A Brief Mindfulness Intervention to Decrease Binge Drinking among College Students:

A Controlled Study

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This dissertation titled
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Abstract

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A Brief Mindfulness Intervention to Decrease Binge Drinking among College Students: A Controlled Study

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The current study is the first controlled evaluation of the effectiveness of a brief mindfulness intervention among college students who are binge drinkers. Participants were 76 undergraduate college students who were randomly assigned to a Mindfulness Group or an assessment only Control Group. Assessments were administered to both groups at the initial intervention and weekly for the subsequent four weeks. The Mindfulness Group received information about mindfulness and participated in a series of mindfulness meditation experiential exercises during the initial intervention. The Mindfulness Group participated in another mindfulness meditation practice two weeks following the initial intervention and was asked to engage in out-of-session mindfulness meditation practice for four weeks. Treatment outcome assessed changes in alcohol-related behaviors and attitudes. Mediators and moderators of treatment outcome were examined as well.

Initial efficacy was supported by significantly fewer binge episodes, less consequences of alcohol use and higher self-efficacy among the Mindfulness Group. Results suggested that level of readiness to change and rate of binge episodes prior to the intervention affect response to treatment. Contrary to study hypotheses, the Mindfulness Group did not report changes in overall dispositional mindfulness, thought avoidance or
readiness to change. Consistent attendance, low rates of attrition, compliance with out-of-session mindfulness meditation practice and high ratings of satisfaction by participants in the Mindfulness Group demonstrated feasibility of the intervention. Results from this study provide initial support for the effectiveness of a brief mindfulness-based intervention among college students who are binge drinkers.
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Introduction

Alcohol Use and College Students

Binge drinking is very prevalent among college students in the United States (Johnston, O’Malley, Bachman & Schulenberg, 2010; O’Malley & Johnston, 2002; U.S. Department of Health and Human Services [USDHHS], 2002a; Wechsler & Nelson, 2008). As defined by the National Institute of Alcohol Abuse and Alcoholism, binge drinking is the consumption of four or more standard drinks for females or five or more standard drinks for males during a two-hour period (U.S. Department of Health and Human Services, 2004). In a given two-week period, 44% of college students nationwide report engaging in binge drinking (Wechsler et al., 2002; Wechsler & Nelson, 2008).

Binge drinking is associated with an array of negative consequences for the individual, other students, the university and the surrounding community (Hingson, Heeren, Zakocs, Kopstein & Wechsler, 2002; Perkins, 2002a; USDHHS, 2002a). Alcohol-related motor vehicle accidents are the number one cause of death among college students (National Highway Traffic Safety Administration, 2008; Hingson et. al., 2002). Impaired academic performance, legal issues, higher rates of risky sexual behaviors, as well as higher rates of perpetration and victimization of physical and sexual assault are common consequences of binge drinking (Abbey, 2002; Presley, Meilman & Leichliter, 2002; Wechsler et al., 2002). Heavy alcohol use is associated with physical illness and injury, and is frequently a factor in suicide attempts and completions (Perkins, 2002a). The university and the surrounding community incur increased costs due to
vandalism, increased police presence and involvement, emotional strain on staff, legal
costs, student attrition and poor relationships between the university and the town
(Hingson, Zha & Weitzman, 2009; U.S. Department of Health and Human Services,
2007).

Binge drinking has been referred to as the number one public health crisis facing
college students (O’Malley & Johnston, 2002). Accordingly, extensive time and
resources have been devoted to efforts intended to reduce high rates of binge drinking.
However, intervention efforts have yielded little change in the rate of binge drinking.
Intervention strategies most commonly utilized include education based, or informational
programs. These interventions are consistently found to be ineffective and are often used
without appropriate evaluation prior to implementation (DeJong & Langford, 2002;
Larimer & Cronce, 2002).

Past research has supported the use of brief motivational enhancement
interventions and cognitive behavioral training programs to reduce rates of binge-
drinking among college students (U.S. Department of Health and Human Services
[USDHHS], 2002b, 2002c). However, meta-analytic examinations indicate that effect
sizes are typically small and much less effective when heavy alcohol users or high-risk
populations (e.g., fraternities) are targeted (Bangert-Drowns, 1988; Carey, Scott-Sheldon,
Carey & DeMartini, 2007). This is an important limitation of existing intervention
approaches. College students who are heavy drinkers experience the most negative
consequences due to alcohol use. They are also at the greatest risk for alcohol problems
extending into adulthood (Carey et al., 2007; Valliant, 1995).
There is a need for novel, cost- and time-efficient interventions to decrease the frequency of binge drinking and associated negative consequences (Carey et al., 2007; Johnston et al., 2010; O’Malley & Johnston, 2002; Substance Abuse & Mental Health Services Administration, Office of Applied Studies [SAMSHA OAS], 2006). Mindfulness-based treatments are a promising group of interventions. Preliminary evidence suggests the effectiveness of mindfulness training in reducing problematic alcohol use, indicating the potential use of this strategy among college students who are binge drinkers (Witkiewitz, Marlatt & Walker, 2005; Zgierska et al., 2009).

**Mindfulness-Based Treatments**

Mindfulness has been described as “the awareness that emerges through paying attention on purpose, in the present moment and non-judgmentally, to the unfolding of moment to moment experience” (Kabat-Zinn, 1994, p. 4). The qualities of mindfulness are cultivated through exercises that focus on observation of one’s experience (Bowen, Chawla & Marlatt, 2011; Germer, 2005; Marlatt & Gordon, 1985). Mindfulness can be cultivated informally, though increased awareness of daily activities or formally, through engagement in mindfulness meditation practices (Germer, 2005; Melbourne Academic Mindfulness Interest Group, 2006).

Mindfulness stems from Buddhist traditions and has been referred to as the “heart” of Buddhist meditation practices (Carmody, Baer, Lykins & Olendzki, 2009; Hahn, 2005). While many variants of meditation exist, mindfulness meditation is characterized by an evenly dispersed attention among all internal and external sensations that arise (Alterman, Koppenhaver, Mulholland, Ladden & Baime, 2004; Baer, 2003;
Dunn et al., 1999; Mikulas, 1990). This is often contrasted with concentrative meditative techniques in which attention is focused on a single thought or sensation, such as one’s breath or a mantra (Alterman, Kopenhaver, Mulholland, Ladden & Baime, 2004; Dunn, Hartigan & Milkulas, 1990). Examples of concentrative meditational techniques include Transcendental Meditation (TM), which was used in early examinations of the impact of meditation on addictive behavior (Alexander, Robinson & Rainforth, 1994).

The integration of mindfulness into Western psychological treatment approaches is relatively new, gaining attention in the last few decades. This is a short amount of time considering that mindfulness, within the context of Eastern traditions, has been in existence for thousands of years. Interest and research in mindfulness in the United States increased following the advent of Mindfulness-Based Stress Reduction (MBSR) in 1979 (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth & Burney, 1985; Kabat-Zinn, Lipworth, Burney & Sellers, 1987). MBSR was the first manualized, empirically supported mindfulness-based treatment (Grossman, Niemann, Schmidt & Walach, 2004; Kabat-Zinn, 1982). MBSR was initially developed in a behavioral medicine setting and intended for use among individuals with a wide range of chronic pain and stress related conditions (Kabat-Zinn, 1982; Kabat-Zinn et al., 1987). Meta-analytic results have found medium effect sizes (Cohen’s $d$) for improvements in both physical ($d = .53$) and psychological symptoms ($d = .54$) from pre- to post-treatment (Cohen, 1992; Grossman et al., 2004).

Following the success of MBSR, other mindfulness-based treatments were developed, including a recently developed protocol, Mindfulness-Based Relapse
Prevention (MBRP). MBRP is an 8-week mindfulness-based intervention intended to prevent relapse among individuals who have successfully completed residential or outpatient drug or alcohol treatment (Bowen et al., 2011). Drawing from Relapse Prevention, Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT), the intervention includes skill-based training and a large experiential component.

**Mindfulness-based interventions for problematic alcohol use.** The use of meditation, primarily concentrative techniques by individuals recovering from substance use disorders is supported by several decades of research (see Alexander et al., 1994 for a review). The examination of mindfulness-based strategies to treat addiction is a newer area of study. Bowen and colleagues (2006) conducted the earliest study to provide evidence for the benefits of mindfulness meditation to reduce problematic substance use (see Appendix A-1 for an overview of studies using mindfulness meditation to treat substance use disorders).

Bowen and colleagues (2006) examined the effect of a 10-day Vipassana Meditation (VM) course on substance use and psychological functioning among incarcerated individuals. VM is a form of mindfulness meditation led by Buddhist monks but taught from a secular perspective. Three-months post release from prison, VM participants reported decreased alcohol and illicit substance use, decreased psychiatric symptoms, increased internal locus of control and increased optimism compared to treatment as usual. Participants also reported fewer negative consequences associated
with substance use 3-months post-release, however, the decreases were not significantly
greater than that reported by the treatment as usual group.

The effectiveness of Mindfulness-Based Relapse Prevention (MBRP) was initially
examined in a pilot study of 19 individuals who had completed outpatient treatment for
alcohol dependence (Zgierska et al., 2008). While there was no comparison group, results
indicated that frequency of drinking days and heavy drinking days as well as quantity of
total drinks did not differ at pre-, post- and two-month follow-up assessment. As MBRP
is an aftercare program, participants generally are abstinent or have very low rates of
substance use at the onset of the intervention. Considering that more than two-thirds of
individuals typically relapse to alcohol following active treatment, the finding that
alcohol use remained low among participants during and following the mindfulness based
aftercare program was noteworthy (Pickens, Hatsukami, Spicer & Svikis, 1985; Walton,

In the first randomized clinical trial of MBRP, Bowen and colleagues (2009)
compared participation in MBRP with participation in a 12-step aftercare program that
was based upon the Alcoholics Anonymous (AA) model. Participation in MBRP was
associated with fewer days of alcohol or drug use post-treatment and at the two-month
follow-up. However, at the four-month follow-up, no between group differences in
alcohol and drug use were found. Following completion of the eight-week MBRP
protocol, the MBRP group returned to the 12-step aftercare program. AA is based on the
medical model and may have been incompatible with certain aspects of MBRP
(Alcoholics Anonymous World Services, Inc., 1984; Bowen et al., 2011). This may explain the lack of group differences at the four-month follow-up.

The use of mindfulness interventions to target heavy alcohol use among college students has not been directly explored. However, preliminary evidence supports the importance of the construct of mindfulness in understanding patterns of alcohol usage among college students. Among Asian-American college students, higher levels of dispositional (i.e., trait) mindfulness were related to lower frequency of binge drinking (Charles, 2010). Furthermore, a brief mindfulness intervention aimed to reduce nicotine use among college students found that compared to a no-treatment control group, participation in a brief mindfulness exercise was related to lower use of nicotine in the seven days following treatment (Bowen & Marlatt, 2009).

Change within mindfulness-based treatments for substance use. From a Buddhist perspective, reliance on alcohol or drugs is a “false refuge” from the pain and suffering of life (Groves & Farmer, 1994). Problematic substance use develops out of a belief that the substance or behavior will lead to happiness or fulfillment whereas in reality, continued usage leads to more suffering. While the use of alcohol or other substances can provide an immediate release from the pain and suffering of the present, future pain and suffering are likely to increase (Marlatt, 2002).

Mindfulness meditation may be helpful for individuals who are heavy alcohol users for several reasons. Mindfulness meditation is related to decreased avoidance of thoughts, sensations and emotions (Baer, 2003; Marlatt & Chawla, 2007; Melbourne Academic Mindfulness Interest Group, 2006). Mindfulness counters avoidance through
direct, nonjudgmental, moment-to-moment awareness of one’s experiences without attempting to avoid or alter the present experience (Kabat-Zinn, 1994; Marlatt & Chawla, 2007). Eventually, increased awareness of habitual patterns of reacting allows for a greater range of emotional and behavioral responses that may be adaptive alternatives to alcohol use (Baer, 2003; Bowen et al., 2011).

Research has highlighted the role of decreased thought avoidance as a mechanism of change within mindfulness-based treatments (Bowen, Witkiewitz, Dillworth & Marlatt, 2007; Witkiewitz et al., 2005). Decreased thought avoidance was found to partially mediate the effects of a 10-day Vipassana Meditation course on post-treatment alcohol use. No group differences in frequency of intrusive thoughts were found. This suggests that mindfulness training alters the manner in which an individual responds to unwanted thoughts, rather than altering the frequency, or content of the thoughts (Bowen et al., 2007).

Mindfulness meditation also serves as an alternative, positively reinforcing activity and increases behavioral self-regulation (Baer, 2009). Successful management of difficult situations increases an individual’s self-efficacy, or belief in one’s ability to control, change or master one’s own behavior (Marlatt & William, 1984). Increased self-efficacy reduces the risk of problematic alcohol use in the future. It also decreases the likelihood that one bad choice will be viewed as a complete loss of control, decreasing the probability that a “lapse” will become a “relapse” (Bowen et al., 2007; Marlatt & Chawla, 2007; Witkiewitz et al., 2005).
Participation in MBRP was associated with increased alcohol refusal self-efficacy and more accurate perceptions of the negative impact of alcohol use among incarcerated individuals in a Taiwanese prison (Lee, Bowen & An-Fu, 2010). Increased awareness of the negative impact of alcohol may thereby increase motivation to change patterns of use. Mindfulness may increase self-awareness of the personal consequences associated with alcohol use resulting in a greater understanding of, and acting in accordance with, one’s personal values and goals (Marlatt, 2002; Marlatt & Chawla, 2007).

**Research Objectives and Hypotheses**

The current study is, to our knowledge, the first study to assess the impact of a Mindfulness-Based Intervention on subsequent alcohol-related behaviors and perceptions among college students who report patterns of binge drinking. The study included random assignment of participants to a Mindfulness Group or an assessment only Control Group. The Mindfulness-Based Intervention was a brief intervention that was delivered individually to participants. Participants read information about mindfulness and engaged in a series of mindfulness meditation exercises both during and outside of sessions. Changes in alcohol-related behaviors and attitudes along with mediators and moderators of treatment outcome were examined. A detailed description of the session procedures and assessment tools is included in the Methods section.

Given the high rates of heavy alcohol use among college students and the lack of efficacious interventions for heavy college drinkers, the primary objective of this study was to assess the impact of a Brief Mindfulness-Based Intervention on patterns of alcohol use and alcohol-related beliefs over a four-week period following the initial session. It
was hypothesized that in the four weeks following the initial intervention, the
Mindfulness Group would report less Binge Episodes and fewer Consequences of
Alcohol Use than the Control Group. Furthermore, the current study hypothesized that
directly following the initial intervention and at the 5th session, the Mindfulness Group
would report higher Readiness to Change Alcohol Use and higher Alcohol Refusal Self-
Efficacy compared to the Control Group. At the initial session, it was proposed that
higher rates of Binge Episodes and greater Consequences of Alcohol Use would be
related to lower levels of Dispositional Mindfulness. Following the initial intervention
and at the 5th session, the Mindfulness Group was hypothesized to report higher
Dispositional Mindfulness than the Control Group.

Mediation and moderation analyses were conducted. It was hypothesized that
decreased Thought Avoidance would mediate the relationship between Treatment Group
and changes in Binge Episodes between the initial and 5th sessions. Exploratory analyses
assessed potential moderators of treatment outcome. Variables examined included Binge
Episodes in the four weeks prior to the intervention, Readiness to Change Alcohol Use,
Psychological Distress and among the Mindfulness Group, Frequency of Mindfulness
Practice, Quantity of Mindfulness Practice and change in Dispositional Mindfulness.
Methods

Participants

Participants were 76 college undergraduates at a public university enrolled in undergraduate psychology courses. Ages ranged from 18 to 23 (M = 19.05, SD = 1.19). Half of the participants (N = 38, 50%) were male and slightly more than half were freshmen (N = 41, 54%). Most of the sample self-identified as Caucasian (N = 69, 91%); 4% self-identified as African-American, 4% as multi-racial and 1% as Hispanic. The attrition rate was 4%, which included two participants from the Control Group and one participant from the Mindfulness Group.

Participants were recruited from an undergraduate psychology participant pool, based on responses on the Daily Drinking Questionnaire (Appendix B-2). The Daily Drinking Questionnaire inquired as to whether the individual had engaged in binge drinking in the past two weeks. Individuals completed the brief measure as part of a pre-screen measure on the psychology department online experimental sign-up system. Individuals who reported at least one binge episode in the past two-weeks were able to sign up for a two-hour time-slot for the current study. To encourage participation, eligible individuals were also sent a mass e-mail inviting them to sign up for the study. At the initial session, participants were further assessed for eligibility. Specifically, participants included individuals who 1) reported at least one binge drinking episode in the past two weeks, 2) were full-time, residential (i.e., non-commuter) students, 3) were not currently under the influence of alcohol or illicit substances other than prescribed
medication at the time of the initial session, 4) were between the age of 18 and 24 and 5) denied a current self-reported diagnosis of a psychotic disorder or bipolar disorder.

Participants were recruited during the fall quarter of the 2011-2012 academic years. The psychology pool for fall quarter included 1,572 students, 840 of which completed the pre-screen questionnaire. Based on past epidemiological research, about 45% or 378 students would be expected to endorse binge drinking in the past two-weeks (Wechsler & Nelson, 2008). Of the eligible students, 126 signed up for a time-slot. Thirty-seven students cancelled their time-slot; an unknown number of which may have then signed up for another time-slot. Of the remaining 92 students, 10 no-showed, three did not meet the criteria for binge episodes when re-assessed at the initial session and 76 completed the initial session.

To randomize participants into the two groups, the researcher designated time-slots to either the Control Group or the Mindfulness Group. Time slots were alternated such that a certain day of the week and time of day was filled by each group (i.e., Mindfulness or Control) the same number of times. Participants did not have knowledge regarding which timeslot was associated with which group; however, research assistants were not blind to the participant’s condition. This method of randomization has been previously used in the mindfulness literature (e.g., Bowen & Marlatt, 2009).

**Alcohol characteristics of participants.** The entire sample was composed of individuals who reported at least one binge episode in the past two weeks. In the College Alcohol Survey, Wechsler and colleagues (2002) utilized a number of categorizations which can be helpful in characterizing the current sample. Based on those
categorizations, 32% (N=24) of the current sample was comprised of “frequent binge drinkers”, individuals who reported three or more binge episodes in the two weeks prior to the initial intervention. Thirty-seven percent (N=28) of participants reported that they consumed alcohol on 10 or more occasions over the past 28 days. Over three-quarters (78%, N=54) of the sample reported five or more consequences of alcohol use in the past three-months (Wechsler et al., 2002). The most frequently endorsed consequences were “needing to consume more alcohol to get the same effect” (61%, N=46) and “neglecting one’s responsibilities” (57%, N=44).

Measures

A brief description of the measures is provided below. See Tables 1 and 2 for descriptive statistics for the measures used in the study. Tests of internal consistency that were conducted for the current sample are reported in Table 2. Psychometric properties of select measures are reviewed in Appendix B-1. Copies of the study measures are contained in Appendices B-2 through B-15.

**Daily Drinking Questionnaire (Collins et al., 1985; Appendix B-2).** This measure assessed participant eligibility. Three questions determined if the criteria for binge drinking was met during the past two weeks. Consistent with past research, males who consumed five or more standard drinks or females who consumed four or more standard drinks over a two-hour period on one or more occasion during the past two weeks were considered “binge drinkers” (Wechsler, Dowdall, Davenport & Castillo, 1995; USDHHS, 2004). This measure was administered as part of a pre-screen
questionnaire completed by participants enrolled in the psychology participant pool. Participants who met criteria for binge drinking were eligible to sign up for the study.

**Demographics questionnaire (Table 1; Appendix B-3).** This 26-item measure was used to collect relevant personal information including basic participant characteristics such as age, ethnicity and race, religious background, sexual orientation and dating status. This measure also asked about past utilization of mental health treatment, current psychological diagnoses and recent alcohol or illicit substance use. This measure was administered during the initial session.

**Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989; Table 2; Appendix B-4).** This 23-item scale assessed the frequency and type of negative consequences experienced by the individual due to alcohol use. Each item was rated on a five-point scale from (0) “never” to (4) “more than 10 times.” Responses were summed to create a total score. The RAPI has been used extensively in college student samples and has been previously found to be reliable and valid among this population (Larimer, Cronce, Lee & Kilmer, 2005; Martens, Neighbors, Dams-O’Connor, Lee & Larimer, 2007; Mendez, 2005). The RAPI was administered during the initial session and again at the 5th session. During the initial session, participants were asked to answer questions based on their experiences in the past three months. At the 5th session, participants were asked to answer questions based on their experiences in the past four weeks.

**Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983; Table 2; Appendix B-5).** This 53-item measure assessed psychological distress. Each item was rated on a five-point scale from (1) “not at all” to (5) “extremely” (Derogatis &
Melisaratos, 1983). Consistent with past literature, the general severity index (GSI) was used in the current study (Derogatis, 1977; Derogatis & Unger, 2010). The GSI included 44 items that were summed to provide a single score of frequency and perceived intensity of psychological symptoms. Higher scores indicated greater perceived psychological distress. Good reliability and validity have previously been established for the BSI and this measure has been normed on both clinical and non-clinical samples (Derogatis & Melisaratos, 1983; Derogatis & Unger, 2010). This measure was administered during the initial session and the 5th session.

**Drinking Refusal Self-Efficacy Questionnaire (DRSEQ, Young, Oei & Crook, 1991; Table 2; Appendix B-6).** This 31-item measure assessed perceived self-efficacy to refrain from using alcohol in various settings. Each item was rated on a six point scale from (1) “I am very sure I would drink” to (6) “I am very sure I would not drink.” Items were summed to create an overall score. Higher scores indicated greater perceived self-efficacy to refuse alcohol in a variety of situations (Young, Oei & Crook, 1991; Oei, Hasking & Young, 2005). Previous research has established good reliability and validity for the DRSEQ (Baldwin, Oei & Young, 1991; Young et al., 1991). This measure was administered at the beginning and end of the initial session and during the 5th session.

**Readiness to Change Questionnaire (RTCQ; Heather, Gold & Rollnick, 1991; Rollnick, Heather, Gold & Rollnick, 1992; Table 2; Appendix B-7).** This 12-item measure assessed readiness to change alcohol use. Each item was rated on a five-point scale from (1) “strongly disagree” to (5) “strongly agree.” A continuous score was
formed for each participant based on the method established by Budd and Rollnick (1996). A single score was formed by summing the scores for the contemplation (items 3, 4, 8 and 9) and action (items 2, 6, 7 and 11) stages with reverse coded scores on the precontemplation stage (items 1, 5, 10 and 12). Higher scores indicated greater readiness to change. Good reliability and validity have previously been established for this measure (Heather, Rollnick & Bell, 1993; McNally & Palfai, 2001, Rollnick et al., 1992). This measure was administered at the beginning and end of the initial session and during the 5th session.

White Bear Suppression Inventory (WBSI, Wegner & Zanakos, 1994; Table 2; Appendix B-8). This 15-item measure assessed thought suppression. Each item was rated on a five point scale from (1) “strongly disagree” to (5) “strongly agree.” Higher scores indicate a greater tendency to engage in thought suppression. Past research has identified two sub-scales, thought avoidance and intrusive thoughts (Rassin, 2003). The current study utilized the 9-item thought avoidance sub-scale to test for a mediation effect, consistent with past research (Bowen et al., 2007). A total score of thought avoidance was created by summing all nine items on this sub-scale. Validity and reliability have previously been established for this measure (Wegner & Zanakos, 1994). This measure was administered at the beginning and end of the initial session and during the 5th session.

Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer & Toney, 2006; Table 2; Appendix B-9). This 39-item measure assessed dispositional mindfulness. Each item was rated on a scale from (1) “never or very rarely
true” to (5) “very often or always true.” The FFMQ includes five sub-scales: observing (8-items), describing (8-items), acting with awareness (8-items), non-judgment of inner experience (8-items), and non-reactivity to inner experience (7-items). In the current study, all 39 items were summed to create one score used to assess overall dispositional mindfulness. Strong reliability and validity have previously been established for this measure (Baer et al., 2006; 2008; Carmody & Baer, 2008). This measure was administered at the beginning and end of the initial session and at the 5th session.

Alcohol Timeline Followback Assessment (TLFB; Sobell & Sobell, 1993; 1995; Table 2; Appendix B-10). This semi-structured interview obtained daily estimates of past quantity and frequency of alcohol use. Various memory aids such as a calendar and key dates (e.g., holidays) assist in recall. This measure was administered during all sessions. Several valuable drinking related variables can be generated from this instrument including frequency of use, quantity of use and rate of binge episodes. Among college students, good reliability and validity have been found for this instrument (Sobell, Sobell, Klajner, Paven & Basian, 1986; Sobell, Sobell, Leo & Cancilla, 1988). At the initial session, alcohol use during the past four-weeks was assessed. At each of the subsequent sessions, alcohol use over the past week was assessed. If a participant missed a session, alcohol use since the last session attended was assessed at the following session.

Manipulation Check for Mindfulness Group (Appendix B-11). This was a brief assessment of participants’ comprehension, interest and satisfaction regarding the
brief mindfulness intervention. This measure was administered to the Mindfulness Group at three points during the initial intervention and at one point during the 3\textsuperscript{rd} session.

**Normative Appetitive Picture System (NAPS; Stritzke et al., 2004; Appendix B-12).** This is an alcohol cue exposure protocol that contained 18 visual images. Cue exposure protocols involve exposing an individual to substance-related stimuli in order to elicit urges or cravings to use substances. A large body of research supports the efficacy of cue exposure protocols in producing a stable set of responses including self-reported urges and physiological reactivity (Carter & Tiffany, 1999). The NAPS is a standardized cue exposure protocol that was administered in three phases, each containing six visual alcohol stimuli. Previous standardization of the cue exposure among college students found good reliability and validity (Stritzke et al., 2004). In the current study, the NAPS was administered to all participants during the initial session.

**Alcohol Urge Questionnaire (AUQ; Bohn, Krahn & Staehler, 1995; Table 2; Appendix B-13).** This 8-item scale assessed alcohol craving. Each item was rated on a seven point scale from (1) “strongly agree” to (7) “strongly disagree.” Items were recoded such that higher scores indicated greater urges to use alcohol. A summation of the 8-items was used to measure alcohol related cravings. Reliability and validity of the measure in clinical and non-clinical populations have previously been established (Bohn et al., 1995; Drummond & Phillips, 2002; MacKillop, 2006; Stritzke et al., 2004). This measure was administered to both groups after each phase of the NAPS and during the 2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th} and 5\textsuperscript{th} sessions.
Control Group Manipulation Check (Appendix B-14). This was a brief measure that asked participants in the control group to report what strategies they used to manage urges to use alcohol during the cue exposure protocol. It was administered to the control group following the NAPS in the initial session.

Mindfulness Meditation between Session Tracking Form (Appendix B-15). This form inquired about frequency and quantity of mindfulness meditation practice over the past week. Participants in the Mindfulness Group were asked to recall if they practiced mindfulness meditation each day, and if so, for what duration. Participants in the Mindfulness Group completed this form during the 2nd, 3rd, 4th and 5th sessions.

Procedure

Initial session. See Appendix A-2 for an overview of session procedures. Eligible participants were able to sign up for time-slots using the psychology department online sign-up system. At the initial testing session, participants were met by a research assistant and assigned a subject number that was their identification number for the duration of the study. Participants were administered informed consent, which included a brief study rationale, an explanation of compensation and requirements for follow-up sessions (Appendix B-16).

Participants completed several self-report measures using an audio computer-assisted self-interview (ACASI) on a laptop computer. Measures included the demographics questionnaire, Rutgers Alcohol Problem Index, Brief Symptom Inventory, Drinking Refusal Self-Efficacy Questionnaire, Readiness to Change Questionnaire, White Bear Suppression Inventory, and Five Facet Mindfulness Questionnaire.
(Appendices B-3 to B-9). The order of the measures was the same for all participants. Demographic variables were collected first, followed by measures that assessed primary outcome variables. No participants asked for breaks or voiced concerns about fatigue and rates of missing data were not noticeably different based on the order of the measures. Following completion of the initial study measures, the researcher administered the Alcohol Timeline Followback measure (Appendix B-10), a semi-structured interview which assessed the individual’s alcohol patterns over the past four weeks.

**Brief mindfulness intervention.** This part of the procedure was only completed by participants in the Mindfulness Group. Participants were assigned to one of three “therapists”, all of who were doctoral students in clinical psychology and had completed coursework in basic therapy skills. Materials for the intervention were gathered from previously validated sources whenever possible. In particular, intervention material drew extensively from Mindfulness Based Relapse Prevention (Mindfulness Based Relapse Prevention, 2011). The experiential exercises were taken from three sources: the UCLA Mindful Awareness Research Center (UCLA Mindful Awareness Research Center, 2009a), Mindfulness Based Relapse Prevention (Mindfulness Based Relapse Prevention, 2011) and Mindful Solutions for Addiction and Relapse Prevention (Goldstein & Goldstein, 2008).

Participants in the Mindfulness Group received a handout explaining the general concepts of mindfulness (Appendix A-3). The handout included a brief explanation of what mindfulness is and an overview of potential benefits of mindfulness including a discussion of why mindfulness may be beneficial for individuals who are binge drinkers.
After participants read this handout, they were administered the first Mindfulness Group Manipulation Check (Appendix B-11).

Next, participants were asked to listen to two mindfulness meditation experiential exercises. The first was a 19-minute meditation that provides instructions for the practice of mindfulness meditation and focused primarily on observation of one’s breathing (Goldstein & Goldstein, 2008a). Following this exercise, participants completed the second Mindfulness Group Manipulation Check (Appendix B-11).

The second exercise was a nine-minute mindfulness meditation called “urge surfing” (Mindfulness Based Relapse Prevention, 2011a). Urge surfing is a frequently used mindfulness exercise intended to reduce the use of alcohol, nicotine or other illicit substances though increased awareness and non-reactivity in response to strong urges (Bowen et al., 2011; Bowen & Marlatt, 2009; Marlatt & Gordon, 1985). In this practice, participants were encouraged to apply mindfulness concepts to the experience of having an urge to react and to visualize “riding” the ebb and flow of the wave (i.e., urge) rather than seeking to alter or avoid the urge. Following this exercise, participants completed a third Mindfulness Group Manipulation Check (Appendix B-11).

Participants in the Mindfulness Group were given a CD containing five mindfulness exercises of various lengths (Appendix A-4). Participants were asked to use the recordings on the CD to engage in at least one hour of formal mindfulness meditation practice per week for the next four weeks.

**Cue exposure.** Next, participants in both the Control and Mindfulness Group began the cue exposure protocol, the Normative Appetitive Picture System (NAPS). This
involved three phases; each lasted about four minutes and contained six images depicting alcohol beverages (Appendix B-12; Stritzke et al., 2004). Slides were included in a power point presentation that participants watched on a computer screen. The slides for the first phase were presented as follows. First, a blank slide was shown for 5-seconds to orient the participant. Then, the first alcohol slide was shown for 15-seconds. A 15-second rest period followed and the second alcohol slide was shown, again for 15-seconds. The rotation of image and rest period continued for the first six slides.

Prior to the first and fourth alcohol visual images were slides that contained brief suggestions for coping with drinking-related thoughts or urges to use alcohol that may arise as a result of the stimuli. These slides were shown for 30 seconds each. The suggestion slides differed by group. Participants in the Mindfulness Group received suggestions to utilize the mindfulness skills of paying attention to the present moment, awareness, and non-judgmental acceptance of one’s experience (script adopted from Bowen & Marlatt, 2009). Participants in the Control Group were asked to utilize any technique they would normally use to cope with urges (script adopted from Bowen & Marlatt, 2009).

Following the final alcohol image, participants were asked to complete the Alcohol Urges Questionnaire (1 to 2 minutes; Appendix B-13). The second and third phase of the cue exposure protocol followed the same procedure as the first phase. Following completion of the third phase, the Control Group was asked to complete the Control Group Manipulation Check (Appendix B-14).
**Post-intervention measures and explanation of follow-up sessions.** Upon completion of the cue exposure protocol, participants completed another set of measures on a laptop computer. Measures included the Drinking Refusal Self-Efficacy Questionnaire, Readiness to Change Questionnaire, White Bear Suppression Inventory and Five Facet Mindfulness Questionnaire (Appendices B-6 to B-9). Participants were debriefed and scheduled for weekly sessions for the next four weeks (Appendix B-17). The entire initial session lasted approximately two hours for the Mindfulness Group and one hour for the Control Group.

**2nd, 3rd, 4th and 5th Sessions.** The procedure for each of the four subsequent weekly sessions was similar. Participants were sent an e-mail or text reminder the day before each scheduled session. At each session, participants completed the Alcohol Timeline Followback measure and the Alcohol Urge Questionnaire (Appendices B-10 and B-13). The Mindfulness Group completed the Mindfulness Meditation between Session Tracking Form at each session (Appendix B-15). The 2nd and 4th sessions each lasted approximately 10 minutes and participants were given the option to complete the measures via the Internet rather than attending the session in person.

During the 3rd session, the Mindfulness Group was asked to listen to a 25 minute mindfulness meditation exercise (Mindful solutions for addiction and relapse prevention, 2008b). This practice focused on awareness of thoughts, emotions and sensations. The Mindfulness Group was asked to complete a final Manipulation Check (Appendix B-11). The 3rd session lasted approximately 10 minutes for the Control Group and 40 minutes for the Mindfulness Group.
During the 5th session, in addition to the Alcohol Timeline Followback measure and the Alcohol Urge Questionnaire, all participants completed a longer set of measures. This included the Rutgers Alcohol Problem Index, Brief Symptom Inventory, Drink Refusal Self-Efficacy Questionnaire, Readiness to Change Questionnaire, White Bear Suppression Inventory and Five Facet Mindfulness Questionnaire (Appendices B-4 to B-9 and B-13). Participants completed these measures using an audio computer-assisted self-interview (ACASI) on a laptop computer. The 5th Session lasted approximately 40 minutes for both groups.

**Participant Compensation.** All participants received two experimental credits for participation in the initial session, a third experimental credit for participation in the 3rd session and a fourth experimental credit for participation in the 5th session. In addition to the four credits received by both groups, the Mindfulness Group received four credits for out-of-session mindfulness meditation practice (i.e., a total of eight experimental credits). Specifically, the Mindfulness Group received one credit at each of the 2nd, 3rd, 4th and 5th sessions for out-of-session mindfulness meditation practice. These credits were given regardless of adherence to guidelines for out-of-session practice in order to reduce response bias.

Participants in both groups received payment for each of the follow-up sessions in the amount of $3 (2nd session), $4 (3rd session), $5 (4th session) and a $3 bonus if they completed all sessions. Furthermore, each session attended by the participant resulted in an entry for a drawing for one of three $20 gift certificates to ITunes, an online music store. Thus, participants were eligible to receive up to five entries.
Results

Data collected using the audio computer-assisted self-interview (ACASI) were transferred into the Statistical Package for the Social Sciences, version 17.0 (SPSS, 2008). Remaining data were hand entered into SPSS, version 17.0 (SPSS, 2008). Data were examined for missing or incorrectly entered values. For missing data, the participant’s average score on that sub-scale was substituted for the missing value. The exceptions to this were single item demographic questions that were considered missing data if left blank and were omitted from analyses. Skew, kurtosis and outliers were assessed for all measures using both statistical (e.g., means, standard deviations, z-scores) and visual (e.g., scatterplots, frequency histograms) analyses. See Appendices C-1 and C-2 for standard skew and kurtosis for all measures used in the analyses as well as a listing of any outliers and transformations that were explored. While several univariate outliers were identified, none were found to be influential cases when examined in the context of the analyses that included these cases. Variables were assessed for multicollinarity. Tests for violations of normality, homogeneity of variance and multivariate outliers were also conducted and are reported when significant.

Group differences in baseline demographic variables, substance use patterns and psychological variables were examined. Independent $t$-tests among continuous variables and chi-square goodness of fit tests for categorical variables were used. Using an alpha level of 0.05 (two-tailed), no group differences at baseline were found. Thus, randomization appeared to be effective in producing equivalent groups. The mindfulness intervention was delivered by one of three “therapists”. Thirty-one participants were
administered the mindfulness intervention by Therapist A, four participants by Therapist B and three participants by Therapist C. Differences on the primary outcome variables based on “therapist” were examined and no significant differences were found. Differences in baseline characteristics were examined among participants who completed (N = 73), and did not complete all sessions (N = 3). No significant differences among baseline demographic, psychological or alcohol-related variables were found. See Table 3 for bivariate correlations between measures assessed at baseline.

**Participant Feedback and Adherence**

Participants were asked to provide feedback regarding the mindfulness intervention by rating their perceived comprehension, interest, helpfulness of the skills and intention to practice in the future. Participants provided feedback at four time periods, following the mindfulness handout and following each of the three mindfulness meditation practices in the initial and 3rd sessions. These ratings were provided on a scale of 0 (not true) to 100 (very true). Mean participant ratings on each scale are provided in Appendix C-5. Mean ratings averages over all four assessment periods ranged from 73.73 (Interest) to 79.94 (comprehension).

Among the Mindfulness Group, attrition was approximately 3% (N=1). Among the 97% (N=37) of participants that completed the intervention, all participants attended every session. Adherence to the out-of-session mindfulness practice was assessed weekly. Each week, participants were asked to engage in at least 60 minutes of mindfulness meditation practice. Between 53% and 58% of participants met the 60
minute goal each week. About 5% (N=2) of participants reported that they did not engage in any out-of-session practice over the course of the study.

**Objective 1**

The first objective contained four hypotheses that assessed Group by Session differences in Binge Episodes, Consequences of Alcohol Use, Alcohol Refusal Self-Efficacy and Readiness to Change Alcohol Use. Binge Episodes, Self-Efficacy and Readiness to Change were tested separately using linear mixed model analyses. Individual models were created to assess the hypotheses that following the initial intervention; the Mindfulness Group would report fewer Binge Episodes, higher Alcohol Refusal Self-Efficacy and higher Readiness to Change Alcohol Patterns compared to the Control Group. As Consequences of Alcohol Use was only assessed at two time-points, this hypothesis was tested using a 2 (Group) by 2 (Session) mixed model ANOVA. It was hypothesized that compared to the Control Group, the Mindfulness Group would report fewer Consequences of Alcohol Use in the four weeks following the initial intervention.

The procedure for creating and testing the mixed models for Binge Episodes, Self-Efficacy and Readiness to Change was similar. The bottom-up stepwise procedure described by Hox (2010) was used to determine the best model fit. The basic modeling strategy was to start with an intercept only model. Next, the level-1 predictor was added and tested followed by level-2 predictor variables. Random slopes for level-1 variables were added and tested. Interaction terms were added and tested last.
The maximum likelihood (ML) approach was used to test fixed effects and the restricted maximum likelihood (REML) approach was used to test random effects. Derivative tests were utilized to compare model fit and components that did not significantly improve model fit were excluded (Singer & Willet, 2003). The exception to the procedure was that the main effects of variables remained in the model to the step which tested the interaction term even if the main effect was not significant.

Session was considered a level-1, within subject variable. Group was considered a level-2, between subject variable. Consistent with previous research (e.g., Carey, Carey, Maisto & Henson, 2006), Gender was considered as a potential covariate. Gender was considered as a level-2 variable and both the main effect of Gender and the interaction of Gender and Group were evaluated.

**Hypothesis 1a.** A two-level linear mixed model analysis was used to assess the effects of Session and Treatment Group on Binge Episodes over a four-week period following the initial session. Models considered are described in Table 4. Session was entered as a level-1 variable. It was comprised of five weekly assessment periods including the initial session (Session = 0) and four subsequent weekly sessions (Sessions = 1, 2, 3 and 4). Group was entered as a level-2 variable and included the Control Group (CG = 0) and the Mindfulness Group (MG = 1). Gender was entered as a binary, level-2 variable (Male = 0).

In the final model, in the presence of the other predictors, the cross-level interaction of Group by Session was significant, $F(299.56, 380) = 5.58, p = .02$. Binge episodes did not differ significantly by Session for the Control Group while the
Mindfulness Group was associated with a significant decrease in Binge Episodes by Session. At the initial Session, the estimate of Binge Episodes for the Control Group was 1.36 while the estimate of Binge Episodes for the Mindfulness Group was 1.11. By the 5th Session, the estimated Binge Episodes for the Control was 1.64; almost double the estimated rate for the Mindfulness Group, which was 0.83 (Figure 1). In the final model, significant individual differences in the intercept were present, $Wald z = 12.20, p < .001$. The model also contained significant residual variance, $Wald z = 4.82, p < .001$.

**Hypothesis 1b.** A 2 (Group) by 2 (Initial Session, Final Session) mixed-model ANOVA assessed the hypothesis that the Mindfulness Group would report fewer Consequences of Alcohol Use in the four weeks following the initial session. As predicted, the interaction between Group and Session was significant, $F (1, 71) = 4.25, p < .04, \eta^2 = .06$ (Table 5, Figure 2). Follow up Bonferroni pairwise comparisons indicated that while there were no group differences at the initial session, $t (71) = .01, p = .99, \eta^2 < .001$, the relationship between group and Consequences of Alcohol use at the 5th Session was marginally significant with fewer Consequences reported by the Mindfulness Group, $t (1, 71) = 2.10, p = .04, \eta^2 = .06$. In the model, Mauchly’s test of sphericity was significant ($p < .001$) indicating that the assumption of sphericity was not met. As a result, the Greenhouse-Geisser statistics were reported. Gender was considered as covariate but was not related to Consequences of Alcohol Use and was not included in the final model.

Due to significant skew in the variable assessing Consequences of Alcohol Use, at both the initial and 5th session, the analysis was rerun using transformed variables. A log
transformation of Consequences of Alcohol Use at the initial session and a square root transformation of Consequences of Alcohol Use at the 5th session were conducted. Both transformations resulted in reduced skew and kurtosis producing normal distributions. Visual inspection indicated that results of the analyses remained unchanged and the original results were utilized in order to provide more meaningful interpretation.

**Hypothesis 1c.** The hypothesis that Alcohol Refusal Self-Efficacy would increase for the Mindfulness Group, compared to the Control Group following the initial session was assessed using a two-level linear mixed model analysis. The level-1 variable, Session, consisted of three assessment periods: the beginning of the initial session (Session = 0), the end of the initial session (Session = 1) and the final session (Session = 2). Session was also considered as a contrast coded variable such that the beginning of the initial session was compared to both the end of the initial session and session 5. The model fit did not improve and Session was retained as a three level categorical variable. The level-2 variable, Group, consisted of the Control Group (CG = 0) and the Mindfulness Group (MG = 1). Gender, consisting of Male (Gender = 0) and Female (Gender = 1) was also considered as a level-2 variable.

Models that were examined are detailed in Table 6. The final model included Session, Group and the cross-level interaction of Session by Group. The cross-level interaction of Session and Group was significant, $F (75.14, 228) = 4.56, p = .04$. Self-Efficacy among the Control Group did not change over the course of the study while the Mindfulness Group was associated with a significant increase in self-efficacy over time (Figure 3). Significant individual differences in Intercept ($Wald z = 5.32, p < .001$) and
Session (Wald $z = 2.01, p = .04$) were present in the final model. Furthermore, significant residual variance remained in the model, Wald $z = 6.10, p < .001$.

**Hypothesis 1d.** A two-level linear mixed model analysis tested the hypothesis that Readiness to Change Alcohol Use would increase among the Mindfulness Group compared to the Control Group following the initial intervention. The level-1 variable, Session, consisted of three assessment periods: the beginning of the initial session (Session = 0), the end of the initial session (Session = 1) and the 5th Session (Session = 2). Group, a level-2 variable, consisted of the Control Group (CG = 0) and the Mindfulness Group (MG = 1). Gender was also entered as a level-2 variable and consisted of two groups, Male (Gender = 0) and Female (Gender = 1).

Table 7 depicts the models that were examined. The level-1 variable (Session), the level-2 variables (Group and Gender) and the interaction term (Session*Group) were unrelated to Readiness to Change. The final model contains the intercept as the only predictor variable, $F (76.16, 224) = 1219.58, p < .001$. Based on the final, intercept only model, the estimate for Readiness to Change for any individual, regardless of Session or Group, is 30.67. Individual differences in the intercept were present, Wald $z = 8.61, p < .001$. Significant residual variance also remained in the model, Wald $z = 5.42, p < .001$.

**Objective 2**

**Hypothesis 2a.** A simultaneous linear regression model was used to test the hypothesis that higher rates of Binge Episodes and greater Consequences of Alcohol Use would be related to lower levels of Dispositional Mindfulness (Table 8). All variables were assessed at the beginning of the initial session. Jointly, Binge Episodes and
Consequences of Alcohol Use accounted for significant variance in Dispositional Mindfulness, $F(2, 73) = 8.65, p < .001, R^2 = .19$. In the presence of Binge Episodes, greater Consequences of Alcohol was related to less Dispositional Mindfulness, $B = -.72, F(1, 73) = 12.18, p = .001$. Binge Episodes was not related to Dispositional Mindfulness in the presence of Consequences of Alcohol Use, $B = -.27, F(1, 73) = .25, p = .63$.

Multicollinearity appears to play a role in this analysis. The coefficient correlation between Binge Episodes and Consequences of Alcohol Use was moderately high ($r = -.44$). Further, the zero-order correlation between Binge Episodes and Dispositional Mindfulness ($r = -.24$) was substantially higher than the partial order correlation ($r = -.06$) between Binge Episodes and Dispositional Mindfulness.

A square root transformation of Binge Episodes and a logarithm transformation of Consequences of Alcohol Use were performed due to non-normality of distributions. Both transformations reduced skew and kurtosis producing a normal distribution pattern. Visual inspection indicated that use of the transformed variables did not change the results of the analysis. For the sake of presentation and interpretation, non-transformed variables were used.

**Hypothesis 2b.** To test the hypothesis that Dispositional Mindfulness would increase among the Mindfulness Group over time, a two-level mixed model analysis was conducted. The same procedure was used for building and testing this model as was detailed in the first objective. Session was considered a level-1 variable and was comprised of three assessment periods, the beginning of the initial intervention (Session = 0), the end of the initial session (Session = 1) and the final session (Session = 2).
Group was considered a level-2 variable and was composed of two groups, the Control Group (CG = 0) and the Mindfulness Group (MG = 1). Past research did not indicate any demographic or psychosocial variables that should be considered as covariates in the model.

See Table 9 for an overview of the models that were evaluated. Dispositional Mindfulness was not predicted by the level-1 variable (Session), the level-2 variable (Group) or the interaction term (Session*Group). Thus, the final model included the intercept as the only predictor in the model, $F(75.85, 224) = 4375.20, p < .001$. The estimate of Dispositional Mindfulness for any individual, regardless of Group or Session, is 125.68. Individual differences in the intercept were present, $Wald z = 8.60, p < .001$. Significant residual variance was present as well, $Wald z = 5.75, p < .001$.

**Objective 3**

**Hypothesis 3.** The third objective proposed that decreased Thought Avoidance would mediate the relationship between Group and change in Binge Episodes. The Baron and Kenny (1984) model for assessing mediation was used. Results of the regression models for each step are reported in Table 10. Support for this hypothesis was not found. Change in Thought Avoidance was not supported as a mediator of treatment outcome as it did not differ between Treatment Groups (Model 1) and was not related to change in Binge Episodes while in the presence of Treatment Group (Model 3). While change in Binge Episodes did differ by Treatment Group (Model 2), change in Thought Avoidance was not identified as a mechanism responsible for the change.
Objective 4

The fourth objective was exploratory and considered whether Binge Episodes prior to the initial session, Readiness to Change Alcohol Use, Psychological Distress, Mindfulness Practice or change in Dispositional Mindfulness were related to Change in Binge Episodes. Change in Binge Episodes was calculated by subtracting Binge Episodes in the four weeks prior to the initial intervention from Binge Episodes in the four-week following the initial intervention. A series of stepwise linear regression models were conducted. The variable of interest was entered as the first block, Treatment Group was entered as the second block and the interaction term was entered as the third block. All variables were centered. Results from each model are detailed in Tables 11 to 15 and are summarized below.

The first model evaluated the relationship between Binge Episodes in the four weeks prior to the initial session and Change in Binge Episodes following the initial session (Table 11). Binge Episodes at the initial session was significantly related to Change in Binge Episodes. However, the interaction between Binge Episodes at the initial session and Treatment Group was not significant. The analysis was re-run using a square root transformation of Binge Episodes at the initial session due to non-normality in the distribution. The transformation resulted in a normal distribution pattern. As results did not change the non-transformed variable was used.

The second model found support for the role of Readiness to Change alcohol use in moderating Change in Binge Episodes (Table 12). The interaction between Readiness to Change and Treatment Group was related to Change in Binge Episodes. The model
containing the interaction term accounted for significantly more variance than the model containing only main effects. Higher initial Readiness to Change Alcohol Patterns was related to a significant decrease in Binge Episodes among the Mindfulness Group but not among the Control Group.

The remaining exploratory variables were not supported as affecting Change in Binge Episodes. Specifically, Change in Binge Episodes was not related to Initial Psychological Distress (Model 3), Quantity and Frequency of Mindfulness Meditation Practice (Model 4) or Change in Dispositional Mindfulness (Model 5; Tables 13-15).
Discussion

The current study offers preliminary evidence for the feasibility and effectiveness of a brief mindfulness intervention as a treatment strategy for college students who are binge drinkers. The main findings suggest that the brief mindfulness intervention had a direct effect on frequency of binge episodes, consequences of alcohol use and alcohol refusal self-efficacy. Lower dispositional mindfulness was related to higher consequences of alcohol use at the initial session and readiness to change at the initial session moderated change in binge episodes among the Mindfulness Group. Contrary to study hypotheses, the Mindfulness Group did not evidence changes in dispositional mindfulness, readiness to change or thought avoidance.

Results suggest that a brief mindfulness intervention may be helpful in changing alcohol-related behaviors among college students who report patterns of binge drinking. In the four weeks following the initial intervention, based on the sample means, the Mindfulness Group reported 2.61 fewer binge episodes than the Control Group, a large effect size (Cohen’s $d = .86$) by conventional standards (Cohen, 1992). Significant reductions in consequences of alcohol use were also reported by the Mindfulness Group versus the Control Group in the four weeks following the initial intervention, producing a medium effect size (Cohen’s $d = .49$; Cohen, 1992).

These findings are strong relative to commonly used interventions aimed to reduce alcohol use among college students. A meta-analysis of individual level interventions for college alcohol use found a small effect size ($d = .25$) for alcohol-related outcome variables when assessed within three weeks of the intervention (Carey et al.,
Within the mindfulness literature, results of the current study are robust as well. For instance, a pilot study of MBRP found medium effect sizes for reductions in frequency of alcohol use (Cohen’s $d = .39$) and consequences of alcohol use (Cohen’s $d = .22$) directly following the 8-week MBRP protocol (Cohen, 1992; Bowen et al., 2009).

The frequency of alcohol use did not differ by treatment group (Appendix C-3). This suggests that participation in the brief mindfulness intervention did not deter participants from engaging in alcohol use but rather reduced rates of binge drinking, a particularly hazardous pattern of alcohol consumption. Further, at the initial session, higher dispositional mindfulness was related to fewer consequences of alcohol use and fewer binge episodes. This suggests that strategies aimed to increase dispositional mindfulness may serve a protective function, resulting in less hazardous choices regarding alcohol use (Charles, 2010; Ostafin & Marlatt, 2008; Perkins et al., 2002).

These findings are compatible with a harm reduction approach to reducing alcohol use (Marlatt, 1996). Through collaboration with the individual and acceptance of their choices, harm reduction seeks to set attainable goals which aim to reduce the harmful consequences of alcohol and/or other high-risk behaviors. Abstinence focused approaches are consistently found to be ineffective in producing change among college students and harm reduction has been proposed to be a better framework from which to approach college drinking (Baer, Kivlahan, Blume, McKnight & Marlatt, 2001; Marlatt, 2002; Marlatt & Witkiewitz, 2002).
Results of this study are consistent with findings from several previous studies that examined the effects of mindfulness-based interventions among clinical populations of substance users. These studies, evaluating more extensive, therapist-delivered mindfulness-based protocols suggest that mindfulness training can lead to decreased substance use, fewer consequences of use, decreased depression, anxiety and stress as well as increased self-control and increased self-efficacy (Alterman et al., 2004; Bowen et al., 2006; Bowen et al., 2009; Lee et al., 2010; Marcus, Fine & Kouzakanani, 2001; Zgierska et al., 2008). Of the three previous studies that included a control group and assessed alcohol use following a mindfulness-based intervention, the average effect size for reductions in alcohol use was 0.39 (Bowen et al., 2006; Bowen et al., 2009; Zgierska et al., 2008). In general, this body of research is limited by the use of small sample sizes, self-selection of participants to group and the lack of follow-up assessment periods.

Considering past findings and current study hypotheses, it was unexpected that Dispositional Mindfulness, as assessed by the overall score on the Five Facet Mindfulness Questionnaire (FFMQ), did not increase among the Mindfulness Group. One potential explanation is that the FFMQ, a measure of dispositional or trait mindfulness is not sensitive enough to detect changes in mindfulness over a relatively short period of time. Development and use of a comprehensive measure of situational or state mindfulness may be better able to detect short-term changes in mindfulness resulting from brief interventions.

However, post-hoc analyses of the five factors of the FFMQ (i.e., awareness, observing, describing, non-judgment and non-reactivity) found that while there were no
mean group differences at the initial session, at the 5th session, mean scores on the
factors of observing and non-reactivity were higher among the Mindfulness Group
compared to the Control Group (Appendix C-4). In light of these findings, it is suggested
that the current intervention may have focused more on certain aspects of mindfulness.
Specifically, during the initial intervention the first mindfulness practice focused on
observation of one’s breath and the second practice focused on non-reactivity in response
to strong urges or difficult emotions. This may explain why certain aspects of
dispositional mindfulness were found to increase (i.e., observing and non-reactivity)
while others remained unchanged (i.e., awareness, describing and non-judgment).

The current study examined individual and treatment process variables to assess
characteristics that might affect treatment outcome. Individuals who reported higher
binge episodes prior to the initial session reported a greater decrease in binge episodes
following the initial session and among the Mindfulness Group, higher readiness to
change was related to greater decreases in binge episodes. While these analyses were
exploratory, they offer preliminary evidence for the identification of characteristics
associated with poor outcome. For instance, results suggest that individuals with lower
readiness to change were at risk for a poor treatment response and that readiness to
change did not increase as a result of the brief mindfulness-based intervention. Future
studies could examine whether the addition of motivational enhancement techniques,
shown to increase readiness to change, might be an effective precursor to participation in
a brief mindfulness-based intervention for those individuals who report lower readiness
to change (USDHHS, 2002b).
While the current study shows preliminary evidence for effects of mindfulness-based techniques on binge drinking, mechanisms of these effects remain unclear. While previous research has found decreased thought avoidance to mediate change in mindfulness-based interventions, this was not evidenced in the current study. Models of change within mindfulness-based interventions have theorized that increased behavioral self-regulation is one potential mediator of change (Brown & Ryan, 2003). Self-regulation may increase as a result of mindfulness training, which though observation of moment to moment experience, results in an increased awareness of habitual or conditioned patterns of reacting (Baer, 2003; Kabat-Zinn, 1994; Shapiro, Carlson & Astin, 2006; Witkiewitz et al., 2005).

Further, research has highlighted the role of implicit processes in behavioral self-regulation. Implicit processes are habitual motivations and attitudes that can be activated automatically without conscious intention or guidance. Recent studies have found that daily activities, including patterns of alcohol use were less impacted by implicit processes among individuals with higher dispositional mindfulness (Levesque & Brown, 2007; Ostafin & Marlatt, 2008). Therefore, mindfulness training may lessen the degree to which implicit processes influence behavior allowing for increased awareness and self-regulation.

These findings have important implications for understanding patterns of binge drinking. Drinking patterns among college students are heavily influenced by peer influences and the culture of heavy alcohol use that characterizes many college environments (Perkins, 2002). If mindfulness training results in an increased awareness
and regulation of behavior, this may decrease the degree to which an individual binge drinks in response to habitual patterns and may alter the impact that peers and situational norms exert on patterns of alcohol use.

While self-regulation was not assessed in the current study, findings indicated that mindfulness was related to increased alcohol refusal self-efficacy. This suggests that participation in a brief mindfulness intervention resulted in a greater sense of control over choices regarding alcohol use. Future studies might examine mechanisms for increased regulation of alcohol behaviors, such as increased awareness and observation of habitual patterns related to alcohol use. Discerning the temporal sequence between changes in self-efficacy and less frequent binge episodes is beyond the scope of this study. Future studies might examine whether mindfulness training directly affects both self-efficacy and rates of binge episodes directly or whether one proceeds and leads to, changes in the other.

**Feasibility and Participant Satisfaction**

The feasibility and utility of the intervention protocol in this population is reflected in low rates of attrition and missed sessions. A review of interventions aimed to reduce college alcohol use indicates that high attrition is a significant methodological limitation within this body of research (Larimer & Cronce, 2007). Rates of attrition in the current study (N=3; 4%) are comparable to, and frequently much lower than, interventions utilizing similar follow-up periods (Carey et al., 2006; Doumas, McKinley & Book, 2009; Saitz et al., 2007).
Compliance with out-of-session mindfulness meditation guidelines was demonstrated as well. Eighty-nine percent of the Mindfulness Group reported at least one instance of out-of-session mindfulness meditation practice each week. Furthermore, participant ratings of interest, comprehension and perceived helpfulness of the intervention were generally high suggesting treatment satisfaction and interest in meditation among participants (Appendix C-5).

Time and cost are important considerations for college alcohol interventions (USDHHS, 2002c; Wechsler & Nelson, 2008). Interventions need to be disseminated to a sizable proportion of the college population, most of who do not view their alcohol as problematic and do not seek treatment (Carey et al., 2007; Knight et al., 2002). The duration of the current intervention, an hour session followed by a 25-minute session two weeks later, is of comparable or shorter duration to frequently used individual level college interventions (Larimar & Cronce, 2007).

For instance, the Brief Alcohol Screening and Intervention for College Students (BASICS, Dimeff, Baer, Kivlahan & Marlatt, 1999) is a brief motivational enhancement intervention that is delivered in two sessions, each of 50-minute duration. The alcohol skills training program (ASTP) is an example of a skill based cognitive behavioral small-group intervention and is delivered in 6-8 weekly sessions, each of 90 minute duration (Fromme, Marlatt, Baer & Kivlahan, 1994). While the current mindfulness-based intervention was delivered individually, it could be tailored to a group setting; further increasing time- and cost-efficiency. Thus, the brevity of the current treatment has the
potential to reduce staff costs while resulting in comparable or better treatment outcomes (Larimer & Cronce, 2007).

**Limitations and Future Directions**

The current study has several limitations to consider. Participants were followed for four weeks following the initial intervention. However, as they received compensation for out-of-session practice during this period and participated in a booster session, the study lacked a true follow-up period. Past research has indicated that effect sizes of brief interventions among college students tend to decrease over time (Larimar & Cronce, 2007). As effect sizes tend to dissipate within six-months post-intervention, future studies should include follow-up assessments of at least six-months to determine the durability of treatment effects (Carey et al., 2007).

The current study utilized an assessment only control group. In order to determine the importance of the specific factors of the mindfulness intervention, future studies should utilize a placebo condition of comparable duration. Eventually, comparisons between a brief mindfulness-based intervention and commonly used brief interventions aimed to reduce college alcohol use such as cognitive skill-based and motivational enhancement interventions are needed (Larimer & Cronce, 2002; USDHHS, 2002b).

The current sample was largely Caucasian, and drawn from a pool of undergraduate students enrolled in introductory level psychology classes at a rural, mid-sized, four-year, public university. Findings may not generalize to all college or university settings. In particular, research has focused primarily on students in
residential, four-year college and university settings (Knight et al., 2002; Wu, Pilowsky, Schlenger & Hasin, 2007). Very little is known about the generalizability of these findings to commuter students and those attending two-year vocational schools, settings that often have less access to resources and fewer mental health services for students. Finally, while care was taken to provide sufficient power for the analyses of the primary study hypotheses, it should be cautioned that the exploratory and supplemental analyses may be underpowered and results should be considered with this limitation in mind.

In spite of these limitations, this is, to our knowledge, the first controlled study to evaluate the efficacy of a brief mindfulness-based intervention for college students who report patterns of binge drinking. Methodologically, the study utilized random assignment of participants and relied on psychometrically validated assessment measures. In the current study, reliability (Cronbach’s alpha) was found to be in the acceptable range for all measures (Nunnally, 1978). The current study used the Timeline Followback Method to assess alcohol patterns, an instrument with strong psychometric properties. The Timeline Followback Method is found to have greater clinical and research utility than summary or aggregate methods which ask the participant to recall past patterns of alcohol use without using specific markers, referred to as “quantity-frequency” measures (Sobell & Sobell, 1993; 1995).

While demand characteristics are an important consideration in any intervention study, the study sought to limit the role of demand characteristics through an emphasis on the impact mindfulness training can have on a variety of health indices (e.g., reduced stress, improved sleep, and increased self-esteem). This was done so as not to prime
participants to respond to alcohol related questions in an overly positive manner. Due to
the emphasis on a range of positive effects of mindfulness training, it is likely that
demand characteristics would have been manifested in an overall positive response bias
whereas in actually, the Mindfulness Group reported positive change on certain outcomes
(e.g., binge episodes, self-efficacy) but not others (e.g., frequency of use, readiness to
change).

The brief mindfulness intervention was standardized to reduce therapist effects,
thereby increasing generalizability. Handouts and audio recordings were used to teach
participants about the concepts of mindfulness and how to engage in mindfulness
meditation. These, or similar materials, could be disseminated among high-risk students
on college campuses and made available at counseling and resource centers. Participants
were provided an opportunity to practice concepts of mindfulness in both a controlled
laboratory setting during the cue exposure protocol and a naturalistic setting outside of
the study sessions. Alcohol-related urges were significantly higher during the cue
exposure than when assessed during subsequent sessions (Appendix C-6) suggesting that
the cue exposure was effective in providing a stimulated exercise for managing urges to
use alcohol.

In summary, the current intervention offers a low cost, time-efficient intervention
that was found to be feasible, satisfactory and effective among college students who
report engaging in patterns of binge drinking. It confirms previous research suggesting
the importance of mindfulness in predicting patterns of problematic alcohol usage among
college students and adds to a growing body of research supporting the efficacy of
mindfulness training in the treatment of substance-related problems (Baer, 2009). Effect sizes are comparable or larger than frequently used college level individual interventions (Bangert-Drowns, 1988; Carey et al., 2007; Larimar & Cronce, 2007). Though more research is needed to confirm and extend these findings, the current mindfulness-based intervention was received well by participants and appears to be a highly effective intervention for reducing hazardous patterns of alcohol use among college students who are binge drinkers.
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doi:10.1097/ADM.0b013e31816f8546
### Table 1

**Descriptive Statistics: Categorical Variables**

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<tr>
<th>Category</th>
<th>Total (N = 76)</th>
<th>Mindfulness Group (N = 38)</th>
<th>Control Group (N = 38)</th>
<th>p-value</th>
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<td>7 (18%)</td>
<td>7 (18%)</td>
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<tr>
<td>Junior</td>
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<td>8 (24%)</td>
<td>7 (18%)</td>
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<td>Senior</td>
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<td><strong>Race/Ethnicity</strong></td>
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<td>34 (90%)</td>
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<td>Protestant</td>
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<td>Other Christian</td>
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<td>1 (3%)</td>
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<td>Atheist</td>
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<td>Other</td>
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<td><strong>Sexual Orientation</strong></td>
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Table 1 (continued)
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<td>Does Not Date</td>
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<td>Dates Casually</td>
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<tr>
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<td>Mother and Step-Father</td>
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<td>Total Sample</td>
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<td>---------------</td>
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<tr>
<td></td>
<td>N</td>
<td>Mean (SD)</td>
<td>Alpha</td>
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<td>Age</td>
<td>76</td>
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<td>BE S2</td>
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</tr>
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<td>BE S3</td>
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<td>BE Change</td>
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<td>FFMQ S1B</td>
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<td>FFMQ S1E</td>
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<tr>
<td>Metric</td>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
</tr>
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<td>--------</td>
<td>--------</td>
<td>--------</td>
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<tr>
<td>BSI GSI S1&lt;sup&gt;k&lt;/sup&gt;</td>
<td>76</td>
<td>63.99 (18.67)</td>
<td>95</td>
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<tr>
<td>BSI GSI S5</td>
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<td>MM Freq Avg&lt;sup&gt;m&lt;/sup&gt;</td>
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<tr>
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<td>14.26 (6.66)</td>
<td>.87</td>
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</tbody>
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<sup>a</sup> Weekly average from past four weeks  
<sup>b</sup> BE = Binge Episodes  
<sup>c</sup> BE Change = (BES2+BES3+BES4+BES5) – (BES1avg*4)  
<sup>d</sup> DRSEQ = Drinking Refusal Self-Efficacy Questionnaire  
<sup>e</sup> S1B = Beginning of Initial Session  
<sup>f</sup> S1E = End of Initial Session  
<sup>g</sup> FFMQ = Five Facet Mindfulness Questionnaire  
<sup>h</sup> RAPI = Rutgers Alcohol Problem Index  
<sup>i</sup> RTCQ = Readiness to Change Questionnaire  
<sup>j</sup> WBSI = White Bear Suppression Inventory  
<sup>k</sup> BSI = Brief Symptom Inventory  
<sup>m</sup> MM Quan Avg = Weekly average the quantity of Mindfulness Meditation out-of-session practice  
<sup>l</sup> MM Freq Avg = Weekly average frequency of Mindfulness Meditation out-of-session practice  
<sup>n</sup> AUQ = Alcohol Urge Questionnaire
Table 3

*Bivariate Correlation Matrix of Baseline Variables*

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*p<.05, **p<.01
Table 4

*Summary of Linear Mixed Models for Binge Episodes (N = 73)*

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*p<.05, **p<.01.
Table 5

*Summary of Mixed Model ANOVA for Consequences of Alcohol Use (N = 73)*

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*p<.05, **p<.01.
* a As the assumption of sphericity was not met, the Greenhouse-Geisser statistics are reported.
Table 6

**Summary of Linear Mixed Models for Alcohol Refusal Self-Efficacy (N = 73)**

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*p<.05, **p<.01.
Table 7

*Summary of Linear Mixed Models for Readiness to Change (N = 73)*

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*p<.05, **p<.01.
Table 8

*Summary of Linear Regression Analysis for Dispositional Mindfulness (N = 76)*

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*p<.05, **p<.01.
Table 9

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<td>253.35**</td>
<td>260.57**</td>
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<td>18.23**</td>
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<td>ML</td>
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<td>REML</td>
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<tr>
<td>-2L(\ell(model))</td>
<td>1730.07</td>
<td>1729.41</td>
<td>1728.49</td>
<td>1720.05</td>
<td>1708.95</td>
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<td>Parameters</td>
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<td>7</td>
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<tr>
<td>Models Compared</td>
<td></td>
<td>1 vs. 2</td>
<td>1 vs. 3</td>
<td>3b vs. 4</td>
<td>4b vs. 6</td>
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<tr>
<td>\Delta-2L(\ell(M1/M2))</td>
<td>0.66</td>
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<td>&gt;.05</td>
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</table>

*p<.05, **p<.01.
Table 10

*Summary of Linear Regression Analyses for Thought Avoidance as a Mediator of Change (N = 73)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>F</th>
<th>Δ F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1: Δ Thought Avoidance</td>
<td></td>
<td></td>
<td></td>
<td>.74</td>
<td>.01</td>
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<tr>
<td>Group</td>
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<td>.74</td>
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<tr>
<td>Model 2: Δ BE</td>
<td></td>
<td></td>
<td></td>
<td>12.32**</td>
<td>.15</td>
</tr>
<tr>
<td>Group</td>
<td>-.249</td>
<td>.71</td>
<td>12.32**</td>
<td></td>
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<tr>
<td>Model 3: Δ BE</td>
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<td></td>
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<td>7.24**</td>
<td>.17</td>
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<td>Group</td>
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<td>11.38**</td>
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<td>Δ Thought Avoidance</td>
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* *p<.05, **p<.01.
Table 11

*Summary of Linear Regression Model for Change in Binge Drinking (N = 73)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>F</th>
<th>Δ F</th>
<th>Δ R²</th>
</tr>
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<tbody>
<tr>
<td><strong>Block 1</strong></td>
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<tr>
<td>Binge Episodes S1*¹</td>
<td>-.43</td>
<td>.09</td>
<td>21.52**</td>
<td>.23</td>
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</tr>
<tr>
<td>Binge Episodes S1</td>
<td>-.43</td>
<td>.08</td>
<td>25.45**</td>
<td>.14</td>
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<tr>
<td>Group*²</td>
<td>-2.44</td>
<td>.61</td>
<td>15.96**</td>
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<tr>
<td>Binge Episodes S1</td>
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<td>.14</td>
<td>7.35**</td>
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<td>Group</td>
<td>-2.44</td>
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<td>15.79**</td>
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<td>Binge Episodes by Group</td>
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</table>

* *p<.05, **p<.01.
*¹ Binge Episodes S1 was centered
*² Group was coded as Control Group = 0; Mindfulness Group = 1
Table 12

Summary of Linear Regression Model for Change in Readiness to Change (N = 73)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>F</th>
<th>Δ F</th>
<th>Δ R²</th>
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<tr>
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<tr>
<td>RTCQS1*</td>
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<td>.04</td>
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<td>Group*</td>
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<td>.71</td>
<td>13.09**</td>
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<td>Block 3</td>
<td></td>
<td></td>
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<td>4.04*</td>
<td>.05</td>
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<td>RTCQS1</td>
<td>.04</td>
<td>.06</td>
<td>.36</td>
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<td>-2.60</td>
<td>.70</td>
<td>13.65**</td>
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<tr>
<td>RTCQS1 by Group</td>
<td>-.18</td>
<td>.09</td>
<td>4.04*</td>
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*p<.05, **p<.01.

*a RTCQS1 was centered

*b Group was coded as Control Group = 0; Mindfulness Group = 1
Table 13

Summary of Linear Regression Model for Psychological Distress (N = 73)

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Δ F</th>
<th>Δ R²</th>
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<td>.02</td>
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<td>Block 2</td>
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<td></td>
<td>12.15**</td>
<td>.15</td>
<td></td>
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<tr>
<td>Initial Psychological Distress</td>
<td>.01</td>
<td>.02</td>
<td>.01</td>
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</tr>
<tr>
<td>Group*²</td>
<td>-2.49</td>
<td>.71</td>
<td>12.15**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 3</td>
<td></td>
<td></td>
<td>.04</td>
<td>&lt;.01</td>
<td></td>
</tr>
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<td>Initial Psychological Distress</td>
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<td>.04</td>
<td>&lt;.01</td>
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<td>Group by Psychological Distress</td>
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</table>

* *p<.05, **p<.01.
*¹ Psychological Distress was centered
*² Group was coded as Control Group = 0; Mindfulness Group = 1
Table 14

Summary of Linear Regression Analysis for Mindfulness Practice (N = 37)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>F</th>
<th>ΔF</th>
<th>R²</th>
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<td>Frequency of MM practice</td>
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<td>.13</td>
<td>.04</td>
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<td></td>
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<tr>
<td>Quantity of MM practice</td>
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<td>.01</td>
<td>1.32</td>
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<td>.01</td>
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* *p<.05, **p<.01.
Table 15

*Summary of Linear Regression Analysis for Predicting Change in Mindfulness (N = 37)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>F</th>
<th>Δ F</th>
<th>R²</th>
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<tbody>
<tr>
<td>Change in Mindfulness</td>
<td>.04</td>
<td>.03</td>
<td>2.38</td>
<td>.06</td>
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</tr>
</tbody>
</table>

* *p<.05, **p<.01.*
Figure 1: Model Estimation of Mean Number of Binge Episodes by Group over Time
Figure 2: Marginal Means of Consequences of Alcohol Use by Group over Time
Figure 3: Model Estimation of Mean Self-Efficacy by Group over Time
# Appendix A-1: Overview of Mindfulness-Based Interventions for Substance Use

## Studies Utilizing Mindfulness Meditation (MM) in an Adult Alcohol or Drug Using Population

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>N</th>
<th>Intervention</th>
<th>Measures</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Marcus et al., 2001 | Therapeutic community | Pre- and post-test: N=18 MM; N=18 TAU; | 8 week mindfulness meditation course Pre- and post-test TAU: 12-step focus | Ways of coping checklist Symptom checklist-90-R | Post-Treatment:  
1. MM: higher levels of self-control coping styles  
2. No differences on other coping styles  
3. No differences on psychiatric symptoms |
| Alterman et al., 2004 | Therapeutic Community | Baseline: N=18 MM, N=13 TAU, At 3-mo follow-up: N=15 MM; N= 10 TAU | 8 week mindfulness meditation course TAU: 12-step focus | Addiction severity index Timeline followback method Spirituality assessment scale Life attitude profile-revised Life orientation test Positive and negative affect scale SF-36 (vitality sub-scale) | 3 month follow-up:  
1. MM: significantly reductions in medical symptoms  
4. About half of the MM continued to report practicing MM at the 3-mo follow-up period. |
| Bowen et al., 2006 | Incarcerated Sample   | Baseline: N= 63 VM; N= 242 TAU; | 10 day Vipassana Meditation course TAU: 12-step focus | Daily Drinking Questionnaire Daily Drug Questionnaire | 3 month follow-up:  
1. VM: less marijuana, crack, cocaine and alcohol use, decreased psychiatric symptoms, |
3-mo follow-up: N=29 VM; N=51 TAU; Participants self-selected for VM group.

- Short Problem Inventory
- Drinking Related Locus of Control
- White Bear Suppression Inventory
- Life Orientation Test

Increased internal locus of control and optimism
2: Both VM and TAU: decreased consequences of alcohol use
3: No change in tobacco use or thought suppression

3b. Bowen et al., 2007
Secondary data analysis of Bowen et al., 2006

Same as above

White Bear Suppression Inventory

3 months follow-up:
1. VM: decreased thought avoidance which partially mediated the effects of the VM course on frequency of alcohol use and consequences of alcohol use
2. No group difference in intrusive thoughts

4. Zgierska et al., 2008
Participants had completed intensive outpatient program for alcohol dependence

Baseline: N=19
Post-test: N=15
Blood work: N=12
Saliva: N=10
8-week MBRP, adapted specifically to alcohol use disorders

Stress-responsive biomarkers
Liver enzymes
Timeline followback method
Symptom Checklist-90R (anx and dep subscales)
Perceived Stress Scale
Compulsive Drinking Scale
Mindfulness Attention Awareness Scale
Lifetime Treatment

Post-test:
1. MBRP: increased mindfulness, perceived stress, depression and anxiety
2. MBRP: Marginally significant improvements in cravings and serum interleukin-6
3. Quantity of outside practice was related to better outcome but frequency was not
4. Alcohol consumption, salivary cortisol and liver enzymes did not change
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Description</th>
<th>Baseline: N=93 MBRP, N=75 TAU;</th>
<th>8-week MBRP TAU: 12-step focus Random Assignment</th>
<th>Timeline Followback Method</th>
<th>Penn Alcohol Craving Scale</th>
<th>Short Inventory of Problems</th>
<th>Five Facet Mindfulness Questionnaire</th>
<th>Acceptance and Action Questionnaire</th>
<th>2 month follow-up: 1. MBRP: Decrease in alcohol use and cravings, increased acceptance and acting with awareness 4 month follow-up: 2. No group difference in alcohol use 5. Over half of MBRP group continued to meditate at 4-mo follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Bowen et al., 2009</td>
<td>Followed completion of outpatient or inpatient substance use treatment</td>
<td>4-mo follow-up: N=72 MBRP; N=51 TAU;</td>
<td>10 session MBRP TAU: education based</td>
<td>Drug use identification disorders test Drugs avoidance self-efficacy scale Beck Depression Inventory- II (MBRP group only)</td>
<td>Post-treatment: 1. MBRP: Decreased depressive symptoms and increases in negative expectations for drug use 3. Both groups reported increased self-efficacy</td>
<td>4. No difference for positive expectations of drug use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Lee et al., 2010</td>
<td>Prison Sample</td>
<td>Pre- and post-test: N=10 MBRP, N=14 TAU</td>
<td>10 session MBRP TAU: education based</td>
<td>Personalized substance use management program</td>
<td>Group differences in depression and anxiety</td>
<td>1. MBRP: Decreased depressive symptoms, increased self-efficacy and decreased negative expectations for drug use, 2. TAU: Increased depressive symptoms, anxiety, and negative expectations for drug use</td>
<td>4. MBRP: Increased self-efficacy</td>
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</table>
Appendix A-2: Session Procedures

<table>
<thead>
<tr>
<th>Session</th>
<th>Task and Materials/Measures (Time)</th>
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<tbody>
<tr>
<td><strong>Initial Session</strong></td>
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</tr>
<tr>
<td>Mindfulness Group</td>
<td></td>
</tr>
<tr>
<td>Informed Consent</td>
<td>(3 min)</td>
</tr>
<tr>
<td>Self-Report Measures</td>
<td>(30 min)</td>
</tr>
<tr>
<td>Demographic Questionnaire</td>
<td></td>
</tr>
<tr>
<td>Rutgers Alcohol Problem Inventory</td>
<td></td>
</tr>
<tr>
<td>Brief Symptom Inventory</td>
<td></td>
</tr>
<tr>
<td>Drinking Refusal Self-Efficacy Questionnaire</td>
<td></td>
</tr>
<tr>
<td>Readiness to Change Questionnaire</td>
<td></td>
</tr>
<tr>
<td>White Bear Suppression Inventory</td>
<td></td>
</tr>
<tr>
<td>Five Facet Mindfulness Questionnaire</td>
<td></td>
</tr>
<tr>
<td>Alcohol Timeline Followback Method</td>
<td>(10 min)</td>
</tr>
<tr>
<td>1st Mindfulness Exercise</td>
<td>(25 min)</td>
</tr>
<tr>
<td>Meditation Instructions and Breathing</td>
<td></td>
</tr>
<tr>
<td>2nd Mindfulness Exercise</td>
<td>(10 min)</td>
</tr>
<tr>
<td>Urge Surfing</td>
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</tr>
<tr>
<td>Cue Exposure</td>
<td>(15 min)</td>
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<tr>
<td>Control Group</td>
<td></td>
</tr>
<tr>
<td>Informed Consent</td>
<td>(3 min)</td>
</tr>
<tr>
<td>Self-Report Measures</td>
<td>(30 min)</td>
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<td>Demographic Questionnaire</td>
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<td>Rutgers Alcohol Problem Inventory</td>
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<td>Brief Symptom Inventory</td>
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<tr>
<td>Drinking Refusal Self-Efficacy Questionnaire</td>
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<tr>
<td>Readiness to Change Questionnaire</td>
<td></td>
</tr>
<tr>
<td>White Bear Suppression Inventory</td>
<td></td>
</tr>
<tr>
<td>Five Facet Mindfulness Questionnaire</td>
<td></td>
</tr>
<tr>
<td>Alcohol Timeline Followback Method</td>
<td>(10 min)</td>
</tr>
<tr>
<td>Session</td>
<td>Activities</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| **2nd Session**<sup>**a**</sup> | Informed Consent (3 min)  
Self-report measure (5 min)  
Alcohol Urge Questionnaire  
Alcohol Assessment (5 min)  
Alcohol Timeline Followback  
**Mindfulness Meditation Tracking Form**  
Debriefing (2 min) |
| **3rd Session**<sup>**a**</sup> | Informed Consent (3 min)  
Self-report measure (5 min)  
Alcohol Urge Questionnaire  
Alcohol Assessment (5 min)  
Alcohol Timeline Followback  
**Mindfulness Meditation (25 min)**  
*Meditation for awareness of emotions*  
*Manipulation Check*  
**Mindfulness Meditation Tracking Form**  
Debriefing (2 min) |
| **4th Session**<sup>**a**</sup> | Informed Consent (3 min)  
Self-report measure (5 min)  
Alcohol Urge Questionnaire  
Alcohol Assessment (5 min)  
Alcohol Timeline Followback  
**Mindfulness Meditation Tracking Form**  
Debriefing (2 min) |
**Mindfulness Meditation Tracking Form**
Debriefing (2 min)

5th Session*^a

- Informed Consent (3 min)
- Self-report measures (25 min)
  - Rutgers Alcohol Problem Inventory
  - Brief Symptom Inventory
  - Drinking Refusal Self-Efficacy Questionnaire
  - Readiness to Change Questionnaire
  - White Bear Suppression Inventory
  - Five Facet Mindfulness Questionnaire
  - Alcohol Urge Questionnaire
- Alcohol Assessment (5 min)
  - Alcohol Timeline Followback

**Mindfulness Meditation Tracking Form**
Participant Payment (3 min)
Debriefing (4 min)

Debriefing (2 min)

Informed Consent (3 min)
Self-report measures (25 min)
  - Rutgers Alcohol Problem Inventory
  - Brief Symptom Inventory
  - Drinking Refusal Self-Efficacy Questionnaire
  - Readiness to Change Questionnaire
  - White Bear Suppression Inventory
  - Five Facet Mindfulness Questionnaire
  - Alcohol Urge Questionnaire
- Alcohol Assessment (5 min)
  - Alcohol Timeline Followback

Bolded areas are only completed by Mindfulness Group

*^a Participants in the Mindfulness Group will also be asked to engage in mindfulness meditation for at least one hour per week between sessions
What is Mindfulness?

Mindfulness means paying attention in a particular way: on purpose, in the present moment and nonjudgmentally.
-Jon Kabat-Zinn

Have you even walked into the kitchen to get something and forgot what you went to get? Or gotten to the store and realize you don’t remember the drive? Have you ever started eating a bag of chips or a box of cookies and the next thing you know, it is half empty?

These are all examples of mindlessness, being on “automatic pilot” which is how we often tend to interact with the world, daydreaming, thinking about events that happened in the past, or one’s future to-do list, not focusing on what is happening in the present moment. Operating on “automatic pilot” results in our not being fully present for our own lives. The consequences of this inattention can be quite costly. They can result in our missing some really good things, and also in our ignoring really important information and messages about our life, our relationships, and even our own health.

Our reactions to the stressful events of our lives can become so habituated that they occur essentially out of our awareness. These reactions can include tensing the body, experiencing anxiety and depression, or becoming reliant on alcohol or drugs.

Mindfulness is in direct opposite to mindlessness, or being on “automatic pilot.” It is way of directly relating to the world, through observation and awareness of all thoughts, feelings and sensations that may arise in the present moment, without trying to change, evaluate, or avoid those thoughts, feelings or sensations.

Practicing Mindfulness

Mindfulness is not something that you have to “get” or acquire. It is already within you — a deep internal resource available and patiently waiting to be released and used. However, it takes practice to develop this inner resource.

There are many ways to practice mindfulness. Mindfulness can be practiced in basically any activity that you engage in- washing the dishes, going for a walk, even reading this handout. All you need to do is pay more careful attention to what is going on both inside you and around you and to allow yourself to experience directly what is there, especially what is in your own body and mind.

When starting a new activity you might try beginning with a few moments of silence, focusing on any thoughts, feelings or sensations in your body. A simple way to start is by taking a few deep breaths. Or, in the middle of an on-going situation or process you
might try bringing attention back to your breathing, or to the physical sensations of walking, or eating a meal. One moment of mindfulness, one breath when we are truly present, can be very powerful.

Hints

Expect your mind to wander! Your mind may wander if you practice for only a few breaths or for a few minutes. Practice kindness and patience with yourself when this happens and gently return awareness to the breath sensation.

Expect to feel some relaxation, especially if you practice for even a few breaths or for a few moments. This relaxed feeling is an ally. It helps us to be more present, more mindful. Relaxation alone is not what mindfulness is about, however! It is about being present with awareness.

Expect to become more mindful with practice. Expect to notice more things, including more painful things. This is actually progress! You are not doing anything wrong. Quite the opposite, you are increasing mindfulness for all things. When you begin to notice the painful things, whether the pain is physical or emotional, see if you can hold yourself with compassion and kindness, and continue to bring open-hearted awareness to the experience that is unfolding. By practicing staying present, not turning away from the painful moments in our lives, we can learn to remain open to all the possibilities in each situation.

Finally, be careful not to try too hard when practicing mindfulness. Don't try to make anything happen, or to achieve any special states or any special effects! Try to approach practice without judgment. Simply relax and pay as much attention as you can to just what is here now. Allow yourself to experience life directly as it unfolds, paying careful and open-hearted attention.

Why is practice important?

Research has shown that meditation is similar to other lifestyle change activities in that it is only effective if you do it! Exercise, diet change, or meditation -- any lifestyle change requires consistent practice to gain results. In early studies of meditation, the cardiologist Herbert Benson, at Harvard, demonstrated that practicing meditation 20 minutes twice-a-day was sufficient to bring about positive changes in physical health. The exact number of minutes of daily practice to bring benefits for large populations is not well understood, and, in truth, it probably varies based on a number of considerations. Generally, however, we can say that regular, daily meditation practice of at least 30 minutes or more is very likely to bring benefits to the person who does it.

Becoming more mindfulness takes practice, so in the current study, we ask you to set aside at least 15 minutes, four times a week for the next four weeks. Set aside some time
free from other activity or distraction to listen to the mindfulness meditations contained on the CD you will receive. These exercises guide you to pay attention to your breath, your emotions, your bodily sensations and your thoughts, accepting whatever may arise within your body and mind. Over time you may find that the "formal" practice supports and strengthens your ability to practice "informally" throughout the day in different situations.

Research shows us that following mindfulness training, individuals report numerous benefits including:

- Increased ability to cope with daily stressors
- Increased energy, enthusiasm and enjoyment of life
- Improved self-esteem
- Decreased depression and anxiety
- Improved sleep and improved immune system functioning
- Decreased alcohol and drug use

Mindfulness and Alcohol Use

Research has shown us that practicing mindfulness skills can be very helpful for individuals who struggle with a variety of physical and psychological conditions including depression, anxiety, chronic pain and drug or alcohol addiction.

We think that mindfulness training may be important for college students who binge drink, even if they are not “addicted” to alcohol. Binge drinking, a common pattern of drinking among college students is defined as four or more drinks for females or five or more drinks for males over the course of two hours or less. Binge drinking increases one’s risk for a variety of negative consequences.

Here are a few of the ways that mindfulness may be beneficial for college students:

Mindfulness can increase awareness.

- This is important because being more aware and present in your own life can lead to a better understanding of the actions and habits you engage in which might not be consistent with your personal goals. When we become more aware of our moment to moment experiences, a greater range of responses becomes available to us.

- Among college students, binge drinking is part of the culture at colleges, thus, individuals may not be aware of the effect it has on them personally, viewing it as normative and something all their friends are doing.

- Over time, practicing mindfulness has been found to increase awareness among individuals who are problematic alcohol users. Through increased awareness,
individuals may become more alert to the impact alcohol may be having on areas of their life such as health, relationships and academics.

Mindfulness can decrease avoidance.

- Think about a time that you had to do something that you really did not want to do. Perhaps it was doing the dishes or writing a term paper for class. In the short term, putting off that unpleasant task is more appealing that actually doing it. However, if you have ever let dishes pile up in the sink, or waited until the night before a term paper is due to start it, you probably realized that avoiding, or putting off what you need to do can make the task more difficult and cause more stress in the long run.

- Mindfulness asks us to face our thoughts and feelings head on, rather than avoiding them. This can be very challenging, especially when confronted with negative or painful emotions or thoughts. Feeling sad, lonely, bored or stressed are reported as primary “triggers” or reasons for drinking reported by college students.

- Alcohol is often used by individuals to cope with negative emotions. This is a type of avoidance. And, just like the dishes or term paper, avoiding thoughts or emotions is not effective in the long run. As individuals practice mindfulness they often find that the thoughts and feelings that they tried really hard to avoid really can’t hurt them. Rather, often the actions taken trying to avoid feeling or thinking certain ways cause more problems.

Practicing mindfulness can be positively rewarding.

- Mindfulness meditation is often referred to as a “positive addiction.” Researchers believe that engaging in mindfulness meditation actually activates parts of your brain that release chemicals that make you feel calm and happy and increase the likelihood that you will want to repeat the activity (i.e., mindfulness meditation) again. Similar brain areas are activated during other activities such as drinking. However, unlike practicing mindfulness, excessive alcohol use can lead to a variety of negative consequences.

Mindfulness and Religion

- Mindfulness is rooted in Buddhism, and mindfulness meditation has been called “the heart” of Buddhist meditational techniques. However, mindfulness taught from a Western perspective and how it will be taught to you in this intervention is non-religious. This means that these techniques can be used by anyone, regardless of your religious background, and regardless of if you consider yourself to be religious or not. These techniques simply help you to be more
engaged in your life, to increase well-being and appreciation of yourself and to decrease automatic reactions to events, thoughts and feelings.

What’s next?

After you finish reading this handout, you will be asked to provide your honest reaction to the handout and you will be asked to recall some information from the handout. Then you will be asked to practice mindfulness meditation by listening to audio recordings of mindfulness exercises. All that is asked of you is to give this approach a try.

Following the mindfulness exercises, you will be exposed to visual pictures of alcohol. These may make you want to have a drink. We ask that you try to apply the concepts of mindfulness such as present focus, observation and non-judgmental acceptance to handle any desires to use alcohol.

Then, we ask that you try to incorporate mindfulness practice into your life for the next several weeks. Even if you are skeptical, just give it a try and see what happens. Maybe it will help with sleep difficulties, or help you communicate better with your roommates or girlfriend/boyfriend. Maybe it will impact your mood or your drinking patterns. There is no right or wrong answer; we just ask that you try this new approach as best you can for a few weeks and let us know how it works for you.

Want to learn more?

In addition to the CD containing mindfulness exercises that you will be given today, here are some links to websites and a list of books to learn more about mindfulness.

The information on this handout is from the following websites:
University of Massachusetts Medical School, Center for Mindfulness, Stress Reduction Program: http://www.umassmed.edu/Content.aspx?id=41254&amp;LinkIdentifier=id
Mindfulness Based Relapse Prevention http://www.mindfulrp.com/
University of California, San Diego Center for Mindfulness http://health.ucsd.edu/specialties/psych/mindfulness/what-is/

Books:
Appendix A-4: Mindfulness Meditation Practices

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<th>Source</th>
<th>Administration Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Meditation Instructions and Breathing Practice</td>
<td>19:01</td>
<td>UCLA Mindful Awareness Research Center, 2009a</td>
<td>Initial Session and CD</td>
</tr>
<tr>
<td>2. Body and Sound Meditation</td>
<td>2:59</td>
<td>UCLA Mindful Awareness Research Center, 2009b</td>
<td>CD only</td>
</tr>
<tr>
<td>3. Taste of Mindfulness</td>
<td>5:03</td>
<td>Mindful Solutions for Addiction and Relapse Prevention, 2008c</td>
<td>CD only</td>
</tr>
<tr>
<td>4. Urge Surfing</td>
<td>8:33</td>
<td>Mindfulness Based Relapse Prevention, 2011</td>
<td>Initial Session and CD</td>
</tr>
<tr>
<td>5. Meditation for Awareness of Emotions</td>
<td>24:51</td>
<td>Mindful Solutions for Addiction and Relapse Prevention, 2008b</td>
<td>3rd Session and CD</td>
</tr>
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</table>
Appendix B-1: Psychometric Properties of Primary Measures

**Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989).** The RAPI is a unidimensional measure found to have high internal consistency (0.91). Test-retest reliability coefficients are high as well, 0.89 at one-month and 0.92 at six-month and one-year test retest periods (Larimer, Cronce, Lee & Kilmer, 2005; Miller et al., 2002; Neal & Carey, 2004; White & Labouvie, 1989). The RAPI has strong convergent validity when compared to measures assessing patterns of use and diagnostic criteria for substance use disorders (White & Labouvie, 1989).

This measure is normed on adolescents and young adults in clinical and non-clinical populations. The RAPI was first developed using a sample of treatment-seeking adolescents and assessed consequences occurring over the past three years. The RAPI has since been validated and used extensively in college student samples (Martens, Neighbors, Dams-O’Connor, Lee & Larimer, 2007; Mendez, 2005). Previous studies have inquired about past consequences of alcohol use occurring over the past three-, six- and twelve-month periods (Cimini et al., 2009; Yusko, Buckman, White & Pandina, 2008). This measure is frequently used as an outcome measure to assess changes in drinking related consequences following an intervention.

**Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983).** This measure was adapted from the SCL-90-R (Derogatis, L. R., 1977; Derogatis & Unger, 2010). The BSI was created to establish a shorter alternative to the SCL-90-R while maintaining high psychometric properties. Norms have been established for inpatient and
outpatient clinical populations as well as for non-clinical “healthy” individuals. Adequate reliability has been demonstrated through high internal consistency ranging from 0.71 (psychoticism) to 0.85 (depression). Strong two-week test-retest reliability has been demonstrated with correlations ranging from 0.68 (somatization) to 0.91 (phobia). Convergent validity has been illustrated through comparisons of BSI scales to MMPI and SCL-90-R scales. Finally, factor analytic methods have confirmed the construct validity of the measure and the BSI has been shown to be predictive of treatment outcome in a variety of populations (Derogatis & Melisaratos, 1983).

**Drinking Refusal Self-Efficacy Questionnaire (DRSEQ, Young, Oei & Crook, 1991).** The measure demonstrates good reliability with internal consistency ranging from 0.87 to 0.94. The test-retest reliability has been assessed at 2-week and 2-month periods and ranges from 0.84 to 0.93 (Young et al., 1991). Validity has been demonstrated by the DRSEQ’s ability to predict consumption patterns and in discriminating between problem and non-problem drinkers. This measure has been normed on student, community and alcohol dependent clinical samples (Baldwin, Oei & Young, 1991).

**Readiness to Change Questionnaire (RTCQ; Heather, Gold & Rollnick, 1991; Rollnick, Heather, Gold & Rollnick, 1992).** The questionnaire is based on the stages of change model (Prochaska & DiClemente, 1992). The measure can be used as a continuous measure to assess change as a result of an intervention or categorically to determine which of three stages of change (i.e., pre-contemplation, contemplation and action) an individual is currently in. The RTCQ has been found to have good internal
consistency ($\alpha$ ranges from 0.73 to 0.85; Rollnick et al., 1992). The test-retest reliability of the measure over a one- and two-day period has been confirmed and correlations range from 0.78 to 0.86. Both concurrent and predictive validity have been demonstrated by comparisons between this measure and other assessments of substance use patterns (Heather, Rollnick & Bell, 1993; McNally & Palfai, 2001).

**White Bear Suppression Inventory (WBSI, Wegner & Zanakos, 1994).**

Internal consistency is high (.89) and the measure is shown to have good test-retest reliability evidenced by correlations of .92 for a 1-week period and .69 for a 3-month period. Convergent validity has been demonstrated by significant correlations between the WBSI and other measures of psychological distress (Wegner & Zanakos, 1994).

**Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer & Toney, 2006).** This measure was recently developed. It was created based on an examination of five existing measures of mindfulness. The FFMQ was statistically derived based on a factor analysis of these five existing mindfulness questionnaires. Five factors were derived: observing, describing, acting with awareness, non-judgment of inner experience, and non-reactivity to inner experience. The FFMQ is proposed to provide a more comprehensive assessment of mindfulness than other measures as none of the pre-existing measures assess all five factors identified within the construct of mindfulness.

Internal consistency ranges from 0.75 (non-reactivity) to 0.91 (describing). The FFMQ has been shown to have good construct validity, demonstrated through factor analytic methods. Convergent validity has been demonstrated though comparison of the
FFMQ with other mindfulness measures and related psychological constructs such as thought suppression, absent-mindedness and emotional regulation (Baer et al., 2006; 2008; Carmody & Baer, 2008). The FFMQ is appropriate for use among both meditating and non-meditating samples and has been validated among college student samples (Baer, 2006; 2008).

**Alcohol Timeline Followback Assessment (TLFB; Sobell & Sobell, 1993; 1995).** This is a method of obtaining estimates of quantity and frequency of alcohol and other drug use over a certain period of time. A semi-structured interview is used to assist the individual in retrospectively recounting alcohol and drug use for each day. Various memory aids such as a calendar and key dates (e.g., holidays) assist in recall. The time frame for assessment of past alcohol use has been validated for up to one year retrospective recall.

Timeline followback methods (TLFB) are found to have greater clinical and research utility than summary or aggregate methods which ask the participant to recall past patterns of alcohol use without using specific markers, referred to as “quantity-frequency” measures. The TLFB method is shown to provide more accurate estimates of alcohol use patterns than quantity-frequency methods. Quantity-frequency methods tend to underestimate the rate of problem drinkers and do not account for fluctuations in alcohol use patterns (Sobell & Sobell, 1995). Several valuable drinking related variables can be generated from this interview including percentage of days at various levels of alcohol use (e.g., abstinent, binge drinking episodes), mean number of alcoholic drinks
each drinking day, maximum number of drinks consumed in a given period or patterns of drinking (e.g., weekday versus weekend drinking).

Among college students, the internal consistency ranges from 0.87 to 0.97 for one-month retrospective recall (Sobell & Sobell, 1995). One-month test-retest coefficients are found to be 0.93 for quantity of alcohol use and 0.87 for frequency of alcohol use (Sobell, Sobell, Klajner, Paven & Basian, 1986; Sobell, Sobell, Leo & Cancilla, 1988). Concurrent validity has been demonstrated through high correlations between the TLFB and with other established measures of alcohol use including assessments of alcohol dependence, consequences of use and biochemical measures of alcohol-related dysfunction. This measure has also been adapted for telephone and computer based administration methods and reliability is not shown to vary based on administration method (Sobell, Brown, Leo & Sobell, 1996).

**Normative Appetitive Picture System (NAPS; Stritzke et al., 2004).** This is an alcohol cue exposure protocol containing 18 visual images. In general, these protocols involve exposing an individual with problematic substance use to substance-related stimuli in order to elicit urges or cravings to use substances. Cue exposures may include visual, auditory, imagery, or in vivo stimuli. A large body of research supports the efficacy of cue exposure protocols in producing a stable set of responses including self-reported urges and physiological reactivity (Carter & Tiffany, 1999).

The NAPS is a previously validated and standardized cue exposure protocol which is administered in three phases, each containing six visual alcohol stimuli (Stritzke et al., 2004). In each phase, two of the images will depict beer, two will depict wine and
two will depict liquor. The NAPS was standardized using college students who were categorized as abstinent, light or heavy alcohol users. The participants were shown visual stimuli depicting alcoholic beverages, non-alcoholic beverages and food. In order to ascertain the reactions of participants to the images, participants rated each stimulus on approach (i.e., desire to consume item), avoidance (i.e., desire to avoid consuming) and arousal (i.e., feelings of calmness versus arousal).

High internal consistency was found for the alcohol stimuli (alpha ranged from .89 to .97). Good specificity was identified as well. Heavy drinkers responded with greater approach and arousal and less avoidance to the alcohol visual stimuli than light or non-drinkers. There was no difference between the groups in response to the non-alcoholic or food stimuli. Convergent validity was also demonstrated by high correlations between approach ratings and higher alcohol usage, higher urges/cravings to use alcohol, less confidence in one’s ability to refuse alcohol and more negative consequences of alcohol use (Stritzke et al., 2004).

Based on extensive research examining the properties of cue exposure protocols, researchers have concluded that there is no further need to conduct basic research to detect if these protocols effectively produce cravings. Rather, research has begun to move in the direction of using cue exposure protocols to test the effectiveness of psychological interventions and mechanisms of change (Bowen et al., 2007; Bowen & Marlatt, 2009; Carter & Tiffany, 1999; Kavanaugh et al., 2004; Ostafin & Marlatt, 2008).

**Alcohol Urge Questionnaire (AUQ; Bohn, Krahn & Staehler, 1995).** This unidimensional measure is found to have high internal consistency ($\alpha = .91$) and test
retest reliability at 1-day ($r = .82$) and 1-week retest intervals ($r = .78$). Convergent validity has been demonstrated by significant correlations between the AUQ and severity of alcohol use, time since last drink, quantity of drinking and number of prior detoxifications (Bohn et al., 1995; Drummond & Phillips, 2002). This measure was initially validated using both treated and untreated clinical populations. Subsequent studies indicate the use of this measure in non-clinical populations as well (MacKillop, 2006; Stritzke et al., 2004).
Appendix B-2: Daily Drinking Questionnaire

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

One Standard Drink is equal to:
One 12 oz regular beer (3 to 5% alcohol) which is equal to
6 oz of microbrew (8-12% alcohol) which is equal to
One 5 oz glass of regular wine (12-17% alcohol) which is equal to
1.5 oz of liquor such as vodka or whiskey (80 proof, 40% alcohol)

1. How often did you drink alcohol during the last two weeks?
   a. I did not drink at all
   b. About once in the past two weeks
   c. Two to three times in the past two weeks
   d. Twice a week
   e. Three to four times a week
   f. Nearly every day
   g. Once a day or more

2. Think of the occasion you drank the most during the last two weeks. How much did you drink? (circle one)
   0 drinks  8 drinks  16 drinks  24 drinks
   1 drink   9 drinks  17 drinks  25 drinks
   2 drinks  10 drinks  18 drinks  26 drinks
   3 drinks  11 drinks  19 drinks  27 drinks
   4 drinks  12 drinks  20 drinks  28 drinks
   5 drinks  13 drinks  21 drinks  29 drinks
   6 drinks  14 drinks  22 drinks  30 drinks
   7 drinks  15 drinks  23 drinks  More than 30 drinks

3. Think of the occasion during the last two weeks in which you drank the most amount of alcohol during a two hour period of time. How much did you drink? (circle one)
   0 drinks  8 drinks  16 drinks  24 drinks
   1 drink   9 drinks  17 drinks  25 drinks
   2 drinks  10 drinks  18 drinks  26 drinks
   3 drinks  11 drinks  19 drinks  27 drinks
   4 drinks  12 drinks  20 drinks  28 drinks
   5 drinks  13 drinks  21 drinks  29 drinks
   6 drinks  14 drinks  22 drinks  30 drinks
   7 drinks  15 drinks  23 drinks  More than 30 drinks
Appendix B-3: Demographics Questionnaire

What is your age? _____
Gender (circle one): male female
Current level of education (circle one): freshman sophomore junior senior
Are you a full time student (circle one): Yes No
a. High School Grade Point Average (GPA): ______ 
b. College Grade Point Average (GPA): ______
I consider myself to be a residential student at Ohio University (circle one):
Yes No
Is English your native language (circle one): No Yes
7. What is your racial identity?
   A. American Indian or Alaska Native E. White/Caucasian
   B. Asian F. Multiracial
   C. Black or African American G. Middle Eastern
   D. Native Hawaiian or Other Pacific Islander H. Other (Please Write in)
   __________________

8. What is your ethnicity?
   A. Hispanic or Latino
   B. Not Hispanic or Latino
9. In what religion were you raised?
   A. Catholic (Christian) E. None/Atheist
   B. Protestant (Christian) F. Muslim
   C. Jewish G. Other (Please Write in)____
   D. Nondenominational
10. In what religion do you currently consider yourself to belong to?
    A. Catholic (Christian) E. None/Atheist
    B. Protestant (Christian) F. Muslim
    C. Jewish G. Other (Please Write in)____
    D. Nondenominational
11. Which one best describes your intimate relationships/sexual orientation?
    A. Exclusively heterosexual experiences
    B. Mostly heterosexual experiences
    C. More heterosexual than homosexual experiences
    D. Equal heterosexual and homosexual experiences
    E. More homosexual than heterosexual experiences
    F. Mostly homosexual experiences
    G. Exclusively homosexual experiences
12. What is your current marital status?
    A. Never married D. Divorced
    B. Cohabitating E. Widowed
    C. Married
13. What is your current dating status?
    A. I do not date.
B. I date casually.
C. I am involved in a long-term monogamous relationship (more than 6-months).
D. I am engaged.
E. I am married.

14. Approximately what is your household combined yearly income?
   A. Unemployed or disabled
   B. Under $10,000
   C. $10,000-20,000
   D. $21,000-30,000
   E. $31,000-40,000
   F. $41,000-50,000
   G. $51,000-75,000
   H. $76,000-100,000
   I. $100,000-200,000
   J. Over $200,000
   K. I don’t know

15. In what type of household were you raised?
   A. Two parent (Mother and Father)
   B. Two parent (Mother and Mother)
   C. Two parent (Father and Father)
   D. Single Mother
   E. Single Father
   F. Mother and Step-father
   G. Father and Step-Mother
   H. Grandparents
   I. Other Relatives
   J. Foster Parents
   K. Orphanage or Group Home
   L. Other (Please write in)_________________

16. How many people are in your household? ___________

17. What is your father’s current occupation? (if retired or deceased please state last occupation)

18. What is your mother’s current occupation? (if retired or deceased please state last occupation)

19. Have you ever been to a therapist, counselor or any other mental health provider (circle one)?  Yes  No
   19a. If yes, what were your reasons for seeking therapy?
       __________________________________________________________________
       __________________________________________________________________

20. Have you ever been prescribed medication for any type of psychological condition by a doctor or psychiatrist (circle one)?  Yes  No
   20a. If yes, what is the name of the medication?
       __________________________________________________________________
   20b. If yes, when were you prescribed this medication?
       __________________________________________________________________
   20c. If yes, are you currently taking this medication?
21. Are you currently diagnosed with depression, anxiety, attention deficit disorder (ADD/ADHD), learning disability, bipolar disorder, schizophrenia, a psychotic disorder or any other psychological condition (circle one)? Yes No
   21a. If yes, what condition? __________________________________
22. Have you ever received treatment for alcohol or drug use (circle one)? No Yes
   22a. If yes, what type? _____
   22b. If yes, are you currently in treatment? _____
   22c. If you received treatment in the past, what was the dates of treatment?___________________________
   22d. If you received treatment in the past or are currently in treatment, was/is the treatment helpful? Yes No
   22e. What were your reasons for seeking treatment? ________________________
23. Please answer the following questions about past alcohol use:
   23a. Have you ever been arrested for alcohol or drug related offenses or arrested while under the influence of alcohol (circle one)? Yes No
   23b. If yes, please explain:__________________________________________________________________
   23c. Have you ever gotten in trouble with the university for any alcohol or drug related incident, including any incidents with your resident assistant (RA; circle one)? Yes No
   23d. If yes, please explain:____________________________________________
24. Have you consumed alcohol in the last 12 hours (circle one)? Yes No
   24a. If yes, please indicate the number and types of alcohol beverages consumed:____________________________________________________________
25. Have you used any recreational drugs in the past 12 hours (circle one)? Yes No
   25a. If yes, please describe:________________________________________________________
26. Have you taken any prescription medication in the past 12 hours differently than you are prescribed it (e.g., more frequently or a greater quantity) or have you taken the medication that you are not prescribed (circle one)? Yes No
   26a. If yes, please describe
27a. How old were you the first time you had more than a sip or two of alcohol to drink? (Please place a check next to the correct response).
   _____ I’ve never had a drink of alcohol
   _____ 9
   _____ 10
   _____ 11
   _____ 12
   _____ 13
   _____ 14
   _____ 15
   _____ 16
   _____ 17
   _____ 18
   _____ 19
   _____ 20
   _____ 21
   _____ 22
   _____ 23
   _____ 24
27b. How old were you the first time you drank to the point of intoxication? (Please place a check next to the correct response).

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<tr>
<th></th>
<th>I’ve never been intoxicated</th>
<th>7 or younger</th>
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<tbody>
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</table>

27c. How old were you the first time you tried marijuana? (Please place a check next to the correct response).

<table>
<thead>
<tr>
<th></th>
<th>I’ve never used marijuana</th>
<th>7 or younger</th>
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<td>9</td>
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Appendix B-4: Rutgers Alcohol Problem Index

Directions: Different things happen to people when they are drinking alcohol, or as a result of their alcohol use. Some of these things are listed below. Please indicate how many times each has happened to you while you were drinking alcohol or as the result of your alcohol use. When marking your answers, use the following code:

0 = Never
1 = 1-2 times
2 = 3-5 times
3 = 6-10 times
4 = more than 10 times

How many times did the following things happen to you while you were drinking alcohol or because of your alcohol use during the last three months?

(Note: At the 5th session, participants will be asked to answer the questions based on experiences in the last four-weeks.)

_____ Not able to do your homework or study for a test.
_____ Got into flights, acted bad, or did mean things.
_____ Missed out in other things because you spent too much money on alcohol.
_____ Went to work or school high or drunk.
_____ Caused Shame or embarrassment to someone.
_____ Neglected your responsibilities.
_____ Relatives avoided you.
_____ Felt that you needed more alcohol than you used to in order to get the same effect.
_____ Tried to control your drinking by trying to drink only at certain times of day or certain places.
_____ Had withdrawal symptoms, that is, felt sick because you stopped or cut down on drinking.
_____ Noticed a change in your personality.
_____ Felt that you had a problem with school as a result of your alcohol use.
_____ Missed a day (or part of a day) of school or work.
_____ Tried to cut down on drinking.
_____ Suddenly found yourself in a place that you could not remember getting to.
_____ Passed out or fainted suddenly.
_____ Had a fight, argument, or bad feelings with a friend.
_____ Had a fight, argument, or bad feelings with a family member.
_____ Kept drinking when you promised yourself not to.
_____ Felt you were going crazy.
______ Had a bad time.
______ Felt physically or physiologically dependent on alcohol.
______ Was told by a friend or neighbor to stop or cut down drinking.
Appendix B-5: Brief Symptom Inventory

Directions: On the next several pages are a list of problems people sometimes have. Please read each one carefully and circle the number that best describes how much that problem has distressed or bothered you during the past 7 days including today. Circle only one number for each problem and do not skip any items.

<table>
<thead>
<tr>
<th>Problem</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nervousness or shakiness</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2. Faintness or dizziness</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3. The idea that someone else can control your thoughts</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4. Feeling others are to blame for most of your troubles</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5. Trouble remembering things</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6. Feeling easily annoyed or irritated</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7. Pains in heart or chest</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8. Feeling afraid in open spaces or on the streets</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9. Thoughts of ending your life</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10. Feeling that most people cannot be trusted</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>11. Poor appetite</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>12. Suddenly scared for no reason</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>13. Temper outbursts that you could not control</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>14. Feeling lonely even when you are with people</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>15. Feeling blocked in getting things done</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>16. Feeling lonely</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>17. Feeling blue</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>18. Feeling no interest in things</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>19. Feeling fearful</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>20. Your feelings being easily hurt</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>21. Feeling that people are unfriendly or dislike you</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>22. Feeling inferior to others</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>23. Nausea or upset stomach</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>24. Feeling that you are watched or talked about by other</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>25. Trouble falling asleep</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>26. Having to check and double-check what you do</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
27. Difficulty making decisions
28. Feeling afraid to travel on buses, subways, or trains
29. Trouble getting your breath
30. Hot or cold spells
31. Having to avoid certain things, places or activities because they frighten you
32. Your mind going blank
33. Numbness or tingling in parts of your body
34. The idea that you should be punished for your sins
35. Feeling hopeless about the future
36. Trouble concentrating
37. Feeling weak in parts of your body
38. Feeling tense or keyed up
39. Thoughts of death or dying
40. Having urges to beat, injure, or harm someone
41. Having urges to break or smash things
42. Feeling very self-conscious with others
43. Feeling uneasy in crowds, such as shopping or at a movie
44. Never feeling close to another person
45. Spells of terror or panic
46. Getting into frequent arguments
47. Feeling nervous when you are left alone
48. Others not giving you proper credit for your achievements
49. Feeling so restless you couldn’t sit still
50. Feelings of worthlessness
51. Feeling that people will take advantage of you if you let them
52. Feelings of guilt
53. The idea that something is wrong with your mind
Appendix B-6: Drinking Refusal Self-Efficacy Questionnaire

Directions: The following items ask you to describe your ability to handle drinking situations. Your answers will be completely confidential, so please try to answer as honestly as you can. The following pages contain a list of situations in which people may find themselves drinking alcohol. Most people find it easier to resist drinking in some of these situations than others. Please circle the number beside each statement which best describes how much you could resist drinking in each case.

1 = I am very sure I would drink
2 = I most likely would drink
3 = I probably would drink
4 = I probably would NOT drink
5 = I most likely would NOT drink
6 = I am very sure I would NOT drink

HOW SURE ARE YOU THAT YOU COULD RESIST DRINKING ALCOHOL?

1. When you are out at dinner.................1 2 3 4 5 6
2. When you are playing pool or cards.......1 2 3 4 5 6
3. When you are watching TV...............1 2 3 4 5 6
4. When you see others drinking.............1 2 3 4 5 6
5. When you are uptight....................1 2 3 4 5 6
6. When you are angry......................1 2 3 4 5 6
7. When you are at a party..................1 2 3 4 5 6
8. When someone offers you a drink........1 2 3 4 5 6
9. When you want to look sophisticated...1 2 3 4 5 6
10. When you want to feel more confident...1 2 3 4 5 6
11. When you are bored....................1 2 3 4 5 6
12. When you want to look better.........1 2 3 4 5 6
13. When you are at lunch.................1 2 3 4 5 6
14. When you feel ashamed................1 2 3 4 5 6
15. When you are waiting for someone....1 2 3 4 5 6
16. When you feel restless.................1 2 3 4 5 6
17. When you feel frustrated...............1 2 3 4 5 6
18. When you want to feel more accepted by friends.................................1 2 3 4 5 6
19. When you are worried.................1 2 3 4 5 6
20. When you feel upset..................1 2 3 4 5 6
21. When you feel down...................1 2 3 4 5 6
22. When you feel nervous................1 2 3 4 5 6
23. When you are on the way home from work.................................1 2 3 4 5 6
24. When you feel sad.....................1 2 3 4 5 6
25. When your spouse or partner is drinking……………………………1 2 3 4 5 6
26. When you are listening to music or reading………………………1 2 3 4 5 6
27. When your friends are drinking…………1 2 3 4 5 6
28. When you are by yourself………………1 2 3 4 5 6
29. When you have finished playing a sport…………………………..1 2 3 4 5 6
30. When you are at a pub or club…………1 2 3 4 5 6
31. When you first arrive home……………..1 2 3 4 5 6
Appendix B-7: Readiness to Change Questionnaire

Directions: The following questionnaire is designed to identify how you personally feel about your drinking right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please circle the answer of your choice to each question. Your answers are completely private and confidential.

1 = Strongly Disagree
2 = Disagree
3 = Unsure
4 = Agree
5 = Strongly Agree

1. I don’t think I drink too much......................1 2 3 4 5
2. I am trying to drink less than I used to.........1 2 3 4 5
3. I enjoy my drinking, but sometimes I drink too much........................................1 2 3 4 5
4. Sometimes I think I should cut down on my drinking...........................................1 2 3 4 5
5. It’s a waste of time thinking about my drinking.....................................................1 2 3 4 5
6. I have just recently changed my drinking habits.................................................1 2 3 4 5
7. Anyone can talk about wanting to do something About drinking, but I am actually doing something about it...........................................1 2 3 4 5
8. I am at the stage where I should think about drinking less alcohol.......................1 2 3 4 5
9. My drinking is a problem sometimes..........1 2 3 4 5
10. There is no need for me to think about changing my drinking habits right now........1 2 3 4 5
11. I am actually changing my drinking habits right now.........................................1 2 3 4 5
12. Drinking less alcohol would be pointless for me................................................1 2 3 4 5
Appendix B-8: White Bear Suppression Inventory

Directions: This survey is about thoughts. There are no right or wrong answers, so please respond honestly to each of the items below. Be sure to answer each item by circling the appropriate letter beside each.

1 = Strongly Disagree
2 = Disagree
3 = Neutral or don’t know
4 = Agree
5 = Strongly Agree

1. There are things I prefer not to think about………1 2 3 4 5
2. Sometimes I wonder why I have the thoughts I do…………………………1 2 3 4 5
3. I have thoughts that I cannot stop…………………1 2 3 4 5
4. There are images that come to mind that I cannot erase……………………1 2 3 4 5
5. My thoughts frequently return to one idea………1 2 3 4 5
6. I wish I could stop thinking of certain things…1 2 3 4 5
7. Sometimes my mind races so fast I wish I could stop it……………………1 2 3 4 5
8. I always try to put problems out of mind………1 2 3 4 5
9. There are thoughts that keep jumping into my head…………………………1 2 3 4 5
10. There are things that I try not to think about…..1 2 3 4 5
11. Sometimes I really wish I could stop thinking….1 2 3 4 5
12. I often do things to distract myself from my thoughts……………………………1 2 3 4 5
13. I have thoughts that I try to avoid…………………1 2 3 4 5
14. There are many thoughts that I have that I don’t tell anyone…………………………1 2 3 4 5
15. Sometimes I stay busy just to keep thoughts from intruding on my mind……………1 2 3 4 5
Appendix B-9: Five Facet Mindfulness Questionnaire

Directions: Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1 = Never or very rarely true  
2 = Rarely true  
3 = Sometimes true  
4 = Often true  
5 = Very often or always true

1. When I’m walking, I deliberately notice the sensations of my body moving.  
2. I’m good at finding words to describe my feelings.  
3. I criticize myself for having irrational or inappropriate emotions.  
4. I perceive my feelings and emotions without having to react to them.  
5. When I do things, my mind wanders off and I’m easily distracted.  
6. When I take a shower or bath, I stay alert to the sensations of water on my body.  
7. I can easily put my beliefs, opinions, and expectations into words.  
8. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.  
9. I watch my feelings without getting lost in them.  
10. I tell myself I shouldn’t be feeling the way I’m feeling.  
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.  
12. It’s hard for me to find the words to describe what I’m thinking.  
13. I am easily distracted.  
14. I believe some of my thoughts are abnormal or bad and I shouldn’t think that way.  
15. I pay attention to sensations, such as the wind in my hair or sun on my face.  
16. I have trouble thinking of the right words to express how I feel about things.  
17. I make judgments about whether my thoughts are good or bad.  
18. I find it difficult to stay focused on what’s happening in the present.  
19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.  
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.  
21. In difficult situations, I can pause without immediately reacting.  
22. When I have a sensation in my body, it’s difficult for me to describe it because I can’t find the right words.  
23. It seems I am “running on automatic” without much awareness of what I’m doing.  
24. When I have distressing thoughts or images, I feel calm soon after.
25. I tell myself that I shouldn’t be thinking the way I’m thinking.
26. I notice the smells and aromas of things.
27. Even when I’m feeling terribly upset, I can find a way to put it into words.
28. I rush through activities without being really attentive to them.
29. When I have distressing thoughts or images I am able just to notice them without reacting.
30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. My natural tendency is to put my experiences into words.
33. When I have distressing thoughts or images, I just notice them and let them go.
34. I do jobs or tasks automatically without being aware of what I’m doing.
35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
36. I pay attention to how my emotions affect my thoughts and behavior.
37. I can usually describe how I feel at the moment in considerable detail.
38. I find myself doing things without paying attention.
39. I disapprove of myself when I have irrational ideas.
Appendix B-10: Alcohol Timeline Followback

The following are instructions for interviewers administering the timeline followback calendar:

Script:
  • What we would like you to do is recall your drinking for the past 30 days.
  • We want to get an idea of how much alcohol you consumed on each day during this time.
  • This is not a difficult task, especially when you use a calendar like this one (participants will be shown sample calendar).
  • What the calendar does is give you a visual picture of the dates and patterns of your drinking.
  • What we have found is that calendars are very useful in helping people recall their drinking.
  • On this sample calendar, as you can see, a number has filled in for each day.
  • The idea is to record the number of drinks you consumed each day.
  • On days when you did not drink any alcohol, not even a sip of a drink, you would write “0.”
  • For days when you had something to drink, you would write in the number of drinks YOU consumed.
  • The important thing is to make sure something is written in for each day on the calendar!

It is important that you record your drinking on the calendar in terms of Standard Drinks. This is because different types of beverages contain different concentrations of alcohol. This card shows what a standard drink is:

<table>
<thead>
<tr>
<th>One Standard Drink is equal to:</th>
<th>which is equal to</th>
</tr>
</thead>
<tbody>
<tr>
<td>One 12 oz regular beer (3 to 5% alcohol)</td>
<td>6 oz of microbrew (8-12% alcohol)</td>
</tr>
<tr>
<td>One 5 oz glass of regular wine (12-17% alcohol)</td>
<td>1.5 oz of liquor such as vodka or whiskey (80 proof, 40% alcohol)</td>
</tr>
</tbody>
</table>

What type of alcoholic beverage do you typically drink? (Participant replies)

So if you had 6 beers on a given day, what would you write down? (Participant replies)

Now if you mix your types of drinks, using Standard Drinks is also easy. For example, if you had two regular beers and three 5-oz glasses of wine, how many Standard Drinks would you write down? (Participant replies)

Do you think you understand how to report how to report using Standard Drinks? (Participant replies)

Helpful Hints

Here are a few other helpful tips that can aid you in reporting your drinking on the calendar,
If you have an appointment book or a daily diary, you can use it to help you recall your use.
Standard holidays such as Halloween and Christmas are marked on the calendar to help you recall your drinking around these times. You can also write in personal holidays and events such as birthdays, vacations, celebrations, major sporting events (e.g., World Series) and so on.

- People who have fairly regular drinking patterns can use such patterns to help them fill out the calendar. For example, you may have a weekend/weekday change in your drinking or you may have a standing Thursday night card game.

**Your Best Estimate**

- In filling out the calendar, we want you to be as accurate as possible.
- We realize that it is hard for anyone to recall things with 100% accuracy, whether it is drinking or anything else.
- If you can’t recall whether you drank on a Monday or a Thursday of a certain week or whether it was the week of November 9th or November 16th, give your best guess.
- If you are not sure whether you drank 7, 8 or 9 drinks, choose the midpoint of the range, so for 7 to 9 drinks, you would write “8” drinks.
  - The important point here is that 7 to 9 drinks is very different than if you said you drank only 1 or 2 drinks or 15 to 17 drinks. Does that make sense? (Respondent replies)
- Remember: your job is to provide your best daily estimate using the calendar.

**Starting Calendar with Participant**

- Let’s begin! As I said before, what we want you to do is use the calendar to record your drinking over the past 30 days.
- Let’s start with yesterday’s date and go back 30 days—those days are ____ through ____. (Interviewer marks these dates on the calendar and shows the participant)
- Do you have any special holidays or dates you want to mark on the calendar to help you better recall your drinking during the past 30 days? (Participant replies and fills in calendar if needed)
- When did you last drink in this 30 day period? (Participant replies with a date)
- How much did you drink on this day? (Participant replies with an amount and interviewer puts that number in on the calendar for the appropriate date)
- What was the greatest amount that you consumed on any given day during this period? Do you recall when this occurred? (Participant replies w/an amount and a date)
- What was the least amount of drinking during this period? (Participant replies w/an amount)
- As mentioned earlier, some people will have patterns to their drinking that can help them recall their use. Do you have any notable patterns to your drinking? (Participant replies)

**Probing Extended Abstinent or Drinking Periods**

- During this period of time, did you have any extended periods of abstinence of 7
days or more when you did not drink alcohol at all, not even a drop?
  o (Participant replies)
    ▪ What was the longest period of total abstinence during this time?
    ▪ What was the next longest period of total abstinence?
  • During this period of time, did you have any extended periods of heavy drinking of 7 days or more?
    o (Participant replies)
      ▪ What was the longest number of continuous days in a row you were drinking during this period? (Determine days and amounts of alcohol consumed on each day)
      ▪ What was the next longest period of continuous drinking days?
  • You appear ready to fill in the rest of the calendar. Do you have any questions?
  • If not, let’s begin. If you have any questions I will be here to answer them.

One week calendar example:

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer=_____</td>
<td>WEEK 6</td>
<td>Beer=_____</td>
<td>Beer=_____</td>
<td>Beer=_____</td>
<td>Beer=_____</td>
<td>Beer=_____</td>
</tr>
<tr>
<td>Wine=_____</td>
<td>Wine=_____</td>
<td>Wine=_____</td>
<td>Wine=_____</td>
<td>Wine=_____</td>
<td>Wine=_____</td>
<td>Wine=_____</td>
</tr>
<tr>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
<td>Liquor=_____</td>
</tr>
<tr>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
<td>Drugs=_____</td>
</tr>
<tr>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
<td>Total time drinking=</td>
</tr>
<tr>
<td># of drinks consumed in any 2 hour period=</td>
<td># of drinks consumed in any 2 hour period=</td>
<td># of drinks consumed in any 2 hour period=</td>
<td># of drinks consumed in any 2 hour period=</td>
<td># of drinks consumed in any 2 hour period=</td>
<td># of drinks consumed in any 2 hour period=</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td>Comments:</td>
<td>Comments:</td>
<td>Comments:</td>
<td>Comments:</td>
<td>Comments:</td>
<td>Comments:</td>
</tr>
</tbody>
</table>
Appendix B-11: Manipulation Check for Mindfulness Group

Manipulation Check following Mindfulness Handout

**Directions:** Please place a vertical mark on the lines to answer the questions below. **Answer the questions based on your reactions to the handout your just read. There is no right or wrong answer, so just give your honest opinion.**

How much do you think you understood the handout you just read?
Not at all          Entirely

Not at all          Entirely

0   25     50   75      100

How interesting was the handout you just read?
Not at all          Extremely

Not at all          Extremely

0   25     50   75      100

How true are the following statements:
Mindfulness skills would be helpful for me.
Very True         Not True

Very True         Not True

0   25     50   75      100

I would practice mindfulness in the future.
Not True          Very True

Not True          Very True

0   25     50   75      100

Please circle that answer that best answers the following questions based on the handout you just read:

Mindfulness teaches us that when you have a thought that is unpleasant you should:
- a. Try to distract yourself from it
- b. Try to avoid thinking about it
- c. Act immediately on the thought
- d. Observe the thought without reacting to the thought

Mindfulness may be helpful for individuals who are heavy drinkers in the following ways (circle as many answers as apply):
- a. By decreasing avoidance of difficult or unwanted thoughts and feelings, individuals are less likely to use alcohol to cope with negative thoughts, stressful situations, boredom or anxiety in social situations
b. Be increasing awareness of automatic patterns of reacting, individuals become more aware of the negative impact alcohol may be having on academic performance, relationships, work and health

c. Mindfulness practice increases self-awareness and well-being while also decreasing the impact of stress. This may in turn decrease the use of alcohol to “relax” or “feel good.”

d. Mindfulness helps you challenge your thoughts or label them as irrational or inaccurate

Please provide any additional comments about the handout you just read:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Manipulation Check following 1st Mindfulness Practice

**Directions:** Please place a vertical mark on the lines to answer the questions below. Answer the questions based on your reactions to the handout your just read. There is no right or wrong answer, so just give your honest opinion.

How much do you think you understood the handout you just read?

<table>
<thead>
<tr>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td>Entirely</td>
</tr>
</tbody>
</table>

How interesting was the handout you just read?

<table>
<thead>
<tr>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td>Extremely</td>
</tr>
</tbody>
</table>

How true are the following statements:

Mindfulness skills would be helpful for me.

<table>
<thead>
<tr>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
<td></td>
<td></td>
<td>Not True</td>
</tr>
</tbody>
</table>

I would practice mindfulness in the future.

<table>
<thead>
<tr>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not True</td>
<td></td>
<td></td>
<td></td>
<td>Very True</td>
</tr>
</tbody>
</table>

Please circle that answer that best answers the following questions based on the audio recording you just listened too:

The “home base” of mindfulness meditation is:

- a. One’s feet
- b. One’s thoughts
- c. One’s breath

Please circle that answer that best answers the following questions based on the handout you just read:

Listening to this mindfulness meditation practice made me feel:

_____________________________________________________________________

Please provide any additional comments about the handout you just read:

________________________________________________________________________
Manipulation Check following 2\textsuperscript{nd} Mindfulness Practice

**Directions:** Please place a vertical mark on the lines to answer the questions below. Answer the questions based on your reactions to the handout you just read. There is no right or wrong answer, so just give your honest opinion.

How much do you think you understood the handout you just read?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entirely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How interesting was the handout you just read?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How true are the following statements:
Mindfulness skills would be helpful for me.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not True</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I would practice mindfulness in the future.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not True</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very True</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please circle that answer that best answers the following questions based on the audio recording you just listened too:

This mindfulness meditation practice asks us to do what in response to any emotions or sensations we encounter during the practice?

a. React to it  
b. Attempt to get rid of it  
c. Stay with it and acknowledge that feeling emotions won’t hurt you  
d. Try to control it

This mindfulness meditation practice compares the experience of having strong emotions which may include cravings or strong desires for alcohol to:

a. A wave that rises and falls  
b. A class which you must study and prepare for  
c. A child who needs comfort and care
Please circle that answer that best answers the following questions based on the handout you just read:

Listening to this mindfulness meditation practice made me feel:

_____________________________________________________________________

Please provide any additional comments about the handout you just read:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Manipulation Check following Mindfulness Practice in 3rd Session

Directions: Please place a vertical mark on the lines to answer the questions below. Answer the questions based on your reactions to the handout you just read. There is no right or wrong answer, so just give your honest opinion.

How much do you think you understood the handout you just read?
Not at all          Entirely
0   25     50   75      100

How interesting was the handout you just read?
Not at all          Extremely
0   25     50   75      100

How true are the following statements:
Mindfulness skills would be helpful for me.
Very True          Not True
0   25     50   75      100

I would practice mindfulness in the future.
Not True         Very True
0   25     50   75      100

Please circle that answer that best answers the following questions based on the audio recording you just listened too:

This mindfulness meditation encourages us to recognize our physical sensations, thoughts and emotions as:
   a. Something to ignore or avoid
   b. Impermanent
   c. Permanent and unchanging
   d. Something we should actively try to alter

When one’s mind wanders, mindfulness meditation encourages us to:
   a. Reprimand oneself for not keeping one’s mind focused on the present moment
   b. Acknowledge the mind as wandering and gently bring the focus back to the breath
   c. Think about whatever the mind has wandered too even if it is about future or past oriented thoughts or feelings
This mindfulness meditation practice teaches us that when emotions are approached and witnessed from a non-judgmental standpoint, emotions will:
   a. Diminish
   b. Grow in strength until they become unbearable
   c. Continue to upset and disturb us

Please circle that answer that best answers the following questions based on the handout you just read:

Listening to this mindfulness meditation practice made me feel:

_____________________________________________________________________

Please provide any additional comments about the handout you just read:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
Appendix B-12: Normative Appetitive Picture System (Examples)

Phase 1 - Image 1

Phase 1 - Image 6
Phase 2 - Image 4

Phase 3 - Image 5
Appendix B-13: Alcohol Urge Questionnaire

Directions: Please rate your agreement or disagreement with each statement at this moment.

1 = Strongly Agree
2 = Agree
3 = Somewhat Agree
4 = Neither agree or disagree
5 = Somewhat Agree
6 = Disagree
7 = Strongly Disagree

_____ 1. “All I want to do now is have a drink”
_____ 2. “I do not need to have a drink right now”
_____ 3. “It would be difficult to turn down a drink this minute”
_____ 4. “Having a drink right now would make things seem perfect”
_____ 5. “I want a drink so bad I can almost taste it”
_____ 6. “Nothing would be better than a drink right now”
_____ 7. “If I had the chance to have a drink, I don’t think I would drink it”
_____ 8. “I crave a drink right now”
Appendix B-14: Control Group Manipulation Check

In the last exercise, you were asked to cope with alcohol related urges or thoughts in any way you naturally would. Please describe the way that you coped with any alcohol related urges or thoughts that you had during this exercise, if you did not experience any urges, please note this as well:

________________________________________________________________________
________________________________________________________________________

Below are some commonly used methods of coping with unwanted thoughts or urges. Please read each of the following and place a check next to any of the statements that describe a tactic, or similar tactic to one you used to cope when you were looking at the alcohol related images in the past exercise.

1. _____ I distracted myself/thought about something else.
2. _____ I tried to ignore or suppress my urges or thoughts.
3. _____ I accepted my urges or thoughts.
4. _____ I used mindfulness strategies to cope with urges or thoughts.
5. _____ I tried to come up with a strategy about how to handle the urges without acting on them.
6. _____ I tried to see my urges in a different light, to make it seem more positive.
7. _____ I tried to make light, or make fun of the thoughts/urges.
8. _____ I thought about what a friend or loved one might tell me to do.
9. _____ I told myself that I’m not really having the thoughts or urges.
10. _____ I criticized myself for having the thoughts or urges.
Appendix B-15: Mindfulness Meditation between Session Tracking Form

<table>
<thead>
<tr>
<th>Day:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Practiced Mindfulness Meditation? (Yes/No)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For how long?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B-16: Ohio University Consent Form

Title of Research: Alcohol and Coping Strategies
Researcher: Liza Mermelstein

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your participation in this study. You should receive a copy of this document to take with you.

Explanation of Study

This is a five-part study. The purpose of this study is to explore the effect that different methods of coping with thoughts, feelings and behaviors has on patterns of alcohol use and perceptions of use. If you choose to participate, you will be asked to participate in five sessions, each one week apart and you may be asked to engage in some out of session activities each week as well. During all of the sessions, you will be able to complete most of the measures using a computer assisted interview on a laptop computer. If you prefer, paper and pencil versions of the measures are also available.

During this initial session, you will be asked to fill out several questionnaires which will ask you about demographic information, current and historical drug and alcohol use patterns, and individual characteristics. Following completion of the questionnaires, you will be asked to complete a brief interview about your alcohol and drug use over the past month. You may be asked to read some materials and listen to some audio recordings, or you may not, depending on the group you were randomly assigned to. You will be asked to look at several images and provide your reactions to those images. Finally, you will be given instructions about completing the remaining parts of the study. Following completion of these activities, you will be debriefed. If you have any questions or concerns, the experimenter will be here to assist you. Your participation in this session should take 75 minutes to two hours depending on the group you were assigned to. Based on group assignment, you may be asked to complete out of session activities for at least one hour before next session.

Following completion of the initial session, you will be asked to return for four additional sessions, each one week apart. You may also be asked to participate in one hour of
outside activities each week following the initial session until the 5th session. During the 2nd, 3rd, 4th and 5th sessions you will be asked to fill out several questionnaires which will ask you about current alcohol use patterns and beliefs and individual characteristics. You may complete these brief measures over the Internet or in person by scheduling a time to come to the Health Disparities Lab. Following completion of these activities each session, you will be debriefed. Participation should take 15 minutes for the 2nd and 4th session, 15 minutes or 40 minutes depending on group assignment for the 3rd session and 45 minutes for the 5th session. You may complete the 2nd and 4th sessions in person or over the internet. You will be asked to schedule an appointment to come to the Health Disparities lab for the 3rd and 5th sessions.

Risks and Discomforts

During this study, you will be asked for personal information about alcohol and drug use. This information is confidential but please consider your comfort level with these types of question before agreeing to participate in the study. This study involves no physical risks for participants. However, some individuals might experience emotional discomfort from answering personal questions. Participation in this study is voluntary, and you may stop responding and withdraw from the study at any point without penalty. Your participation may also lead to increased awareness of your personal methods of coping with unwanted thoughts, feelings and behaviors.

During the academic quarter in which you participate, a master list containing the name of participants will exist which could link your name with data representing illegal activity. While the intension is to maintain the confidentially of this data, it is could be release if this information was subpoenaed.

Benefits

Your participation will provide you the opportunity to learn, first-hand, the process of collecting data for psychological research. Further, you will have the opportunity to be involved in research which is aimed at the improved delivery of interventions aimed at reducing binge drinking and negative consequences of alcohol use among college students.

Confidentiality and Records

All of your data will be kept confidential and your name will not be on the measures you complete at any time. You will receive a pre-numbered packet that does not have your name on it. Only the primary investigator, Liza Mermelstein, will have access to the information linking names and participant numbers and this list will be destroyed at the end of this academic quarter. The primary investigator will examine your responses to assess your current distress level for safety purposes and to make sure you qualify for the study. It is important to note that if you endorse any items about harming yourself, an
experimenter will attempt to contact you to follow-up on your safety and provide you with local resources and contact information for further assistance. Information gathered in this study will be used by investigators for research purposes only and no names will be attached to any subsequent presentation or publication.

Additionally, while every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU;

Compensation

At each session, you will receive one entry into a drawing for three $20 ITunes gift certificates. The drawing will be held after all participants have completed the study and you will be notified by e-mail if you win. The odds of winning are approximately 1 in 250. The following details additional compensation that you will receive at each session. Please be aware that in accordance with Ohio University policy, a receipt with your name and address must be given to the Ohio University Finance department. This receipt will identify you as having participated in an experiment that provides compensation but does not specify what experiment you participated in. All monetary compensation will be received by participants at the final (i.e., 5th) session, unless participants withdraw from the study early.

Initial Session: You will receive two credits of experimental credit for today’s participation.

2nd Session: You will be compensated $3 for participation in this part of the study which you will receive at the end of the study. For participation in the 2nd session, you will receive one experimental credit at the end of the 2nd session. If you were assigned to a group asking you to engage in activities outside of session, you will receive a second experimental credit at the end of the 2nd session.

3rd Session: You will be compensated $4 for participation in this part of the study which you will receive at the end of the study. For participation in the 3rd session, you will receive one experimental credit at the end of the 3rd session. If you were assigned to a group asking you to engage in activities outside of session, you will receive a second experimental credit at the end of the 3rd session.

4th Session: You will be compensated $5 for participation in this part of the study which you will receive at the end of the study. For participation in the 4th session, you will receive one experimental credit at the end of the 4th session. If you were assigned to a
group asking you to engage in activities outside of session, you will receive a second experimental credit at the end of the 4th session.

5th Session: You will be compensated $5 for participation in this part of the study which you will receive at the end of the study. Additionally, if you completed all five sessions, you will receive a $3 bonus. For participation in the 5th session, you will receive one experimental credit at the end of the 5th session. If you were assigned to a group asking you to engage in activities outside of session, you will receive a second experimental credit at the end of the 5th session.

Thus, participation in all five sessions will result in six experimental credits for all participants which will be received each week at the end of the session. Specifically, participants will receive two credits for participation in the initial session and one credit each week for the subsequent four weekly session. Participants may receive four additional credits (i.e., 10 credits total) if they were assigned to the group that asks participants to engage in outside of session weekly activities.

It is your right to withdraw from the study at any point you like. If you indicate that you no longer wish to participate in the study, you will receive compensation based on how many sessions you completed before withdrawing and you will not be contacted again. If you miss a session or cancel your session, you will be contacted by e-mail asking if you would like to reschedule. If you do not wish to reschedule or you do not respond to the e-mail, you will be sent a subsequent e-mail indicating the compensation you are entitled to based on prior participation and invited to come to the Health Disparities Lab to receive any monetary compensation you are entitled too. If you miss a session, you will not be dropped from the study. If you are not able to reschedule for that week, you may resume participation the following week. However, you will not receive compensation for the week that you missed and you will not be eligible for the $3 bonus for completion of all sessions.

Contact Information

If you have any questions regarding this study, please contact the principal investigators for this study, Liza Mermelstein or the research supervisor, Dr. John P. Garske. These individuals can be contacted regarding any questions or concerns:

Liza Mermelstein, M.S. 057 Porter Hall (593-1707)
lizamermelstein@gmail.com

John P. Garske, Ph.D. 255c Porter Hall (597-1303)
garske@ohio.edu

If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.
By signing below, you are agreeing that:
    you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
    you have been informed of potential risks and they have been explained to your satisfaction.
    you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
    you are 18 years of age or older
    your participation in this research is completely voluntary
    you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Signature_________________________ Date______________

Printed Name________________________
Appendix B-17: Debriefing Form

Initial, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} Sessions

Thank you for your participation in this research project. The study is designed to explore the effect that different methods of coping with thoughts and feelings has on patterns of alcohol use and perceptions of use. To accomplish this goal, you have been asked questions about personal life events, current alcohol and drug use patterns, and current level of psychological distress.

The information provided by these questionnaires will help psychology researchers and clinicians learn more about factors that are related to current alcohol use and the impact that different methods of coping may have on patterns alcohol use. The results of such studies will assist psychologists to develop better interventions that may assist individuals in decreasing alcohol use.

As a reminder, all of your questionnaire responses will remain strictly confidential. If you have any further questions regarding the nature of this study, or would like to request details of the results, please feel free to contact one of the following:

- Liza Mermelstein, M.S. 057 Porter Hall (593-1707)
  lizamermelstein@gmail.com

- John P. Garske, Ph.D. 255c Porter Hall (597-1303)
  garske@ohio.edu

In addition, if you are concerned about the study materials used or questions asked and wish to speak to a professional, or if you would like more information or reading material on this topic, please contact one of the following resources:

- Ohio University Psychology and Social Work Clinic 593-0902
- Ohio University Counseling and Psychological Services 593-1606
- Ohio University 24/7 Crisis Intervention Service 593-1616
- Health Recovery Services 592-6720
Debriefing Form – 5th Session

Thank you for your participation in this research project. The study is designed to explore the effect that different methods of coping with thoughts and feelings has on patterns of alcohol use and perceptions of use. To accomplish this goal, you have been asked questions about personal life events, current alcohol and drug use patterns, and current level of psychological distress.

The information provided by these questionnaires will help psychology researchers and clinicians learn more about factors that are related to current alcohol use and the impact that different ways of coping with urges to use alcohol may have on reducing alcohol use. The results of such studies will assist psychologists to develop better interventions that may assist individuals in decreasing alcohol use. In this intervention one group received instruction about and practiced mindfulness techniques. The other group did not receive any intervention. You were randomly assigned to one of these groups. If you would like to learn more about the information that the other group received, please e-mail Liza Mermelstein at the e-mail address below. Additionally, upon completion of data analysis, findings of this study will be available to you. If you are interested in receiving a copy of these results, please e-mail Liza Mermelstein at the address below.

As a reminder, all of your questionnaire responses will remain strictly confidential. If you have any further questions regarding the nature of this study, or would like to request details of the results, please feel free to contact one of the following:

Liza Mermelstein, M.S.  
057 Porter Hall (593-1707)  
lizamermelstein@gmail.com

John P. Garske, Ph.D.  
255c Porter Hall (597-1303)  
garske@ohio.edu

In addition, if you are concerned about the study materials used or questions asked and wish to speak to a professional, or if you would like more information or reading material on this topic, please contact one of the following resources:

Ohio University Psychology and Social Work Clinic  
593-0902

Ohio University Counseling and Psychological Services  
593-1606

Ohio University 24/7 Crisis Intervention Service  
593-1616

Health Recovery Services  
592-6720
## Appendix C-1: Scale Diagnostics: Ungrouped Data

<table>
<thead>
<tr>
<th>Measure</th>
<th>Skew</th>
<th>Standard Skew</th>
<th>Kurtosis</th>
<th>Standard Kurtosis</th>
<th>Outliers*</th>
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<td>-1.07</td>
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<td>BE Change</td>
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<td>RAPI S1</td>
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<td>13.67</td>
<td>18.76</td>
<td>34.44</td>
<td>44; 68</td>
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<td>0.10</td>
<td>1.82</td>
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<td>-0.46</td>
<td>-0.32</td>
<td>-0.58</td>
<td>None</td>
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<tr>
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<td>2.10</td>
<td>0.80</td>
<td>1.05</td>
<td>None</td>
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<td>Δ WBSI</td>
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<td>1.49</td>
<td>2.68</td>
<td>-18</td>
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<td>Ref Sq Rt Δ WBSI</td>
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<td>0.53</td>
<td>0.95</td>
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<td>-0.85</td>
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<td>5.89</td>
<td>3.09</td>
<td>5.61</td>
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<td>Log BSI S1</td>
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<td>MM Prac Freq Wkly Avg</td>
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<td>-1.30</td>
<td>0.42</td>
<td>0.56</td>
<td>None</td>
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<td>MM Prac Quan Wkly Avg</td>
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<td>4.65</td>
<td>7.44</td>
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*Outliers were + or − 3.29 standard deviations from the sample mean, p < .001
### Appendix C-2: Scale Diagnostics: Grouped Data

<table>
<thead>
<tr>
<th></th>
<th>Mindfulness Group</th>
<th>Control Group</th>
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</thead>
<tbody>
<tr>
<td>BE S1</td>
<td>1.14</td>
<td>2.97</td>
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<td>BE S2</td>
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<tr>
<td>BE S3</td>
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<td>1.46</td>
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<td>BE S4</td>
<td>0.94</td>
<td>2.42</td>
</tr>
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<td>BE S5</td>
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<td>0.91</td>
</tr>
<tr>
<td>RAPI S1</td>
<td>3.50</td>
<td>9.14</td>
</tr>
<tr>
<td>Log RAPI S1</td>
<td>0.38</td>
<td>1.00</td>
</tr>
<tr>
<td>RAPI S5</td>
<td>2.17</td>
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<tr>
<td>Sq Rt RAPI S5</td>
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<td>DRSEQ S1E</td>
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*Outliers were + or – 3.29 standard deviations from the sample mean, p<.001*
Appendix C-3: Mean Group Differences on Alcohol Indices

<table>
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<tr>
<th></th>
<th>MG (N=38) Mean (SD)</th>
<th>CG (N=38) Mean (SD)</th>
<th>Sample Range</th>
<th>t-test</th>
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<tbody>
<tr>
<td>BE S1*&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.28 (1.01)</td>
<td>1.28 (.78)</td>
<td>.25-4</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>BE S2</td>
<td>.79 (.96)</td>
<td>1.49 (.99)</td>
<td>0-3</td>
<td>3.09**</td>
</tr>
<tr>
<td>BE S3</td>
<td>1.08 (1.12)</td>
<td>1.54 (1.04)</td>
<td>0-4</td>
<td>1.84</td>
</tr>
<tr>
<td>BE S4</td>
<td>.81 (1.00)</td>
<td>1.70 (1.29)</td>
<td>0-5</td>
<td>3.33**</td>
</tr>
<tr>
<td>BE S5</td>
<td>0.95 (1.00)</td>
<td>1.50 (1.36)</td>
<td>0-4</td>
<td>1.99*</td>
</tr>
<tr>
<td>BE Change&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-1.48 (2.80)</td>
<td>1.13 (3.23)</td>
<td>-7-10</td>
<td>3.67**</td>
</tr>
<tr>
<td>Total Drinks S1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.23 (14.55)</td>
<td>16.57 (10.50)</td>
<td>.5-70</td>
<td>-.57</td>
</tr>
<tr>
<td>Total Drinks S2</td>
<td>15.08 (13.81)</td>
<td>17.30 (12.40)</td>
<td>0-60</td>
<td>.73</td>
</tr>
<tr>
<td>Total Drinks S3</td>
<td>16.32 (14.07)</td>
<td>18.11 (11.62)</td>
<td>0-58</td>
<td>.60</td>
</tr>
<tr>
<td>Total Drinks S4</td>
<td>14.87 (14.49)</td>
<td>21.18 (16.33)</td>
<td>0-72</td>
<td>1.79</td>
</tr>
<tr>
<td>Total Drinks S5</td>
<td>16.54 (11.85)</td>
<td>19.00 (16.47)</td>
<td>0-69</td>
<td>.74</td>
</tr>
<tr>
<td># Drinking Episodes S1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.19 (.97)</td>
<td>2.18 (.96)</td>
<td>.25-5.25</td>
<td>-.06</td>
</tr>
<tr>
<td># Drinking Episodes S2</td>
<td>2.05 (1.37)</td>
<td>2.16 (1.07)</td>
<td>0-6</td>
<td>.39</td>
</tr>
<tr>
<td># Drinking Episodes S3</td>
<td>2.24 (1.28)</td>
<td>2.41 (1.17)</td>
<td>0-5</td>
<td>.60</td>
</tr>
<tr>
<td># Drinking Episodes S4</td>
<td>1.97 (1.54)</td>
<td>2.35 (1.14)</td>
<td>0-6</td>
<td>1.21</td>
</tr>
<tr>
<td># Drinking Episodes S5</td>
<td>2.08 (.98)</td>
<td>2.25 (1.32)</td>
<td>0-6</td>
<td>.62</td>
</tr>
<tr>
<td>Avg # Drinks per Episode S1</td>
<td>7.44 (3.93)</td>
<td>7.18 (3.07)</td>
<td>3.14-18.61</td>
<td>-.32</td>
</tr>
<tr>
<td>Avg # Drinks per Episode S2</td>
<td>6.43 (4.35)</td>
<td>7.14 (3.83)</td>
<td>0-29</td>
<td>.75</td>
</tr>
<tr>
<td>Avg # Drinks per Episode S3</td>
<td>6.51 (4.08)</td>
<td>7.13 (4.02)</td>
<td>0-17.5</td>
<td>.67</td>
</tr>
<tr>
<td>Avg # Drinks per Episode S4</td>
<td>5.95 (4.10)</td>
<td>8.74 (5.10)</td>
<td>0-21</td>
<td>2.58**</td>
</tr>
<tr>
<td>Avg # Drinks per Episode S5</td>
<td>6.94 (4.02)</td>
<td>7.55 (5.11)</td>
<td>0-20</td>
<td>.57</td>
</tr>
</tbody>
</table>

*<sup>a</sup> = Weekly average from past four weeks

*<sup>b</sup> = BE Change = BE in 4 weeks after initial session – BE in 4 weeks prior to initial session

*p<.05, **p<.01.
Appendix C-4: Mean Group Differences on Mindfulness Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mindfulness Group</th>
<th>Control Group</th>
<th>t-test (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M(SD)</td>
<td>M(SD)</td>
<td></td>
</tr>
<tr>
<td>S1B Aware</td>
<td>25.37 (6.06)</td>
<td>25.57 (5.88)</td>
<td>.15 (.88)</td>
</tr>
<tr>
<td>S1B Describe</td>
<td>26.91 (5.85)</td>
<td>26.18 (6.75)</td>
<td>-.50 (.62)</td>
</tr>
<tr>
<td>S1B Non-Judgment</td>
<td>26.82 (6.11)</td>
<td>27.76 (5.89)</td>
<td>.69 (.50)</td>
</tr>
<tr>
<td>S1B Non-Reactivity</td>
<td>21.83 (4.00)</td>
<td>21.62 (3.47)</td>
<td>.24 (.81)</td>
</tr>
<tr>
<td>S1B Observe</td>
<td>25.77 (5.52)</td>
<td>23.47 (5.31)</td>
<td>-1.86 (.07)</td>
</tr>
<tr>
<td>S1E Aware</td>
<td>23.24 (6.26)</td>
<td>25.13 (6.03)</td>
<td>1.33 (.19)</td>
</tr>
<tr>
<td>S1E Describe</td>
<td>26.86 (5.78)</td>
<td>26.37 (7.02)</td>
<td>-.33 (.74)</td>
</tr>
<tr>
<td>S1E Non-Judgment</td>
<td>26.76 (5.78)</td>
<td>28.50 (6.65)</td>
<td>1.21 (.23)</td>
</tr>
<tr>
<td>S1E Non-Reactivity</td>
<td>21.70 (3.34)</td>
<td>20.75 (5.10)</td>
<td>.95 (.35)</td>
</tr>
<tr>
<td>S1E Observe</td>
<td>27.03 (5.64)</td>
<td>23.98 (6.10)</td>
<td>-2.24 (.03)</td>
</tr>
<tr>
<td>S5 Aware</td>
<td>25.71 (5.65)</td>
<td>25.33 (5.72)</td>
<td>-.29 (.76)</td>
</tr>
<tr>
<td>S5 Describe</td>
<td>27.81 (5.45)</td>
<td>25.89 (6.18)</td>
<td>-1.41 (.16)</td>
</tr>
<tr>
<td>S5 Non-Judgment</td>
<td>28.11 (6.29)</td>
<td>28.81 (6.01)</td>
<td>.48 (.63)</td>
</tr>
<tr>
<td>S5 Non-Reactivity</td>
<td>19.24 (4.23)</td>
<td>22.51 (4.10)</td>
<td>-3.35 (.001)**</td>
</tr>
<tr>
<td>S5 Observe</td>
<td>26.24 (6.35)</td>
<td>22.31 (5.98)</td>
<td>-2.73 (.01)*</td>
</tr>
</tbody>
</table>

*Bonferroni Adjustment was made (alpha of .05/5): *p<.01; **p<.002
Appendix C-5: Mean Participant Ratings of Mindfulness Intervention

<table>
<thead>
<tr>
<th></th>
<th>Comprehension</th>
<th>Interest</th>
<th>Perceived Helpfulness</th>
<th>Intention to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
<td>M(SD)</td>
</tr>
<tr>
<td>Post-Handout</td>
<td>84.45 (10.26)</td>
<td>82.11 (13.93)</td>
<td>77.37 (27.01)</td>
<td>80.26 (15.15)</td>
</tr>
<tr>
<td>Post-S1 Practice 1</td>
<td>79.87 (19.85)</td>
<td>73.03 (25.08)</td>
<td>75.92 (24.46)</td>
<td>76.71 (18.46)</td>
</tr>
<tr>
<td>Post-S1 Practice 2</td>
<td>75.53 (20.03)</td>
<td>70.13 (22.10)</td>
<td>75.66 (25.63)</td>
<td>74.74 (20.10)</td>
</tr>
<tr>
<td>Post-S3 Practice</td>
<td>79.91 (17.48)</td>
<td>69.65 (20.93)</td>
<td>80.59 (21.24)</td>
<td>73.53 (20.32)</td>
</tr>
<tr>
<td>Mean:</td>
<td>79.94</td>
<td>73.73</td>
<td>77.39</td>
<td>76.31</td>
</tr>
</tbody>
</table>

*Each item was rated by participants on a scale of 0 to 100*
### Appendix C-6: Mean Group by Time Differences in Urges to Use Alcohol

<table>
<thead>
<tr>
<th>Comparison</th>
<th>$\mu_1$</th>
<th>$\mu_2$</th>
<th>$\mu_1 - \mu_2$</th>
<th>$F$-value</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUQ S1Avg vs. AUG S2-Avg</td>
<td>18.77</td>
<td>15.85</td>
<td>2.92</td>
<td>16.23</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>