation; the other three dimensions were found to have a negative valance. This suggests that being future oriented, or having a past-positive or present-hedonistic orientation may be a protective factor when it comes to the likelihood of becoming socially isolated. A possible explanation for why being present-hedonistic may be a protective factor of social isolation is those individuals tend to focus on enjoyment and

excitement in the present. To the extent that present hedonists are looking for excitement, they probably will not find it if they are isolating themselves. Individuals who are past-positive and future-oriented tend to have a positive view of the past and have a healthy outlook on the future. Those individuals are more likely to make future goals, so it makes sense that they would not isolate themselves because they are working toward a positive goal, and isolating oneself is not a positive route to successfully accomplishing goals.

One of the major gaps in the literature this study was designed to address involved examining the relationship between the time perspective dimensions and social interaction anxiety. In short, this construct was not particularly well predicted by the time perspective dimensions. In fact, only 15 percent of the variability was accounted for in the criterion. Interestingly, despite the relatively poor prediction in social interaction anxiety, four of the five time perspective dimensions emerged as statistically significant predictors; future-orientation was the only non-significant path. This finding is indeed a novel contribution to the literature, inasmuch as the (1999) Zimbardo and Boyd dimensions have not been examined in relation to social interaction anxiety. Perhaps this is a finding that could potentially stimulate future clinically-oriented research.

**Theoretical and Applied Implications**

A number of different theoretical frameworks were used to position the present investigation within the existing literature. Effects for the majority of binge-drinking theories presented in the introduction did not emerge as expected in the present study. The hypothesized model was largely developed on the basis of three previous studies. The first study—by Eshbaugh (2008)—pointed out that depression is positively related to binge drinking. However, in the sample of college students from the present study, that

was not the case. One potential explanation for this non-significant finding is that this investigation used a college sample that is not representative of members of the general population. This suggests that from a theoretical perspective, the body of research on binge drinking needs to be expanded to take into account a broader range of participant subgroups.

A second study, by Steward and Devine (2000) found that college students who drank as a mechanism to cope with life stressors tended to also have higher levels of depression. Despite previous findings that suggest a relationship between depression and binge drinking, the present study did not find a relationship between the two constructs. One explanation for why these findings could be different from the findings of Stewart and Devine is that the sample from their study had a mean age of 21.3, whereas the present study's sample had a mean age of 19.5. It is possible that in the present study, alcohol was not as accessible to participants, making it more difficult for them to binge drink.

The third study on which this investigation was based, carried out by Ciesla and colleagues (2011), found that worry was a good predictor of binge-drinking behavior, which was an effect that was not supported in this study. A possible explanation for why this effect was not found is that college students may have different worries than members of the general population, and those worries may not provoke binge drinking behavior. These are complicated findings for researchers to unpack, because the psychological mechanisms and clinical conditions used to predict binge-drinking behavior in the general population are not necessarily the same constellation of variables that are effective in predicting binge-drinking behavior among members of a college

student population. These findings should provide insights for researchers who carry out investigations designed to identify the predictive constructs that underlie binge-drinking.

Next, the path model aimed to explain whether social isolation and social interaction anxiety were good predictors of depression and worry. In accordance with previous research (Dawes et al., 2015; Matthews, et al., 2016; Yadegarfard, et al., 2013), in the present investigation social isolation was found to be a good predictor of depression and worry. Similar to previous research, the results of this study showed that individuals who were more socially isolated also tended to be more depressed, and more likely to worry. Results from the present study, in combination with prior work (Grant, et al., 2014; Ohayon & Schatzberg, 2010; Stein, et al., 2001), also supported the notion that social interaction anxiety was a good predictor of both depression and worry, in that the more social interaction anxiety an individual has, they more likely he or she is to be depressed or to worry.

Next, the predictors of social isolation will be discussed, which include the social interaction anxiety variable and the five time perspective dimensions. Social interaction anxiety has been found in previous research to be a good predictor of social isolation (e.g., Olfson, et al., 2000). It is no surprise then that these two variables were found to be linked in the present study. The more social interaction anxiety an individual has, the more likely he or she will be to self-isolate. Although this relationship had been previously established, the effect of time perspective on social isolation has been entirely neglected in the literature. Knowing that certain time perspectives put individuals at risk for social isolation and other time perspectives serve as protective factors against becoming socially isolated is an important finding.

From an applied perspective, it is important to note that meaningful links between two of the time perspectives (present-hedonistic and future-orientated) and binge drinking were observed. This suggests that these two dimensions could perhaps be used as screening measures designed to predict the types of individuals who might be likely to abuse alcohol. Another important factor when looking at binge drinking involved the negative relationship between social isolation and social anxiety. This link could be helpful as knowing the protective power those two social constructs serve to make individuals less likely to binge drink. If researchers could find the social basis binge drinking has on college students, there may be a better chance at limiting this form of drinking behavior.

Also from an applied perspective, certain time perspective dimensions were shown to be linked to social isolation. This knowledge may make it possible to help individuals with past-negative, future-oriented, past-positive, and present-hedonistic orientations from potentially becoming isolated. This could be accomplished by teaching individuals with these orientations interpersonal skills. Such training could also ultimately limit individuals' likelihood of experiencing depressive symptoms or worry. Moreover, it may be helpful to try to change an individual's dominant time perspective, particularly if that orientation to time puts them at risk for social isolation or alcohol abuse. But unfortunately, as a personality trait, time perspective has been shown to be relatively stable over time (Zimbardo & Boyd, 1999) and difficult to modify. This is why teaching an individual social skills and coping mechanisms are perhaps the most promising intervention approaches. Findings from this investigation should help

researchers better understand which are the malleable precursors of binge drinking, and which are not.

**Limitations and Future Directions**

As with all empirical research, this study is not without its limitations. One limitation of the project involved the possibility of a response bias when it came to individuals honestly characterizing the frequency of their binge drinking behaviors. That is, when asking college students about their alcohol use, biases stemming from the sensitivity of the topic could have represented a threat to internal validity (Brener, Billy, & Grady, 2003). An underreporting bias may have emerged to the extent respondents were not completely honest and forthright about their drinking practices. It is possible that some students who participated in this survey were worried that their responses would be seen by either their professors or peers.

A second limitation inherent in the study involved the fact that students were not required to answer every item on the questionnaire. That is, participants were able to "opt out" of any questions they did not feel comfortable answering. That raises the possibility of a potential item response bias; that is, some responses may have been left blank in a non-random fashion. The most likely questions to be omitted on the basis of such a bias would have been those that were particularly sensitive, such as those that involved excessive alcohol use, mental health conditions, or feelings of social isolation—all questions that were central to the goals of the current investigation.

A third limitation involved the diversity of the participant pool, which was fairly homogeneous in terms of respondents' age and stage of their college career. This lack of diversity could call into question the representativeness of the sample relative to college

students in general. Obtaining a more age-representative sample of respondents would have been difficult, however, given the demographic profile or the individuals who use the SONA database. Thus, we see the value in conducting future investigations that seek to establish a broader base in terms of the full range of students who attend college.

In terms of other future directions, it could be beneficial to explore other predictor variables, such as the role peer pressure plays in encouraging binge drinking practices. Another factor that could have an impact on the likelihood of binge drinking is a familial history of alcohol abuse. This is a particularly promising research direction in light of previous studies that have shown that alcohol use runs in families (American Psychiatric Association, 2013; Dager et al., 2013; Kushner & Sher, 1993). Another potentially profitable future direction would involve conducting a multi-cohort investigation that includes a wider range of ages and life stages (including college students as one of the groups). Such a study could help to determine why the predictors in the present investigation were largely found to be ineffective, given that the very same predictors were shown to be robust in studies involving non-students.

**Conclusion**

The present study offers a number of important insights with regard to the relationships among variables tested in the path model. Unfortunately, the psychological constructs used in this study to explain binge drinking turned out to be insufficient. This may have been the case because college students may have different reasons for binge drinking than members of the general population, and the hypothesis set for this investigation was based on findings from non-college student samples. Alternatively, the results from this study might not have replicated findings from the general population,

because students may be unwilling to honestly report their binge drinking or mental health status, undermining the internal validity of these constructs. Whatever the reason, the findings from the present study suggest that researchers need to look elsewhere for the reasons behind why college students choose to binge drink.

REFERENCES

Ahn, J. (2002). Beyond single equation regression analysis: Path analysis and multi-stage regression analysis. *American Journal of Pharmaceutical Education, 66*(1), 37-42.

Aldworth, J. (2009). *Results from the 2007 national survey on drug use and health: National findings.* Rockville, MD:DIANE Publishing.

American Psychiatric Association. (2013).*Diagnostic and Statistical Manual of Mental Disorders* (5thed.). Arlington, VA: American Psychiatric Publishing.

Anagnostopoulos, F., & Griva, F. (2012). Exploring time perspective in Greek young adults: Validation of the Zimbardo Time Perspective Inventory and relationships with mental health indicators. *Social Indicators Research, 106*(1), 41-59.doi: 10.1007/s11205-011-9792-y

Arroll, B., Goodyear-Smith, F., Crengle, S., Gunn, J., Kerse, N., Fishman, T…(2010). Validation of PHQ-2 and PHQ-9 to screen for major depression in the primary care population. *Annals of Family Medicine, 8*(4), 348-353. doi:10.1370/afm.1139

Borsari, B. E., & Carey, K. B. (1999). Understanding fraternity drinking: Five recurring themes in the literature, 1980–1998. *Journal of American College Health, 48*(1), 30-37. doi:10.1080/07448489909595669

Brener, N. D., Billy, J. O., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health*, *33*(6), 436-457. doi:10.1016/S1054-139X(03)00052-1

Brown, E. J., Turovsky, J., Heimberg, R. G., Juster, H. R., Brown, T. A., & Barlow, D. H. (1997). Validation of the Social Interaction Anxiety Scale and the Social Phobia Scale across the anxiety disorders. *Psychological Assessment*, *9*(1), 21-27. doi:10.1037/1040-3590.9.1.21

Bruce, S. E., Yonkers, K. A., Otto, M. W., Eisen, J. L., Weisberg, R. B., Pagano, M… (2005). Influence of psychiatric comorbidity on recovery and recurrence in generalized anxiety disorder, social phobia and panic disorder: A 12-year prospective study. *The American Journal of Psychiatry*, *162*(6), 1179-1187.

Ciesla, J. A., Dickson, K. S., Anderson, N. L., & Neal, D. J. (2011). Negative repetitive thought and college drinking: Angry rumination, depressive rumination, co-rumination, and worry. *Cognitive Therapy and Research*, *35*(2), 142-150. doi:10.1007/s10608-011-9355-1

Chavarria, J., Allan, N. P., Moltisanti, A., & Taylor, J. (2015). The effects of present hedonistic time perspective and past negative time perspective on substance use consequences. *Drug and Alcohol Dependence*, *152*, 39-46. http://dx.doi.org/10.1016/j.drugalcdep.2015.04.027

Dager, A. D., Anderson, B. M., Stevens, M. C., Pulido, C., Rosen, R., Jiantonio, K. R. E., … Pearlson, G. D. (2013). Influence of alcohol use and family history of alcoholism on neural response to alcohol cues in college drinkers. *Alcoholism: Clinical and Experimental Research*, *37*(1), 161–171. https://doi.org/10.1111/j.1530-0277.2012.01879.x

Dawes, P., Emsley, R., Cruickshanks, K. J., Moore, D. R., Fortnum, H., …Munro, K. J. (2015). Hearing loss and cognition: The role of hearing aids, social isolation and depression. *PloS ONE*, *10*(3), 1-9. doi:10.1371/journal.pone.0119616

Earl, J. K., Bednall, T. C., & Muratore, A. M. (2015). Matter of time: Why some people plan for retirement and others do not. *Work, Aging, and Retirement*, *1*(2), 181-189. doi:10.1093/workar/wau005

Eshbaugh, E. M. (2008). Factors that predict self-perceived problem drinking among college students. *Journal of Alcohol & Drug Education*, *52*(3), 72-88.

Gilles, D. M., Turk, C. L., & Fresco, D. M. (2006). Social anxiety, alcohol expectancies, and self-efficacy as predictors of heavy drinking in college students. *Addictive Behaviors 31*(3), 388-398. https://doi.org/10.1016/j.addbeh.2005.05.020

Grant, D. M., Judah, M. R., Mills, A. C., Lechner, W. V., Davidson, C. L., & Wingate, L. R. (2014). Rumination and excessive reassurance seeking: Mediators of the relationship between social anxiety and depression? *Journal of Psychopathology and Behavioral Assessment*, *36*(3), 465-474. doi:10.1007/s10862-013-9399-5

Greenfield, S. F., Weiss, R. D., Muenz, L. R., Vagge, L. M., Kelly, J. F., Bello, L. R., & Michael, J. (1998). The effect of depression on return to drinking: A prospective study. *Archives of General Psychiatry, 55*(3), 259-265. doi:10.1001/archpsyc .55.3.259

Gupta, R., Hershey, D. A., & Gaur, J. (2012). Time perspective and procrastination in the workplace: An empirical investigation. *Current Psychology, 31*(2), 195-211. doi:10.1007/s12144-012-9136-3

Hawthorne, G. (2006). Measuring social isolation in older adults: Development and initial validation of the Friendship Scale. *Social Indicators Research, 77*(3), 521-548. doi:10.1007/s11205-005-7746-y

Hazlett-Stevens, H., Ullman, J. B., & Craske, M. G. (2004). Factor structure of the Penn State Worry Questionnaire: Examination of a method factor. *Assessment, 11*(4), 361-370. doi:10.1177/1073191104269872

Henson, J. M., Carey, M. P., Carey, K. B., & Maisto, S. A. (2006). Associations among health behaviors and time perspective in young adults: Model testing with boot-strapping replication. *Journal of Behavioral Medicine, 29*(2), 127-137. doi:10.1007/s10865-005-9027-2

Hingson, R. W. (2010). Magnitude and prevention of college drinking and related problems. *Alcohol Research & Health*, *33*(1-2), 45-54.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Annual Review of Public Health, 26*: 259–279. doi:10.1146/ annurev.publhealth.26.021304.144652

Hingson, R. W., Zha, W., & Weitzman, E. R. (2009). Magnitude of and trends in alcohol-related mortality and morbidity among US college students ages 18-24, 1998-2005. *Journal of Studies on Alcohol and Drugs, Supplement,* (s16), 12-20. https://doi.org/10.15288/jsads.2009.s16.12

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: Ameta-analytic review. *PLoS Medicine, 7*(7). 1-20. doi:10.1371/journal. pmed.1000316

Hopko, D. R., Reas, D. L., Beck, J. G., Stanley, M. A., Wetherell, J. L., Novy, D. M., &Averill, P. M. (2003). Assessing worry in older adults: Confirmatory factor analysis of the Penn State Worry Questionnaire and psychometric properties of an abbreviated model. *Psychological Assessment, 15*(2), 173-183. doi:10.1037/1040-3590.15.2.173.

IBM Corporation. (2018). *IBM SPSS Statistics for Windows, Version 25.0*. Armonk, NY: IBM Corporation.

Jang, J., Patrick, M., Keyes, K., Hamilton, A., & Schulenberg, J. (2017). Frequent binge drinking among U.S. adolescents, 1991 to 2015. *Pediatrics, 139*(6), 1-9. https://doi.org/10.1542/peds.2016-4023

Jennison, K. M. (2004). The short term effects and unintended long term consequences of binge drinking in college: A10 year follow up study. *The American Journal of Drug and Alcohol Abuse*, *30*(3), 659-684. https://doi.org/10.1081/ADA-200032331

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2011). Monitoring the Future national survey results on drug use, 1975-2010. *Volume I: Secondary school students*. Ann Arbor: Institute for Social Research, The University of Michigan Institute for Social Research.

Keough, K. A., Zimbardo, P. G., & Boyd, J. N. (1999). Who's smoking, drinking, and using drugs? Time perspective as a predictor of substance use. *Basic and Applied Social Psychology, 21*(2), 149-164. doi:10.1207/S15324834BA210207

Knight, J. R., Wechsler, H., Kuo, M., Seibring, M., Weitzman, E. R., & Schuckit, M. A. (2002). Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol and Drugs, 63*(3), 263-270. https://doi.org/10.15288/jsa.2002.63.263

Kroenke, K., Spitzer, R.L., & Williams, J.B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Spitzer, R.L., & Williams, J.B. (2003). The patient health questionnaire-2: Validity of a two-item depression screener. *Medical Care, 41*(11), 1284-1292. http://www.jstor.org/stable/3768417

Lynam, D. R., Gaughan, E. T., Miller, J. D., Miller, D. J., Mullins-Sweatt, S., & Widiger, T. A. (2011). Assessing the basic traits associated with psychopathy: Development and validation of the Elemental Psychopathy Assessment. *Psychological Assessment, 23*(1), 108-124. doi:10.1037/a0021146

Martens, M. P., Rocha, T. L., Martin, J. L., & Serrao, H. F. (2008). Drinking motives and college students: Further examination of a four-factor model. *Journal of Counseling Psychology*, *55*(2), 289-295. http://dx.doi.org/10.1037/0022-0167.55.2.289

Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: Abehavioural genetic analysis. *Social Psychiatry and Psychiatric Epidemiology*, *51*(3), 339-348. doi:10.1007/s00127-016-1178-7

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy*, *36*(4), 455-470. https://doi.org/10.1016/S0005-7967(97)10031-6

McBride, N. M., Barrett, B., Moore, K. A., & Schonfeld, L. (2014). The role of positive alcohol expectancies in underage binge drinking among college students. *Journal of American College Health, 62*(6), 370-379. doi:10.1080/07448481.2014.907297

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *28*(6), 487-495. https://doi.org/10.1016/0005-7967(90)90135-6

Mooney, A., Earl, J. K., Mooney, C. H., & Bateman, H. (2017). Using balanced time perspective to explain well-being and planning in retirement. *Frontiers in Psychology, 8*. doi:10.3389/fpsyg.2017.0178

National Institute of Alcohol Abuse and Alcoholism (NIAAA). (2004). *The Physician Guide to Helping Patients with Alcohol Problems.* NIH Publication no. 4-3769. Rockville, MD: U.S. Government Printing Office.

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400-424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Ohayon, M. M., & Schatzberg, A. F. (2010). Social phobia and depression: Prevalence and comorbidity. *Journal of Psychosomatic Research, 68*(3), 235-243. https://doi.org/10.1016/j.jpsychores.2009.07.018

Olfson, M., Guardino, M., Struening, E., Schneier, F. R., Hellman, F., & Klein, D. F. (2000). Barriers to the treatment of social anxiety. *The American Journal of Psychiatry, 157*(4), 521-527.

Olobutuyi, M. E. (2006). *A user's guide to path analysis.* Lanham, Maryland: University Press of America.

O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol, Supplement,* (s14), 23-39. https://doi.org/10.15288/jsas.2002.s14.23

Pedersen, E. R., & LaBrie, J. (2006). Drinking game participation among college students: Gender and ethnic implications. *Addictive Behaviors, 31*(11), 2105-2115. https://doi.org/10.1016/j.addbeh.2006.02.003

Peters, L., Sunderland, M., Andrews, G., Rapee, R. M., & Mattick, R. P. (2012). Development of a short form Social Interaction Anxiety (SIAS) and Social Phobia Scale (SPS) using nonparametric item response theory: The SIAS-6 and the SPS-6. *Psychological Assessment, 24*(1), 66-76. doi:10.1037/a0024544

Powell, L. M., Williams, J., & Wechsler, H. (2004). Study habits and the level of alcohol use among college students. *Education Economics, 12*(2), 135-149. https://doi.org/10.1080/0964529042000239159

Rodgers, B., Korten, A. E., Jorm, A. F., Christensen, H., Henderson, S., & Jacomb, P. A. (2000). Risk factors for depression and anxiety in abstainers, moderate drinkers andheavy drinkers. *Addiction, 95*(12), 1833-1845. doi:10.1080/0965214002 0011135

Shoal, G. D., Castaneda, J. O., & Giancola, P. R. (2005). Worry moderates the relation between negative affectivity and affect related substance use in adolescent males: A prospective study of maladaptive emotional self-regulation. *Personality and Individual Differences, 38*(2), 475–485. https://doi.org/10.1016/j.paid.2004. 05.005

Simons, L., Lantz, V., Klichine, S., & Ascolese, L. (2005). Drinking games, binge drinking and risky sexual behaviors among college students. *Journal of Alcohol and Drug Education, 49*(3), 23-36. http://argo.library.okstate.edu/login?url=https: //search.proquest.com/docview/217436478?accountid=4117

Spitzer, R. L., Kroenke, K., Williams, J. B., & Patient Health Questionnaire Primary Care Study Group. (1999). Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *Journal of the American Medical Association, 282*(18), 1737-1744. doi:10.1001/jama.282.18.1737

Strano, D. A., Cuomo, M. J., & Venable, R. H. (2004). Predictors of undergraduate student binge drinking. *Journal of College Counseling, 7*, 50-63.

Substance Abuse and Mental Health Services Administration (SAMHSA). (2011). *The DAWN report: Trends in emergency department visits involving underage alcohol use: 2005 to 2009.* Rockville, MD: Substance Abuse and Mental Health Services Administration.

Stein, M. B., Fuetsch, M., Müller, N., Höfler, M., Lieb, R., & Wittchen, H. U. (2001). Social anxiety disorder and the risk of depression: A prospective community study of adolescents and young adults. *Archives of General Psychiatry, 58*(3), 251-256. doi:10.1001/archpsyc.58.3.251

Stewart, S. H., & Devine, H. (2000). Relations between personality and drinking motives in young adults. *Personality and Individual Differences, 29*(3), 495-511. https://doi.org/10.1016/S0191-8869(99)00210-X

Straus, R., & Bacon, S. D. (1953). *Drinking in college.* New Haven, CT: Yale University Press.

Streiner, D. L. (2005). Finding our way: An introduction to path analysis. *Canadian Journal of Psychiatry, 50*(2), 115-122. https://doi.org/10.1177/070674370505000207

Tahmassian, K., & Moghadam, N. J. (2011). Relationship between self-efficacy and symptoms of anxiety, depression, worry and social avoidance in a normal sample of students. *Iranian Journal of Psychiatry and Behavioral Sciences, 5*(2), 91-98.

Theunissen, M. J., Jansen, M., & Van Gestel, A. (2011). Are mental health and binge drinking associated in Dutch adolescents? Cross-sectional public health study. *BioMed Central Research Notes, (4)*100. https://doi.org/10.1186/1756-0500-4-100

Tucker, J. S., Orlando, M., & Ellickson, P. L. (2003). Patterns and correlates of binge drinking trajectories from early adolescence to young adulthood. *Health Psychology, 22*(1), 79.

U.S. Department of Health and Human Services. (2007). What colleges need to know now: An update on college drinking research. *National Institutes of Health, National Institute of Alcohol Abuse and Alcoholism, National Advisory Council on Alcohol Abuse and Alcoholism, Task Force on College Drinking*. https://pubs.niaaa.nih.gov/publications/UpdateCollegeDrinking/1College_Bulletin-508_361C4E.pdf

U. S. Department of Health and Human Services. (2011). *National survey on drug use and health: Summary of national findings.* Rockville, MD: Substance abuse and mental health services administration.

Wechsler, H., Davenport, A., Dowdall, G., & Moeykens, B., & Castillo, S. (1994). Health and behavioral consequences of binge drinking in college. *Journal of the American Medical Association, 272*(21), 1672-1677.

Wechsler, H., & Isaac, N. (1992). 'Binge' drinkers at Massachusetts colleges: Prevalence, drinking style, time trends, and associated problems. *Journal of the American Medical Association, 267*(21), 2929-2931. doi:10.1001/jama.1992.03480210091038

Wechsler, H., Lee, J. E., Kuo, M., & Lee, H. (2000). College binge drinking in the 1990s: A continuing problem. Results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*, *48*(5), 199-210. https://doi.org/10.1080/07448480009599305

Wechsler, H., & Nelson, T. F. (2001). Binge drinking and the American college student: What's five drinks? *Psychology of Addictive Behaviors 14*(2), 287-291.

White, A., & Swartzwelder, S. H. (2009). Inbound college students drink heavily during the summer before their freshman year: Implications for education and prevention efforts. *American Journal of Health Education, 40*(2), 90-96. https://doi.org/10.1080/19325037.2009.10599083

Yadegarfard, M., Meinhold-Bergmann, M. E., & Ho, R. (2014). Family rejection, social isolation, and loneliness as predictors of negative health outcomes (depression, suicidal ideation, and sexual risk behavior) among Thai male-to-female transgender adolescents. *Journal of LGBT Youth*, *11*(4), 347-363. https://doi.org/10.1080/19361653.2014.910483

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology 77:* 1271-1288. https://doi.org/10.1007/978-3-319-07368-2_2

# APPENDICES

## APPENDIX A

### Informed Consent Used in the Investigation

ONLINE CONSENT FORM
**Project Title:** Pre-screener

**Investigator(s):** [names and affiliations withheld]

**Purpose:** This survey serves as a prescreener for the [name of university] psychology department's Participant Pool. It is being conducted by [names withheld], and faculty and graduate student members of the Department of Psychology at [name of university]. The purpose of this survey is to identify participants who qualify for future research studies. In this survey, you will respond to a variety of questions about yourself, your thoughts, and your behaviors.

**Procedures:** To participate in the SONA system for the semester and be eligible to earn extra credit points by participating in other, different, research projects, you must first access the prescreener survey; however, your completion of the survey is optional. If you choose not to participate in the prescreener survey, you may do so by selecting "decline to answer" for each of the questions. You will still be a part of the SONA system if you choose this option and remain eligible for the compensation described below. If you decide to participate, you will first indicate some demographic information (e.g., gender, age, etc.). Then you will complete a set of questionnaires in which you will answer questions about your thoughts, feelings, and behaviors. Feel free to skip any questions that you are uncomfortable answering. The amount of time required to complete the survey will be between 20 to 30 minutes. When you complete the survey you will be asked to submit your answers.

**Risks of Participation:** The risks associated with this study are minimal. While some of the survey items ask about personal issues and potentially could trigger an unfavorable emotional response in some individuals, most of the survey items are innocuous. These risks are not greater than those ordinarily encountered in daily life. Moreover, you may simply not answer any survey items that you perceive as threatening and/or discomforting; you may also stop at any time. If some item is distressing so that you wish to talk to someone about it, [name of university] Counseling Services are available free of charge to students.

**Benefits:** Your participation today may result in a benefit to society, if our research leads to a better understanding of how individuals view themselves.

**Confidentiality:** Your answers will be stored on a secure web server. Your answers will then be transferred to a spreadsheet after the end of the semester. Although your responses will be linked to your account and used to determine your eligibility in future studies, only administrators and researchers who have IRB approval will have access to this information. All other researchers who use the prescreener for recruitment purposes will only have access to aggregate data that cannot be linked back to you in any way. Any written results used from this data will be presented in the form of group findings, and no information will be released that could possibly identify you as an individual. The data will be kept for at least five years on a computer.

Only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed or monitored by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research.

**Compensation:** Individuals who complete this survey within the first two weeks of class will receive 1 hour of credit for their participation. After that time no credit will be awarded. Your responses on this survey may also make you eligible for future studies. We would like you to know that for college courses, there are alternative means to receive similar credit. You may contact your instructor to learn about these alternatives.

**Contacts:** If you have any questions or concerns about this project, please contact XXXX or XXXX. If you have questions about your rights as a research volunteer, you may contact XXXX, IRB Chair, at irb@xxxxx.edu.

**Participant Rights:** Your participation in this research in voluntary. You can discontinue the survey at any time without reprisal or penalty. You may also skip questions that you do not wish to answer. However, to receive class credit through SONA, you need to continue to the end of the survey and type in your name where indicated.

**Consent:** I have read and fully understand the consent form. I understand that my participation is voluntary. By clicking below, I am indicating that I freely and voluntarily and agree to participate in this study and I also acknowledge that I am at least 18 years of age.

APPENDIX B

Scales and Measures Used in the Investigation

**Demographic questions**

Please indicate your gender:
- Male
- Female
- Other

Please indicate your age: ___

Please indicate your year in college:
- Freshman
- Sophomore
- Junior
- Senior
- Other

Please indicate your ethnicity (check the one you identify with the most):
- White/Caucasians
- Black/African-American
- Hispanic/Latino
- Asian/Asian-American
- American Indian/Alaskan Native or First Nation
- Other (please specify) _____

**Elemental Psychopathy Assessment Validity Items** (Lynam et al., 2011)

These validity items were scattered throughout the questionnaire in order to screen for inattentive responding among respondents.

*Note: Items #1-8 used a 5-point Likert-type scale response format (1 = disagree strongly; 5 = agree strongly).*

1. I frequently forget my middle name.
2. I try to eat something almost every day. (R)
3. I never speak to anyone during the day.
4. I am better rested on mornings after a good night of sleep than after I have stayed awake all night. (R)
5. On average, I get less than an hour of sleep a night.

6. I do not like to lend things to people who will not take care of them. (R)
7. I have never listened to music.
8. I have sailed across the Atlantic Ocean in a hot air balloon.

*Note*: (R) Indicates an item that has been reversed coded

**Time Perspective 15-item Short Form** (Gupta et al., 2012)

*Note: The following questions used a* 1 (*strongly disagree*); 5 (*strongly agree*) *response format. PP = past positive, PN = past negative, FO = future oriented, PF = present fatalistic, and PH = present hedonist.*

1. It gives me pleasure to think about my past. (PP)
2. Happy memories of good times spring readily to mind. (PP)
3. On balance, there is much more good to recall than bad in my past. (PP)
4. I think about the bad things that have happened to me in the past. (PN)
5. It's hard for me to forget unpleasant images of my youth. (PN)
6. I have made mistakes in the past I wish I could undo. (PN)
7. Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play. (FO)
8. I complete projects on time by making steady progress. (FO)
9. I believe that a person's say should be planned ahead each morning. (FO)
10. My life path is controlled by forces I cannot influence. (PF)
11. You can't really plan for the future because things change so much. (PF)
12. It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway. (PF)
13. I try to live my life as fully as possible, one day at a time. (PH
14. I take risks to put excitement in my life. (PH)
15. I do things impulsively. (PH)

**Social Isolation (Friendship) Scale** (Hawthorne, 2006)

*Note: The following questions used a* 1 (*strongly disagree*); 5 (*strongly agree*) *response format.*

1. It has been easy for me to relate to others. (R)
2. I feel isolated from other people.
3. I have someone to share my feelings with. (R)
4. I find it easy to get in touch with others when I need others to feel they have to help me. (R)
5. When with other people I feel separate from them.
6. I feel alone and friendless.

*Note*: (R) Indicates an item that has been reverse coded

**Patient Health Questionnaire-3** (Kroenke et al., 2001)

Over the last 2 weeks, how often have you been bothered by the following problems?

*Note: All three items used a 4-point scale response format* 0 (*Not at all*); 3 (*Nearly every day*).

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Feeling bad about yourself–or that you are a failure of have let yourself or your family down

**Revised Penn State Worry Questionnaire (PSWQ-A)** (Hopko et al., 2003)

Instructions: Rate each of the following statements on a scale of 1 (*not at all typical of me*) to 5 (*very typical of me*).

1. My worries overwhelm me.
2. Many situations make me worry.
3. I know I should not worry about things, but I just cannot help it.
4. When I am under pressure, I worry a lot.
5. I am always worrying about something.
6. As soon as I finish one task, I start to worry about everything else I must do.
7. I have been a worrier all my life.
8. I have been worrying about things.

**Social Interaction Anxiety Scale-Short Form 6-items** (Peters et al., 2012)

The rating scale is as follows: 0 (*Not at all characteristic or true or me*) to 4 (*Extremely characteristic or true of me*).

1. I have difficulty making eye contact with others.
2. I find it difficult mixing comfortably with the people I work with.
3. I tense up if I meet an acquaintance on the street.
4. I feel tense if I am alone with just one person.
5. I have difficulty talking with other people.
6. I find it difficult to disagree with another's point of view.

**Excessive Alcohol Consumption**

1. On how many occasions during the past 30 days have you had 5 or more drinks (for women, 4 of more drinks) in a single two-hour period?
   1-30 *dropdown list options*

VITA

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