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Brief interventions for heavy college drinkers: randomized clinical trial to investigate comparable efficacy of two active conditions

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BRIEF INTERVENTIONS FOR HEAVY COLLEGE DRINKERS: RANDOMIZED CLINICAL TRIAL TO INVESTIGATE COMPARABLE EFFICACY OF TWO ACTIVE CONDITIONS

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Abstract

Brief interventions for college heavy drinkers have shown promise in reducing drinking and related negative consequences. However, since duration of the intervention, content, method of delivery, and duration of the follow up period vary across studies, we do not know whether length of the intervention has an impact on its effectiveness. In the present study, we conducted a randomized trial systematically evaluating efficacy of two brief interventions aimed at reducing alcohol use and consequences among college student drinkers. In addition, we evaluated treatment mediators and moderators. We randomly assigned 278 heavy drinking students to a 10-minute brief intervention, a 50-minute brief intervention, or attention-control group. Both interventions were provided by clinical graduate students trained in Brief Alcohol Screening and Intervention for College Students (BASICS) and included personalized feedback on alcohol consumption including information about norms, effects of alcohol and advice on ways to reduce risks associated with drinking. As hypothesized, both active conditions were more efficacious than the control in reduction of alcohol consumption. However, we did not achieve the same results for alcohol-related problems. In addition, hypothesized mediators of intervention efficacy were partially supported. Specifically while our results supported alcohol drinking norms and coping behavioral strategies as mediators, we did not find support for self-efficacy nor for alcohol expectancies. Moreover, hypothesized moderators of interventions efficacy (i.e. gender, readiness to change, and drinking motives) were not supported either. Given the preliminary nature of our investigation, more research is warranted in this area.

Introduction

Problematic Alcohol Use on College Campuses

Binge drinking, defined as more than five drinks for an adult male or more than four drinks for an adult female in a two-hour period (National Institute of Alcohol Abuse and Alcoholism; NIAAA, 2004) poses a major problem on college campuses (Wechsler, Lee, Kuo, & Lee, 2000). In spite of increased prevention and intervention efforts aimed at reducing alcohol consumption and risks associated with it, there has been a 3% increase in alcohol-related deaths between 1998 and 2005 (Hingson, Zha, & Weitzman, 2009). Additionally, college students drink more than their same age peers who do not attend college (Johnston, O'Malley, Bachman, 2000; Hingson et al., 2009). In fact, according to the most recent data, 44.7% of college students reported engaging in heavy drinking in the past month in 2005, which is an increase from 41.7% observed in 1999. (Hingston et al., 2009). Furthermore, heavy drinking is associated with engaging in high risk behaviors such as driving under the influence of alcohol (Hingson, Heeren, Winter, & Wechsler, 2005).

In fact, according to the report put forward by the National Highway Traffic Safety Administration (NHTSA), an average of three young adults are killed each day when they drink and drive (United States Department of Transportation; USDOT; NHTSA, 2005). Specifically, in 2003, 6,002 young adults died in motor vehicle crashes, and alcohol was involved in 38% of these deaths (USDOT; NHTSA, 2003). Notably, the effects of heavy drinking are felt not only by the individual who engages in problem drinking behavior but also by his/her fellow students and the community he/she lives in (Wechsler, 1996). Indeed, Wechsler, Lee, Kuo, and Lee (2000) reported that students residing on "high binge" campuses (i.e., more than 50% of students are binge drinkers), who did not partake in binge drinking or who abstained from alcohol, were

twice as likely to experience being assaulted, awakened, or kept from studying by drinking students than were students at "low binge" campuses (i.e., 35% or lower of students are binge drinkers). While many young adults will "mature out" of heavy use by their mid-twenties, a minority will continue to drink heavily and experience harmful consequences associated with this behavior (Demb & Campbell, 2008; Jackson et al., 2001; Schulenberg & Maggs, 2002).

Brief Alcohol Screening and Intervention for College Students

Unfortunately, the majority of education and intervention programs have not achieved the desired reduction in drinking among college students (Larimer & Cronce, 2002). In addition, Wechsler et al. (2002) reported that in spite of efforts to teach college students about risks of drinking alcohol, consumption of alcohol among students remains dangerously high. Borsari and Carey (2005) proposed one reason for this regrettable reality could be that students are aware of harmful consequences of drinking, yet, remain unmotivated to reduce their alcohol consumption.

Over the recent years, researchers have been investigating efficacious interventions for college student heavy drinkers. There is enough evidence to conclude that the components of a successful intervention for college drinkers are: motivational enhancement, cognitive-behavioral intervention, expectancy challenge, and skills training (NIAAA, 2002; Larimer & Cronce, 2002; 2007). The Brief Alcohol Screening and Intervention for College Students (BASICS) incorporates all of these components (Dimeff, Baer, Kivlaha, & Marlatt, 1999) and it is considered a "gold standard" in brief interventions for young adult heavy drinkers. BASICS is characterized as "nonconfrontational, nonjudgmental, nonauthoritarian, and nonlabelling" (Dimeff et al., 1999). The intervention consists of two 50-minute sessions. The first session assesses the student's pattern of alcohol consumption while the second consists of feedback about the student's personal risk factors. The core elements of BASICS are cognitive-behavioral

techniques aimed at enhancing self management strategies (setting drinking limits, monitoring one's drinking, rehearsing drink refusal, and practicing other useful new behaviors through role play), motivational enhancement, discussion of expectancies and placebo effects of alcohol, harm reduction (planning safe transportation) and normative feedback (Dimeff et al., 1999).

Mistakenly, traditional interventions for college drinking take students' motivation to change drinking behavior for granted and proceed to teach students skills designed to help them modify their drinking behavior (Borsari & Carey, 2005). Interventions such as BASICS start with motivating college drinkers to change their drinking patterns (Dimeff et al., 1999). Then, when students are ready and committed to change, they are taught new techniques to help alter their behavior.

Building motivation for change involves use of Motivational Interviewing (MI) (Miller & Rollnick, 1991; 2002). MI posits that a key element of effective intervention for alcohol and substance problems is resolving ambivalence about changing behavior. Ambivalence is viewed as a normative part of the change process, consistent with the Stages of Change model developed by Prochaska, DiClemente, and Norcross (1992). According to the model, change occurs on a continuum in which there are five stages of change: precontemplation, contemplation, preparation, action, and maintenance. The role of the therapist is to assist the patient in movement from one stage to another. In order to do so, Miller and Rollnick (1991) proposed the following clinical techniques: express empathy, avoid argumentation, "roll" with resistance (i.e., meeting patient's ambivalence about change with acceptance rather than argumentation), support self-efficacy, and develop discrepancy (i.e., pointing out a discrepancy between present behavior and important personal goals or values).

Intervention Efficacy and Cost Effectiveness

In summary, the literature suggests brief interventions for college student drinkers are successful in reducing the amount of alcohol consumed as well as negative consequences associated with alcohol consumption (Larimer & Cronce, 2002; 2007). Still, both the length (ranging from 4 sessions to 5 minutes) and the method of delivery (in person, mail, computer delivered) of the interventions implemented in numerous studies have varied (Larimer, 2004), and there have been no studies conducted to date in college populations that have directly compared the efficacy of two interventions different in length. Nonetheless, there is some evidence in the literature for comparable treatment outcome between longer and shorter interventions. Murphy et al. (2004) and White et al (2006) compared in-person BASICS interviews with written BASICS feedback alone. Participants randomized to either group significantly reduced drinks per week, frequency of drinking and heavy drinking, and negative consequences, with no differences between groups. However, lack of a control group poses a significant limitation of the aforementioned studies, and small sample size was also a limitation in the Murphy et al. (2004) study, whereas all participants in the White et al. (2006) study were mandated to receive intervention and may have reduced their drinking for reasons other than either intervention.

Treatment length's effect on drinking outcomes has been evaluated in an adult sample. In a study conducted through the World Health Organization (WHO) (Barbor et al., 1994; WHO Brief Intervention Study Group, 1996), the length of brief alcohol intervention was evaluated among adult alcohol drinkers. Specifically, researchers randomly assigned 1260 heavy nondependent alcohol drinkers to either brief advice (5 minutes), brief counseling (20 minutes and manual), or control groups. Researchers found greater drinking reductions in both

interventions compared to controls. In addition, Wutzke, Conigrave, Saunders, and Hall (2002) reported 10-year follow up results of the WHO study conducted in Australia. Researchers randomly assigned 554 nondependent alcohol drinkers to the following four conditions: a) 5-minute intervention; b) 20-minute intervention, c) 40-minute intervention, and d) control condition. At 9-month follow, participants in all active interventions reported significantly reduced alcohol consumption compared to controls, and length of the intervention did not have a significant effect on outcome. Moreover, treatment gains were maintained at 2-year follow up, though were not maintained at 10-year follow-up (Wutzke et al., 2002).

There is some preliminary evidence that shorter interventions may achieve better results in some populations. Specifically, Petry**,** Weinstock, Lengerwood, and Morasco (2008) randomly assigned adults with gambling problems to the following conditions: a) 10-minutes of brief advice; b) one session of Motivational Enhancement Therapy (MET); c) one session of MET plus 3 sessions of Cognitive Behavioral Therapy (CBT); and d) assessment only control. Petry et al (2008) reported that at the 6-week follow up, the brief advice condition, as compared to control, was the only condition that lead to significant reductions in gambling. In addition, participants in the brief advice condition showed clinically significant reductions in gambling at the 9-month follow up.

Results of the aforementioned studies suggest that, at least for adult nondependent drinkers, short interventions are as effective as longer ones. Still, this question has not been tested with college populations, and needs further investigation for the following reasons. First, as pointed out by Sobell and Sobell (2000), in accordance with stepped care principles, the least invasive and burdensome treatment should be employed. MI-based interventions such as BASICS have already been employed as a "gold standard" for non-dependent college alcohol

drinkers. Still, even among such time-limited interventions, there is a significant variation in the duration. Following the argument posited by Sobell and Sobell (2000), if there is evidence that an MI-based intervention of shorter duration is as efficacious as a longer one, the former should be implemented as a first line of treatment. Second, it is reasonable to assume that shorter interventions are less costly than longer ones. Therefore, from an economic point of view, assuming both are equally effective, shorter intervention seems like a more prudent choice. In fact, there is some preliminary support in the alcohol literature for cost effectiveness of brief interventions (Babor et al., 2006, 2007; Gibson & Shanahan, 2007). Third, as a result of ethical and methodological issues associated with placebo-controlled trials in medicine, researchers have advocated implementation of non-inferiority designs in clinical trials (D'Agostino, Massaro, and Sullivan, 2003; Dilba**,** Bretz, Hothorn, and Guiard**,** 2003). Non-inferiority trials involve comparison of the efficacy of two active treatments to establish that the new experimental treatment is not inferior (i.e. less efficacious based on a pre-established margin) than the "gold standard." One reason for conducting non-inferiority trials is to show that while a new drug or treatment achieves comparable treatment efficacy, the new treatment would be preferable for some individuals over the "gold standard." (D'Agostino et al., 2003). Similarly, we expect that although both interventions will be equally efficacious for college drinkers, the 10-minute intervention is more cost effective and less burdensome, may be preferred by some students, and one intervention may be more beneficial than the other for some students. Exploration of moderators of treatment efficacy will allow us to determine which individuals will be most likely to benefit from a short versus a longer intervention.

Treatment Mediators and Moderators

Evaluating active components of brief interventions (Saunders, Kypri, Walters, Laforge, & Larimer, 2004), and for whom these interventions work best is an important next step in college drinking research. Below, we describe proposed mediators and moderators of treatment to be explored in the proposed study. We adhered to the definition of both constructs put forward by Baron and Kenny (1986). Specifically, they defined a moderator as: "a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable. Specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables. ... In the more familiar analysis of variance (ANOVA) terms, a basic moderator effect can be represented as an interaction between a focal independent variable and a factor that specifies the appropriate conditions for its operation." *p. 1174.* In addition, Baron and Kenny (1986) defined a mediator as a variable that: "accounts for the relation between the predictor and the criterion. Mediators explain how external physical events take on internal psychological significance. Whereas moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur." *p. 1176.* The choice of variables included in either category was based on empirical evidence. Specifically, for each of our moderators/mediators, we based the decision to include it in its respective category based on preliminary support in the literature.

Mediators

Perceived norms: There is evidence for a mediating role of perceived descriptive norms in efficacy of brief interventions (see Larimer and Cronce, 2007 for review). It has been well documented that perceived norms for alcohol use play an influential role in college student

alcohol consumption (Perkins & Wechsler, 1996), with some research indicating a student's perception of the amount of alcohol consumed by his/her peers is the strongest predictor of the amount of alcohol he/she will consume (Neighbors, Lee, Lewis, Fossos, and Larimer, 2007; Perkins, Haines, and Rice, 2005). Students often overestimate the amount of alcohol consumed by their peers and underestimate the severity of the negative consequences of problem drinking (Borsari & Carey, 2003). Similarly, Mallett et al. (2006) found students who had the greatest misperceptions about the amount of alcohol needed to experience negative consequences of drinking were at the highest risk for heavy drinking. It follows that changing students' perceptions regarding norms for alcohol use and perceptions of personal risks related to alcohol use at different levels can influence students to reduce their drinking. Normative feedback intervention studies have supported this hypothesis (Neighbors, Larimer, and Lewis, 2004; Neighbors, Dillard, Lewis, Bergstrom, and Neil, 2006).

Cognitive-behavioral coping skill: Martens et al. (2004, p. 2) defined alcohol related protective behavioral strategies as "various cognitive-behavioral techniques that students can employ during each drinking episode" in order to reduce harm associated with alcohol drinking. While some studies provide preliminary support that protective behavioral strategies are related to treatment outcome (Martens et al., 2004; Larimer et al., 2007), other findings are contradictory (Martens et al., 2007). It is important to investigate this further. One of the goals of BASICS is to teach students skills which will minimize harm associated with heavy drinking; thus we expect that the longer intervention will lead to greater acquisition of protective behavioral strategies, which, in turn will affect the amount of alcohol consumed and number of alcohol-related problems.

Drinking refusal self-efficacy and positive alcohol expectancies: It has been suggested that refusal self-efficacy and alcohol expectancies should be studied together in evaluating their effects on drinking behavior (Evans et al., 1995; Oei & Morawska, 2004). According to Social Learning Theory (Bandura, 1977), self-efficacy is defined as perceived ability to perform a particular task. Drinking refusal self-efficacy is, therefore, one's belief that one can resist drinking while tempted. There is ample support in the literature for the association between self efficacy and treatment outcome (Litt, Kadden, Kabela-Cormier, and Petry, 2008; Moos & Moss, 2007). Moreover, alcohol expectancies are beliefs about the effects of alcohol on one's behavior, mood, and cognitions (Goldman, Brown, Christiansen, and Smith, 1991). Evidence suggests that providing experiences and feedback which counter perceptions of alcohol's causal role in enhancing social interactions can lead to drinking reductions (Darkes & Goldman, 1993; Darkes & Goldman, 1998). Oei and Morawska (2004) proposed a cognitive model of binge drinking in which positive alcohol expectancies and self-efficacy impact the acquisition and maintenance of binge drinking. Specifically, they proposed that while positive alcohol expectancies predict quantity of alcohol consumed, drinking refusal self-efficacy will predict the frequency of binge drinking episodes. There is preliminary support for this model in the adult alcohol literature (Hasking & Oei, 2002). In the college literature, there is some evidence that positive alcohol expectancies are associated with both frequency and quantity of drinking while self-efficacy is associated only with the frequency of binge drinking episodes (Blume, Schmaling, and Marlatt, 2003). Thus, it appears that for college students, both quantity and frequency of drinking are associated with alcohol expectancies. In addition, for both adult and college student binge drinkers, self-efficacy predicts frequency of drinking.

Moderators

Gender: There is preliminary support in the literature for moderating effects of gender (see Larimer and Cronce, 2007 for review). Specifically, Larimer and Cronce (2007) reported female students benefited more from mailed personalized feedback than did male students. Similarly, Murphy et al. (2004) reported female students achieved greater treatment gains than did male students as a result of personalized feedback for college student drinkers. Thus, we believe that in the proposed study, female participants will benefit more from both active interventions than male participants.

Stages of change: According to the Stages of Change (SOC) model, behavior change occurs on a five-stage continuum: precontemplation, contemplation, preparation, action, and maintenance (Prochaska, DiClemente, and Narcross, 1992). Individuals vary in SOC for a particular behavior, and the role of the MI clinician is to increase motivation and help the client to progress through these stages. There is preliminary evidence that SOC has a moderating effect in treatment efficacy among college student problem drinkers (Carey, Henson, Carey, and Maisto, 2007; Fromme & Corbin, 2004).

Drinking Motives: Cooper (1994) proposed a four factor model of drinking motives, enhancement (i.e. drinking to maintain positive affect); coping (i.e. drinking to cope with negative affect); conformity (i.e. drinking to avoid negative peer appraisal); and social (i.e. drinking to enhance participation in social activities). There is some support for Cooper's (1994) model overall in college drinkers (Martens**,** Rocha, Martin, and Serrao**,** 2008; MacLean & McLecci, 2000), and support for the association with alcohol problems and consumption and coping and conformity motives (Lewis et al., 2008; Buckner**,** Keough, and Schmidt, 2007). Moreover, there is some evidence that students who drink to conform and to cope with negative

affect experience more alcohol related problems than those who drink for enhancement and social reasons (Lewis et al., 2008; Martens et al., 2008). Based on these findings, we expect the full BASICS, aimed at coping skills enhancement, will have a greater impact for those who drink to cope and conform than those who drink for social and enhancement reasons.

Preliminary Studies

We conducted a pilot study in which we randomly assigned 114 college binge drinkers to either a 10-minute intervention, 50-minute intervention, or a 4-week control. There was a significant difference between participants in the 10-minute intervention and control condition regarding their alcohol consumption at 4-week follow up. However, there was no significant difference between the 50-minute intervention and the control condition on alcohol consumption. There were also no significant differences between active intervention conditions, and neither intervention showed advantages for reducing problems or increasing protective behaviors relative to the control condition. Our results suggest that a very brief intervention can impact short-term alcohol use outcomes, with potentially no advantage of longer interventions for this population (Kulesza, Apperson, Larimer, and Copeland, 2010).

Summary and Rationale

The present investigation addresses limitations of prior studies, and will be the first to examine duration of in-person contact in relation to efficacy in a college population. In the present study, we explored whether there is a significant difference in the effectiveness of an intervention as brief as 10 minutes versus a 50 minute intervention in reduction of alcohol consumption and alcohol-related problems among college students, in comparison to an attention-control group using randomized design. In addition, we evaluated moderators and mediators of treatment, such as gender, self-efficacy for avoiding problem drinking, peer norms

of alcohol consumption, stages of change for readiness to stop or cut down on drinking, positive alcohol expectancies, and alcohol-related coping skills for reducing alcohol-related problems. We assessed drinking and consequences 4 weeks post intervention to determine comparability of intervention effects.

Aims and Hypotheses

Aim 1: Compare efficacy of 2 brief motivational interventions with comparable content but different duration (50-minute v. 10-minute) in reducing alcohol use and consequences among college student heavy drinkers.

Hypothesis 1a: The 10-minutes session will be as efficacious at reducing drinking and drinking-related consequences among college students as the 50-minute session. We based this prediction on the adult alcohol literature (Wutzke et al., 2002), college gambling literature (Petry et al., 2008) as well as preliminary support findings among college heavy drinkers (Kulesza et al., 2010).

Hypothesis 1b: We hypothesize both 50- and 10-minute interventions will be more efficacious than attention-control. We based this prediction on two literature reviews conducted by Larimer and Cronce (2002 and 2007).

Aim 2: Investigate whether cognitive-behavioral coping skills utilization aimed at reducing alcohol-related problems, perceived descriptive norms for alcohol consumption, drinking refusal and self-efficacy, and alcohol expectancies will mediate intervention effects.

Hypothesis 2a: Efficacy of both interventions, relative to attention- control, will be mediated by the change from pre to post-intervention perceived alcohol descriptive norms.

Hypothesis 2b: Efficacy of both interventions, relative to wait-list control, will be mediated by the extent of post intervention drinking refusal self-efficacy.

Hypothesis 2c: Efficacy of both interventions, relative to a wait-list control, will be mediated by the extent of change of post-intervention positive alcohol expectancies.

Hypothesis 2d: Efficacy of both interventions, relative to a wait-list control, will be mediated by post-intervention cognitive-behavioral coping skills use.

Hypothesis 2e: Individuals in the 50-minute intervention will use more coping skills aimed at reduction of alcohol-related problems than the individuals in the 10— minute intervention.

Aim 3: Investigate whether gender, baseline stages of change, and drinking motives, will moderate intervention efficacy in the 10- versus the 50-minute intervention.

Hypothesis 3a: Both interventions will be more efficacious for female rather than male participants.

Hypothesis: 3b: Both interventions will be more efficacious for participants higher in baseline readiness to change their drinking.

Hypothesis 3c: Drinking motives will moderate intervention efficacy such that both interventions will be equally efficacious for individuals drinking to enhance positive affect and for social reasons. However, for those individuals who drink to cope with negative affect and for conformity reasons, the 50-minute intervention will result in greater treatment gains than the 10-minute one. We based this prediction on findings from the college drinking literature (Lewis et al., 2008; Martens et al., 2008) and on the fact that during 50-minute BASICS, aimed at coping skills enhancement, there will be greater opportunity to introduce new coping skills than in the 10-minute BASICS. In addition, this relationship will be stronger for alcohol-related problems than for amount of alcohol consumed.

Method

Statistical Power and Sample Size Considerations

We calculated power for the proposed study based on suggestions in an article by Dilba et al. (2006). Power to show equivalence was determined for two of the principal outcome measures, number of alcohol-related problems on the RAPI (White & Labouvie, 1989) and amount of alcohol consumed on the DDQ (Collins et al., 1985). Based on similar studies (Marlatt et al. 1998), we based our analysis on a small effect size (Cohen's $\underline{d} = 0.20$) to show equivalence between 10- and 50-minute intervention conditions as compared to the no-treatment control condition. Specifically, as suggested by Dilba et al. (2006) we calculated power to show equivalence based on the +/-2 margin using R software package. Therefore, we will consider both interventions equivalent as long as there is no greater than |2| difference in drinks per week between them based on the DDQ (Collins et al., 1985). With a sample size of 300 participants (100 participants per condition) there will be statistical power ($\beta = .80$), $\alpha = .05$ to show equivalence between the two active interventions.

Participants

Participants were undergraduate students from Louisiana State University (LSU), who were enrolled in Psychology courses in which they could earn extra course compensation for participation in psychology experiments. Consistent with Baer et al. (2001) and prior BASICS research (Marlatt, et al., 1998), students were defined as high risk if they: a) reported drinking at least monthly and consuming at least 5 (for a man) or 4 (for a woman) drinks in a two-hour period on at least one occasion in the past month or b) reported three or more alcohol-related problems on 3 to 5 occasions in the past 3 years on the RAPI(White & Labouvie, 1989). Based

on prior research (Kulesza et al., 2010; Marlatt et al., 1998;), we expected at least 32% of the undergraduate student- population at LSU to meet these criteria.

We screened 672 participants, through the LSU Psychology Subject Pool, of whom 289 (43%) met the inclusion criteria and were invited to participate. The LSU Psychology Subject Pool is composed of students enrolled in Psychology courses at LSU and receiving course compensation for participation. Out of 289 eligible participants, 11 individuals (3.8% of eligible participants) were not interested in participating in the study, while 278 signed the consent and completed the in-person assessment. Because the non-participating group was so small (i.e. only 3.8% of eligible participants), we did not conduct parametric and non-parametric analyses to compare this group to those who decided to participate. The average age of those who agreed to participate in the study (n= 278) was 20.1 (SD= 2.4), and they consumed an average of 16.2 (SD= 7.5) drinks per week. The majority of these participants were Caucasian (87%) and female (71%). Out of 278 participants who signed to consent to participate, 10 (3.6% of the sample) dropped out from the study. Therefore, the vast majority of participants (i.e., almost 96%) completed the study. The data in the table shows that, at baseline, the participants did not differ significantly on any of the variables of interest.

Instruments

Demographics and Drinking History

Demographic information included age, height, weight, sex, race, ethnicity, year in school, class standing, full-time/part-time enrollment status, and residence status. *The Brief Drinker Profile* (BDP; Miller & Marlatt, 1984) is a structured interview designed to assess family history of alcohol problems, and personal drinking history.

Table 1. Participant Characteristics at Baseline

	Overall (*n*=278)	50-minute (*n*= 93)	10-minute (*n*= 95)	Control (*n*=90)	*p*
Age	20.1 (*SD*= 2.4)	19.8 (*SD* =1.5)	20.2 (*SD* = 2.5)	20.3 (*SD* = 2.8)	*ns*
Race (%)	Caucasian(87%) African American (5%)	Caucasian(86%) African American (7%)	Caucasian(86%) African American (4%)	Caucasian (90%) African America (4%)	*ns*
Gender(%)	Males (29%) Females (71%)	Males (29%) Females (71%)	Males (29%) Females (71%)	Males (30%) Females (70%)	*ns*
DDQ [a]	16.2 (*SD* = 7.5)	16.7 (*SD* = 7.0)	15.9 (*SD* = 7.5)	16.1 (*SD* = 7.9)	*ns*
RAPI [b]	10.6 (*SD* = 7.6)	11.0 (*SD* = 7.8)	9.9 (*SD* =7.1)	10.9 (*SD* = 7.8)	*ns*

Note: [a] Indicates an average # of drinks per week in the past month. [b] Indicates an average # of alcohol related problems in the past month.

Outcome Variables

The Rutgers Alcohol Problem Inventory (RAPI; White & Labouvie, 1989). The RAPI (see Appendix A) is a 23-item measure of frequency and severity of alcohol-related problems. Students indicate on a Likert-type scale from 0 (*never)* to 4 (*more than 10 times*) whether and how often they had experienced consequences impacting personal, social, or academic functioning in the past three years. The RAPI has strong psychometric properties (alpha= .91; Martens et al., 2004) and is a reliable discriminator between clinical and non-clinical samples of college-age drinkers (White & Labouvie, 1989).

The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). The DDQ (see Appendix B) assesses drinking frequency and quantity. Participants were asked to report, for the past month, the typical number of drinks consumed during each day of the week. In addition, participants reported, for the past month, the typical number of hours they usually drink during each day of the week. Collins et al. (1985) reported adequate convergent validity for the DDQ.

Moderating Variables

The Readiness to Change Questionnaire (RTCQ; Rollnick, Heather, Gold, and Hall, 1992). The RTCQ (see Appendix C) is a 12-item measure of motivation to change drinking, based on Prochaska and Diclemente's (1992) stages of change model. The RTCQ comprises three factor-analytically derived scales: precontemplation, contemplation, and action. Rollnick et al., 1992 reported the following coefficient alpha values for each of the subscales: Precontemplation .73; Contemplation .80, and Action .83. The RTCQ significantly predicted drinking outcomes among male drinkers 8 weeks and 6 months after discharge from hospital demonstrating evidence of predictive validity (Heather, Rollnick, & Bell, 1993).

The Drinking Motives Questionnaire (DMQ; Cooper, 1994*)*. The DMQ (see Appendix D) is a 20-item scale of drinking motives based on Cooper's model. Participants respond on a 5-item scale from "never/almost never" to "always/almost always" how often they drink for: a) negative coping reasons (i.e. coping with negative affect and conformity); and b) positive coping reasons (i.e. social, and enhancement motives). Cooper (1994) found adequate internal consistency, structural and criterion-related validity.

Mediating Variables

Protective Behavioral Strategies Survey (PBSS; Martens et al., 2004). The PBSS (see Appendix E) is a 25-item measure of the students' use of cognitive-behavioral strategies to reduce harm associated with alcohol consumption. The PBSS is composed of the following three subscales: limiting/stopping drinking, manner of drinking, and serious harm reduction with the following coefficient alpha scores: .81, .73, and .63. Martens et al. (2005) reported evidence that supports the PBSS as an internally stable measure with adequate convergent and predictive validity.

The Drinking Norms Rating Form (DNRF; Baer, Stacy, & Larimer, 1991). The DNRF (see Appendix F) is a 10-item self report measure of students' perception of alcohol use among their peers, parallel in format to the DDQ. The DNRF (Baer et al., 1991) has been widely utilized in previous research to assist with highlighting the discrepancy between perceived and actual norms (Baer et al., 1991; Larimer et al., 2009).

The Comprehensive Effects of Alcohol (CEOA; Fromme, Scott, & Kaplan, 1993). The CEA (see Appendix G) is a 38-item self report measure that includes 8 different positive and negative alcohol outcome expectancies. Fromme et al. (1993), reported following coefficient alpha values for each of the six factor analytically derived subscales: Behavioral Impairment .90;

Risk and Aggression .80; Self Perception .65; Sociability .81; Liquid Courage .76; and Sex .73. In addition, the CEOA has shown adequate construct validity in distinguishing between abstainers, heavy and light drinkers (Fromme et al., 1993).

The Situational Confidence Questionnaire (SCQ; Annis & Davis, 1988). The SCQ (see Appendix H) is a 39-item measure of self-efficacy to abstain from alcohol in high risk drinking situations. Participants indicate how confident they are in each situation on a 6-point scale. The SCQ has adequate internal consistency and good predictive and discriminant validity (Annis & Davis,1988).

Procedure

Recruitment and Screening

We invited LSU undergraduate students enrolled in Psychology courses to participate in the study by completing a brief screening survey on the Internet for which they had the opportunity to earn one course compensation point. Screening consisted of demographics, the RAPI (White & Labouvie, 1989) and the DDQ (Collins et al., 1985). Students, who met the inclusion criteria, were invited to participate in the longer study and earn 5 course compensation points. Through this method, we screened 672 participants of which 289 (43%) met the inclusion criteria and were invited to participate. Eleven individuals were not interested in the study while 279 signed the consent and completed the in-person assessment.

Baseline Assessment

All participants for the randomized trial were scheduled to meet with the graduate student to complete the Brief Drinking Profile (Miller & Marlatt, 1984) in person. Then, they were asked to complete self-report measures of alcohol use (DDQ; Collins et al.,1985) and consequences (RAPI; White & Labouvie, 1989), perceived norms (DNRF; Baer, Stacy & Larimer, 1991),

alcohol outcome expectancies (CEOA; Fromme et al., 1993) and drinking motives (DMQ; Cooper 1994), protective behaviors measure (PBSS; Martens et al., 1995), drink refusal self-efficacy (SCQ-42; Annis & Davis, 1988), and readiness to change (RTCQ; Rollnick et al., 1992) (See Measures). All measures except BDP were completed online using a secure web server, to increase ease of data entry and enable production of the graphic feedback utilized for the brief interventions. In addition to online assessments, participants were asked to record daily drinking for 2 weeks prior to their intervention session using monitoring cards provided by the interviewer (Dimeff et al. 1999).

Intervention

After completing baseline assessment, students were randomized to either a 10-minute or a 50-minute brief intervention session, or attention-control group. All sessions in both active treatment conditions involved a review of standardized graphic feedback from baseline, consistent with the BASICS framework. Sessions were conducted by trained graduate students using a written manual (Dimeff et al., 1999). Both graduate students were trained to criterion as per at least two BASICS training workshops attended with Dr. Larimer's research group. All sessions were conducted in accordance with the principles of MI outlined by Miller and Rollnick (1992, 2002) and adhered to Dimeff et al. (1999) manual. Although the clinician would have all components of BASICS at his/her disposal, and feedback would include all of these elements, the amount of emphasis placed on these elements would vary from session to session. Whether it is a 10- or a 50-minute session, the "goal in all circumstances is to move the client forward along the stages-of-change continuum" (Dimeff et al., 1999). For instance, it would be premature to introduce behavioral techniques such as drink refusal to a client who is in the precontemplative stage (i.e. motivation for behavior change is lacking). To best serve such a client, the clinician

would devote the majority of the session to the MI component. A client who is in the action stage (i.e. motivated to change his/her behavior), on the other hand, may not need as much time devoted to increasing awareness of risk and building motivation. Thus, the therapist would spend additional time discussing behavioral skills helpful in reduction of alcohol use. This is consistent with the BASICS philosophy and emphasis on tailoring this brief intervention to the specific needs of an individual client.

Attention Control Condition

In order to control for time spent with a clinician, individuals in the control condition were asked to come to the clinic and spend time (i.e., 15 minutes) with the therapist on discussing topics unrelated to their alcohol consumption (i.e., LSU football, academics).

Follow-up

Follow-up measures were completed at 4 weeks after their intervention feedback/attention control visit. Students received multiple e-mail reminders with a link to complete assessments and contacted by phone if they did not respond to e-mails. Measures were available online for students to complete. Since our participants are comfortable with computers and the internet, it was more convenient for them to do the internet based follow-up assessments without having to make an appointment at the clinic. We had a 96% retention rate in the present study.

Results

Planned Analyses

In order to assess whether the 10-minute intervention was not inferior to the 50-minute intervention in producing change in both amount of alcohol consumed (DDQ) and on drinking related problems (RAPI) we planned to use the non-inferiority analysis. As described by D'Agostino, Massaro, and Sullivan (2003), this procedure is designed to evaluate whether the effect of the outcomes produced by the new treatment (in this case the 10-minute intervention) are not inferior by a priori established margin to the outcomes produced by the "gold standard" treatment (in this case the 50-minute intervention). Although not widely known among clinical psychology researchers, non-inferiority analyses have been successfully utilized among medical researchers. While conducting analyses, we adhered to suggestions provided in the literature (D'Agostino, Massaro, and Sullivan, 2003; Fleming, 2008; Kieser & Friede, 2007, and Powers, 2008). We planned to use R software package to conduct our analyses.

Additionally, we evaluated mediators and moderators of treatment efficacy. We adhered to criteria of assessing mediation outlined by Barron and Kenny (1986). According to Baron and Kenny (1986), the following need to be true to show statistical mediation: (1) the initial variable must be correlated with the outcome variable; (2) the initial variable must be correlated with the proposed mediator; (3) the association between the initial variable and the outcome variable of interest becomes nonsignificant when the mediating variable is held constant. Fourth, to full mediation, we controlled for the mediator variable and evaluated whether the relationship between the initial and the outcome variable were no longer significant. Moderation was tested by conducting factorial analysis of covariance and examining interaction between the initial

Table 2. Pre and Post-intervention comparisons on selected variables

	Overall (*n*=268)	50-minute (*n*=81)	10-minute (*n*=90)	Control (*n*=97)	*p*
DDQ B [a]	16.2 (*SD* = 7.5)	16.7 (*SD* = 7.01)	15.9(*SD* = 7.5)	16.1(*SD* = 7.9)	*ns*
DDQ F	13.1 (*SD* = 8.01)	12.7 (*SD* = 7.3)	11.1(*SD* = 7.4)	15.2(*SD* = 8.6)	*.002*
RAPI B [b]	10.6 (*SD* = 7.6)	11.01 (*SD* = 7.8)	9.9 (*SD* = 7.1)	10.9 (*SD* =7.8)	*ns*
RAPI F	7.7 (*SD* = 6.6)	6.8 (*SD* = 6.1)	7.3 (*SD* = 6.8)	28.7 (*SD* = 6.7)	*ns*
PBSS B [c]	28.8 (*SD* = 7.9)	28.8 (*SD* = 7.8)	28.9 (*SD* = 7.9)	28.8 (*SD* = 8.1)	*ns*
PBSS F	30.1 (*SD* = 8.2)	31.2 (*SD* = 8.2)	31.8 (*SD* = 8.04)	27.5 (*SD* = 7.7)	*.000*
SCQ B [d]	26.7 (*SD* = 8.1)	26.1 (*SD* = 7.8)	25.9 (*SD* = 9.4)	27.9 (*SD* = 6.7)	*ns*
SCQ F	27.9 (*SD* = 7.7)	26.2 (*SD* = 7.7)	29.2 (*SD* = 7.9)	29.9 (*SD* = 7.2)	*.037*
DMQ B [e]	62.9 (*SD* = 12.1)	63.7 (*SD* = 12.4)	63.1 (*SD* = 11.5)	62.2 (*SD* = 12.4)	*ns*
DMQ F	62.2 (*SD* = 12.7)	62.4 (*SD* = 14.5)	60.4 (*SD* = 12.3)	63.7 (*SD* = 11.3)	*ns*
RTCQ B [f]	P (74%) C (13%) A (13%)	P (80%) C (14%) A (6%)	P (67%) C (17%) A (16%)	P (76%) C (9%) A (15%)	*ns*
RTCQ F	P (66.3%) C (7%) A (26.7%)	P (67%) C (5%) A (28%)	P (60%) C (7%) A (33%)	P (72%) C (9%) A (19%)	*ns*
CEAO-B [g]	10.9 (*SD* = 1.8)	10.93 (*SD* = 1.9)	10.63 (*SD* = 1.9)	11.1 (*SD* = 1.7)	*ns*
CEAO-F	10.8 (*SD*= 1.9)	10.9 (*SD* = 1.9)	10.4 (*SD* = 2.1)	10.9 (*SD* = 1.7)	*ns*

Note: B = Baseline, F = Follow up, P = Precontemplation, C = Contemplation, A = Action
[a] Indicates an average number of drinks per week. [b] Indicates the number of alcohol-related problems. [c] Indicates the number of behavioral coping skills. [d] Indicates the strength of confidence to abstain from alcohol . [e] Indicates the strength of alcohol drinking motives. [f] Indicates individual's stage of change. [g] Indicates the strength of positive alcohol related expectancies.

variable and the proposed moderator. For each of the analyses below, we explained specific steps of either analysis as they pertain to specific variables of interest.

Effects of Interventions vs. Control

Please see Table 2 for the descriptive statistics relevant to the analyses presented below.

Hypothesis 1a: The 10-minutes session will be as efficacious at reducing drinking and drinking-related consequences among college students as the 50-minute session.

In order to establish equivalence of both active interventions, we proposed to conduct non-inferiority analysis. However, our power calculations were incorrect, and we had insufficient power to conduct the proposed analysis. Therefore, we conducted pairwise comparisons for amount of alcohol consumption t (1,169)= 2.02, p =.16 and alcohol-related problems t(1,169)= .17 ,p =.67. We did not find a significant difference between the two active treatment conditions for either variable.

Hypothesis 1b: We hypothesize both 50- and 10-minute interventions will be more efficacious than attention-control.

To test the hypothesis that both 50-minute (n =81) and 10-minute (n =90) treatment conditions would be more efficacious than the control (n =98) condition in reduction of alcohol consumed and in reduction in the number of problems associated with heavy drinking from baseline to 4 weeks post-intervention, we conducted multivariate analysis of covariance (MANCOVA). In our analysis the independent variable was treatment assignment with three levels: control, 10-minute and 50-minute treatment conditions. The dependent variables were: a) amount of drinking at the 4-week follow up (assessed by the DDQ, administered 4 weeks post-intervention); and b) the number of problems associated with heavy alcohol consumption at follow up (assessed by the RAPI, administered 4 weeks post-intervention). The covariates were

the DDQ and the RAPI scores at baseline respectively for each DV. The combined DVs differed significantly, Wilk's $\lambda = .92$, $F(4, 526) = 5.8$, $p = .001$; $\eta^2 = .04$.

To examine the individual DVs, we performed ANCOVAs and utilized a Bonferroni correction to control for Type I error resulting in an adjusted alpha of .025. Follow up ANCOVAs, with treatment assignment as the independent variable (IV) and baseline alcohol consumption or alcohol-related problems as covariates, were significant for the amount of alcohol consumed $F(2, 264) = 9.84$, $p = .001$, $\eta^2 = .07$ but not for alcohol-related problems, $F(2, 264) = 3.08$, $p = .05$, $\eta^2 = .02$.

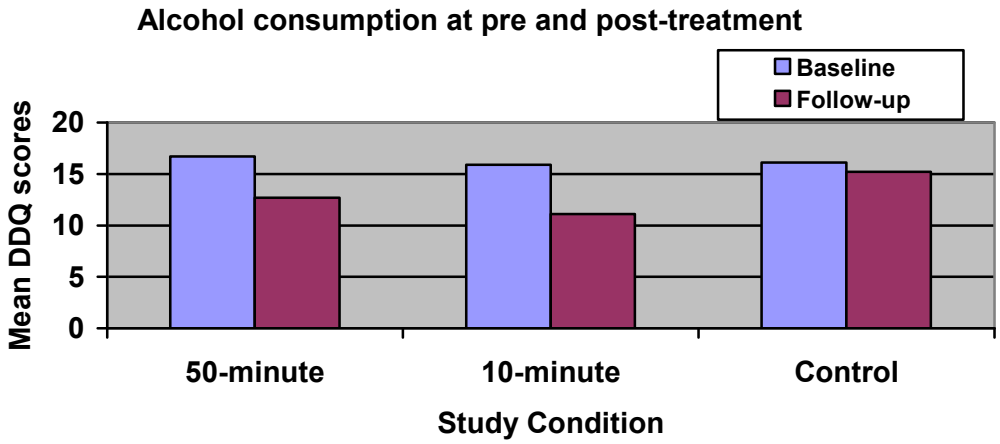
We then conducted pairwise post-hoc comparisons with Bonferroni correction for multiple comparisons and found that participants in the 50-minute intervention reported significantly fewer drinks consumed per week at follow-up compared to participants in the control condition, $t(1,177) = 4.02$, $p = .01$, $d = .3$. Similarly, participants in the 10-minute intervention had significantly fewer drinks per week at follow-up compared to participants in the control condition, $t(1,177) = 4.12$, $p = .001$, $d = .5$. However, the two active treatment conditions did not differ significantly, $t(1,169) = 2.02$, $p = .16$, $d = .2$. See Figure 1, for average number of drinks consumed by participants in all groups at baseline and at the subsequent 4-week follow-up.

Mediation Analyses

In order to test for mediation, we adhered to criteria of assessing mediation outlined by Barron and Kenny (1986). According to Baron and Kenny (1986), the following need to be true to show statistical mediation: (1) the initial variable must be correlated with the outcome variable; (2) the initial variable must be correlated with the proposed mediator; (3) the mediator variable affects the outcome while controlling for the initial variable; (4) to establish full

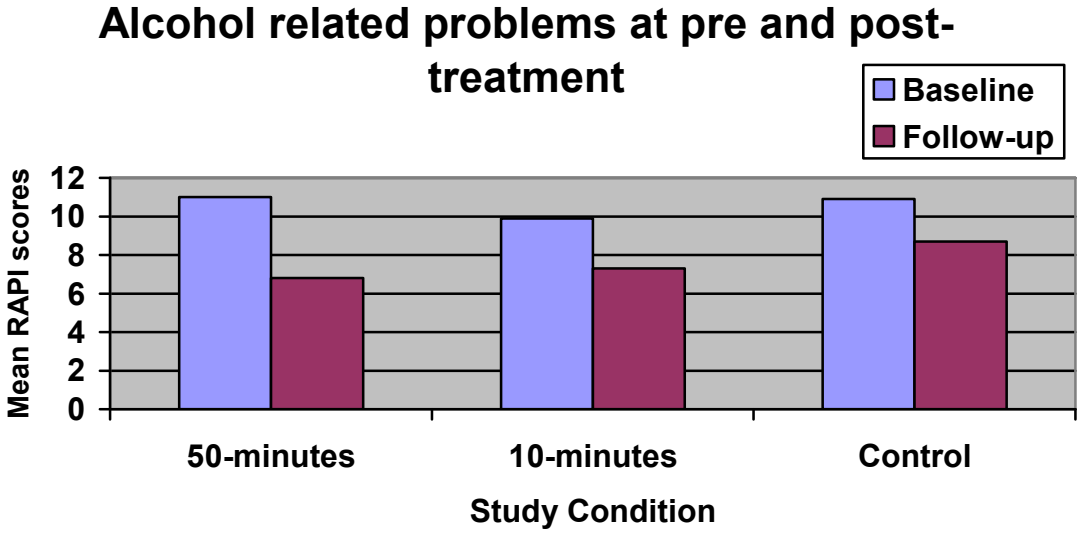
mediation, we controlled for the mediator variable and showed that the relationship between the initial and the outcome variable were no longer significant

Figure 1.



In Figure 2, we present mean RAPI scores between the two intervention groups during the baseline and follow up assessments.

Figure 2.



Hypothesis 2a: Efficacy of both interventions will be mediated by the change from pre to post-intervention perceived alcohol descriptive norms.

Mediation for Alcohol-Related Problems

In order to test for mediation, linear regression was conducted. We first regressed the follow-up RAPI scores on intervention group assignment (with three levels) as the predictor/IV. Intervention group did not significantly predict RAPI scores, $F(1,267) = 3.3$, $p = .073$. Therefore, we did not proceed with further analyses for this variable.

Mediation for Amount of Alcohol Consumed

In order to test for mediation, we used multiple regression analyses to test whether intervention group significantly predicted DDQ scores. We regressed the follow-up DDQ scores on intervention group (with three levels) as the IV, and it was significant, $F(1,267) = 4.8$, $p = .03$, $\beta = .13$, $R^2 = .02$, Adjusted $R^2 = .01$. We then conducted another regression analysis in which we regressed the mediator variable (i.e. follow up descriptive norms indicating perceived quantity of drinking among other university students) on intervention group. The equation was significant, $F(1,267) = 42.3$, $p = .001$, $\beta = .37$, $R^2 = .14$, Adjusted $R^2 = .13$. Specifically, participants in the control condition ($M = 4.04$, $SD = .87$) perceived that other college students consumed more alcohol than they did as compared to those in either 50-minute (**$M = 3.22$, $SD = .71$) or 10-minute intervention ($M = 3.56$, $SD = .93$). We then conducted another analysis in which we regressed DDQ scores on the descriptive norms variable while controlling for the intervention group. The regression was significant, $F(1,267) = 9.4$, $p = .002$, $\beta = .19$, $R^2 = .034$, Adjusted $R^2 = .031$. Specifically, both variables were positively correlated, $r = .19$, $p = .001$, indicating that the more an individual perceived engagement in heavy drinking among his/her peers, the more alcohol he/she consumed. Finally, to establish full mediation, we controlled for the mediator

variable (i.e., alcohol descriptive norms indicating perceived quality of drinking among other university students), and then regressed the follow-up DDQ scores on the intervention group. Intervention group no longer significantly predicted DDQ scores while controlling for the effects of alcohol descriptive norms, F(1,267) = 2.03 , p =.25, β = .08, R^2 = .039, Adjusted R^2 = .032. The mediator variable remained a significant predictor of DDQ scores, F(1,267) = 5.4, p =.02, β = .16,

Hypothesis 2b: Efficacy of both interventions will be mediated by the extent of post intervention drinking refusal self-efficacy.

Mediation for Alcohol-Related Problems

In order to test for mediation, linear regression was conducted. We first regressed the follow-up RAPI scores on intervention group assignment as the predictor/IV. Intervention group did not significantly predict RAPI scores, F(1,267) = 3.3, p =.073. Therefore, we did not proceed with further analyses for this variable.

Mediation for Amount of Alcohol Consumed

In order to test for mediation, we used multiple regression analyses to test whether intervention group significantly predicted DDQ scores. We regressed the follow-up DDQ scores on intervention group as the IV, and it was significant, F(1,267) = 4.8, p =.03, β = .13, R^2 = .038, Adjusted R^2 = .034. We then conducted a regression analysis in which we regressed the mediator variable (i.e. drinking refusal self-efficacy) on intervention group. The equation was not significant, F(1,267) = 2.03, p =.15. β = .09, R^2 = .008, Adjusted R^2 = .004. Therefore, we did not proceed with further analyses for this variable.

Hypothesis 2c: Efficacy of both interventions will be mediated by the extent of change of post-intervention positive alcohol expectancies.

Mediation for Alcohol-Related Problems

In order to test for mediation, linear regression was conducted. We first regressed the follow-up RAPI scores on intervention group assignment as the predictor/IV. Intervention group did not significantly predict RAPI scores, $F(1,267) = 3.3$, $p = .073$. Therefore, we did not proceed with further analyses for this variable.

Mediation for Amount of Alcohol Consumed

In order to test for mediation, we used multiple regression analyses to test whether intervention group significantly predicted DDQ scores. We regressed the follow-up DDQ scores on intervention group as the IV, and it was significant, $F(1,267) = 4.8$, $p = .03$, $\beta = .13$, $R^2 = .038$, Adjusted $R^2 = .034$. We then conducted a regression analysis in which we regressed the mediator variable (i.e. positive alcohol expectancies) on intervention group. The equation was not significant, $F(1,267) = .12$, $p = .91$, $\beta = .01$, $p = .91$. Therefore, we did not proceed with further analysis for this variable.

Hypothesis 2d: Efficacy of both interventions will be mediated by post-intervention cognitive-behavioral coping skills use.

Mediation for Alcohol-Related Problems

In order to test for mediation, linear regression was conducted. We first regressed the follow-up RAPI scores on intervention group assignment as the predictor/IV. Intervention group did not significantly predict RAPI scores, $F(1,267) = 3.3$, $p = .073$. Therefore, we did not proceed with further analyses for this variable.

Mediation for Amount of Alcohol Consumed

In order to test for mediation, we used multiple regression analyses to test whether intervention group significantly predicted DDQ scores. We regressed the follow-up DDQ scores

on intervention group as the IV, and it was significant, F(1,267) = 4.8, p =.03, β = .13, R^2 = .038, Adjusted R^2 = .034. We then conducted a regression analysis in which we regressed the mediator variable (i.e. cognitive-behavioral coping skills aimed at reducing alcohol consumption) on intervention group. The equation was significant, F(1,267) = 10.42, p =.00. β = -.19, R^2 = .032, Adjusted R^2 = .031. We then conducted another analysis in which we regressed DDQ scores on the behavioral coping skills variable while controlling for the intervention group. The regression was significant F(1,267) = 18.4, p =.00, β = -.33, R^2 = .121, Adjusted R^2 = .115. Specifically, both variables were negatively correlated, r= -.34, p=.001, indicating that fewer behavioral coping skills aimed at reducing alcohol consumption an individual utilized, the more he/she consumed alcohol. Finally, to establish full mediation, we controlled for the mediator variable (i.e., cognitive behavioral coping skills), and then regressed the follow-up DDQ scores on the intervention group. Intervention group no longer significantly predicted DDQ scores while controlling for the effects of cognitive behavioral coping skills, F(1,267) = 18.4, p =.24, β = .07, R^2 = .121, Adjusted R^2 = .115. The mediator variable remained a significant predictor of DDQ scores, F(1,267) = 18.4, p =.00, β = .-33

Hypothesis 2e: Individuals in the 50-minute intervention will use more coping skills aimed at reduction of alcohol-related problems than the individuals in the 10— minute intervention.

We conducted an ANCOVA with the intervention group as an IV and the PBSS follow up score as a DV while controlling for the baseline PBSS score. The ANCOVA was significant, F (2,265) = 8.3, p =.00. Therefore, we conducted pairwise post-hoc comparisons with Bonferoni correction for multiple comparisons and found that participants in the 50-minute intervention reported significantly more coping strategies than participants in the control condition, t (1,179) = 9.8, p = .00. In addition, participants in the 10-minute intervention also reported significantly

more coping strategies than participants in the control condition, t (1,179) = 8.4, p = .00. However, we did not find a significant difference between the two active treatment conditions, t (1,169) = .28, p =.59.

Moderation Analyses

Hypothesis 3a: Both interventions will be more efficacious for female rather than male participants.

To test the hypothesis that interventions will be more efficacious for female rather than male students, we conducted univariate analysis of variance (ANOVA) for each of the two outcome variables.

Moderation for Alcohol-Related Problems

In our analysis the independent variables were: a) treatment assignment with three levels: control, 10-minute and 50-minute treatment conditions and b) gender. The dependent variable was the number of problems associated with heavy alcohol consumption at follow up. The main effect of treatment assignment was not significant $F(2, 263) = 2.37$, p = .09, η^2 = .02, nor was the main effect of gender $F(1, 263) = .32$, p = .57, η^2 = .001, or the interaction $F(2, 263) = .67$, p = .51, η^2 = .005.

Moderation for Amount of Alcohol Consumed

In our analysis the independent variables were: a) treatment assignment with three levels: control, 10-minute and 50-minute treatment conditions and b) gender. The dependent variable was the amount of drinking at follow up. Both main effects of gender and treatment assignment predictors were significant while their interaction was not. Specifically, female participants (M = 12.2, SD = .57) reported significantly fewer drinks consumed per week at follow-up compared to male participants (M = 14.9, SD = .8 η^2 = .087), $F(1, 163) = 6.86$, p =.001 η^2 = .03. In addition,

participants in the 50-minute intervention *(M* = 12.94, *SD* = .95) reported significantly fewer drinks consumed per week at follow-up compared to participants in the control condition *(M* = 16.12, *SD* = .86), *t* (1,177) = 4.02, *p* = .01, *d* = .3. Participants in the 10-minute intervention *(M* = 11.69, *SD* = .89) had significantly fewer drinks per week at follow-up compared to participants in the control condition *(M* = 16.12, *SD* = .86), *t* (1,177) = 4.12, *p* = .001, *d* = .5. However, the two active treatment conditions did not differ significantly, *t* (1,169) = 2.02, *p* =.16, *d* = .2.

Hypothesis: 3b: Both interventions will be more efficacious for participants higher in baseline readiness to change their drinking.

Moderation for Alcohol-Related Problems

In our analysis the independent variables were: a) intervention assignment with three levels: control, 10-minute and 50-minute treatment conditions and b) baseline stages of change with three levels: Precontemplation, Contemplation, and Action; and c) . The dependent variable was the number of problems associated with heavy alcohol consumption at follow up. However, only the baseline stages of change main effect was significant while neither the treatment assignment main effect nor the interaction were significant. Specifically, participants in the Contemplation stage (*M* = 12.8, *SD* = 1.1) endorsed more alcohol-related problems than participants in either Precontemplation (*M* = 6.6, *SD* = .45) or Action stage (*M* = 7.4, *SD* = 1.2), *F* (2, 260) = 14.57, *p* =.001, η^2 = .1.

Moderation for Amount of Alcohol Consumed

In our analysis the independent variables were: a) intervention assignment with three levels: control, 10-minute and 50-minute treatment conditions and b) baseline stages of change with three levels: Precontemplation, Contemplation, and Action. The dependent variable was the amount of drinking at follow up. Both the main effect of baseline stages of change and the main

effect of intervention assignment were significant while their interaction was not. Specifically, participants in the Precontemplation stage (M = 12.56, SD = .56) reported significantly fewer drinks consumed per week at follow-up compared to participants in the Contemplation stage (M = 16.4, SD = 1.3), F (2, 260) = 3.89, p = .02, η^2 = .03. In addition, participants in the 50-minute intervention (M = 12.94, SD = .95) reported significantly fewer drinks consumed per week at follow-up compared to participants in the control condition (M = 16.12, SD = .86), t (1,177) = 4.02, p = .01, d = .3. Participants in the 10-minute intervention (M = 11.69, SD = .89) had significantly fewer drinks per week at follow-up compared to participants in the control condition (M = 16.12, SD = .86), t (1,177) = 4.12, p = .001, d = .5. However, the two active treatment conditions did not differ significantly, t (1,169) = 2.02, p =.16, d = .2.

Hypothesis 3c: Drinking motives will moderate intervention efficacy such that both interventions will be equally efficacious for individuals drinking to enhance positive affect and for social reasons (i.e. Enhancement Motives). However, for those individuals who drink to cope with negative affect and for conformity reasons (i.e. Coping Motives), the 50-minute intervention will result in greater treatment gains than the 10-minute one. In addition, this relationship will be stronger for alcohol-related problems than for amount of alcohol consumed.

Moderation for Alcohol-Related Problems

Enhancement Motives

A hierarchical regression analysis was conducted to test whether Enhancement Motives moderated intervention assignment's influence on alcohol-related problems. On step 1, Enhancement Motives and intervention assignment were entered as predictor variables of alcohol-related problems. The overall model was significant, F(2, 266) = 5.56, p = .004, R^2 = .042, Adjusted R^2 = .031, and Enhancement Motives was a significant predictor, β = .17, p =

.006. Specifically, both variables were positively correlated, r= .17, p=.002, indicating that the stronger endorsement of enhancement motives for drinking, the more alcohol-related problems an individual endorsed as well. The interaction term of Enhancement Motives and intervention assignment was entered on step 2 (i.e., alcohol-related problems was regressed on the interaction term), and this model was significant, F (3, 265) = 3.78, p =.01, R^2 = .042, Adjusted R^2 = .031**.** However, neither the Enhancement Motives (β = .09, p = .58), nor the intervention assignment (β = .04, p = .89) or their interaction term (β = .17, p = .63) were significant predictors.

Coping Motives

A hierarchical regression analysis was conducted to test whether Coping Motives moderated intervention assignment's influence on alcohol-related problems. On step 1, Coping Motives and intervention assignment were entered as predictor variables of alcohol-related problems. The overall model was significant, F(2, 266) = 15.96, p = .001, R^2 = .11, Adjusted R^2 = .1, and Coping Motives was a significant predictor, β = .30, p = .001. Specifically, both variables were positively correlated, r= .29, p=.001, indicating that the stronger endorsement of coping motives for drinking, the more alcohol-related problems an individual endorsed as well. The interaction term of Coping Motives and intervention assignment was entered on step 2 (i.e., alcohol-related problems was regressed on the interaction term), and this model was significant, F (3, 265) = 10.88, p =.001, R^2 = .11, Adjusted R^2 = .1**.** However, neither the Coping Motives (β = .18, p =.24), nor the intervention assignment (β = .2, p =.93) or their interaction term (β = .19, p =.39) were significant predictors.

Moderation for Amount of Alcohol Consumed

Enhancement Motives

A hierarchical regression analysis was conducted to test whether Enhancement Motives moderated intervention assignment's influence on alcohol consumption. On step 1, Enhancement Motives and intervention assignment were entered as predictor variables of alcohol consumption. The overall model was significant, $F(2, 266) = 4.18$, $p = .02$, $R^2 = .03$, Adjusted $R^2 = .02$, and intervention assignment was a significant predictor, $\beta = .13$, $p = .03$ while the Enhancement Motives was not, $\beta = .11$, $p = .06$. The interaction term of Enhancement Motives and intervention assignment was entered on step 2 (i.e., alcohol consumption was regressed on the interaction term), and this model was significant, $F(3, 265) = 3.2$, $p = .02$, $R^2 = .04$, Adjusted $R^2 = .02$. However, neither the Enhancement Motives ($\beta = .29$, $p = .09$), nor the intervention assignment ($\beta = .49$, $p = .14$) or their interaction term ($\beta = -.4$, $p = .27$) were significant predictors.

Coping Motives

A hierarchical regression analysis was conducted to test whether Coping Motives moderated intervention assignment's influence on alcohol consumption. On step 1, Coping Motives and intervention assignment were entered as predictor variables of alcohol consumption. The overall model was significant, $F(2, 266) = 3.96$, $p = .02$, $R^2 = .02$, Adjusted $R^2 = .02$, and intervention assignment was a significant predictor, $\beta = .14$, $p = .02$ while the Coping Motives was not, $\beta = .11$, $p = .08$. The interaction term of Coping Motives and intervention assignment was entered on step 2 (i.e., alcohol consumption was regressed on the interaction term), and this model was significant, $F(3, 265) = 2.69$, $p = .04$, $R^2 = .03$, Adjusted $R^2 = .02$. However, neither the Coping Motives ($\beta = .18$, $p = .28$), nor the intervention assignment ($\beta = .23$, $p = .25$) or their interaction term ($\beta = -.11$, $p = .65$) were significant predictors.

Discussion

The current study was designed to (1) build upon prior findings in the college drinking literature while addressing their limitations; (2) test the efficacy of brief in-person interventions as a function of duration (50 versus 10 minutes); and (3)prospectively assess potential mediators and moderators of intervention efficacy. In order to accomplish these aims, we assessed alcohol consumption, alcohol-related problems, and proposed mediators and moderators at baseline/pre-intervention and again at 4 weeks post-intervention among college student drinkers.

Alcohol consumption among college student populations is a well-researched area. Specifically, there is a robust body of literature lending support to the efficacy of brief interventions in reducing alcohol consumption and alcohol related problems among college students (see Larimer & Cronce 2002, 2007 for review). However, the length of the interventions across studies varies with some as brief as 5 minutes and others consisting of 3 30-minute sessions of in-person contact. The present investigation was designed to demonstrate that both the 50-minute intervention and the 10-minute intervention would be equally efficacious in reduction of both alcohol related problems and amount of alcohol consumed by college problem drinkers. That is, if the essential components for change could be included in a 10- vs. 50-minute intervention, the economical benefit in terms of time and money invested is clear. Such findings, along with the theoretical implications would contribute significantly to the existing literature on brief interventions. In addition, the present study added to existing research by investigating possible mechanisms of change or the "active ingredients" of this intervention's efficacy. This included investigating already promising mechanisms of change (e.g., drinking norms; alcohol coping skills) and by investigating new ones, such as drinking refusal self efficacy and positive alcohol expectancies.

Intervention Efficacy

Our first aim was to show that while both active conditions would be superior to the attention-control condition in reducing alcohol consumption and alcohol-related problems, their efficacy would not significantly differ. Due to inadequate power, we were not able to adequately assess true equivalence between the two active conditions. However, the present findings still provide some support for the hypothesis that both active conditions were comparable in efficacy. That is, while both interventions were superior to the attention-control condition in reducing alcohol consumption, the two active interventions did not significantly differ from one another. These findings are consistent with previous reports from the adult alcohol non dependent drinkers showing comparable efficacy of shorter and longer interventions (Babor et al., 1994; Wutzke et al., 2002). Additionally, our findings extend extant literature to include college non-dependent drinkers and provide further evidence to the efficacy of brief interventions in reducing alcohol consumption among this population (Larimer & Cronce 2002, 2007).

Contrary to prediction and quite surprisingly, there were no significant differences between the active interventions and the attention-control group for reduced alcohol-related problems. Therefore, the first hypothesis is only partially supported. While our findings regarding amount of alcohol consumed are consistent with prior findings, our results regarding alcohol-related problems are both inconsistent with our hypothesis and prior findings (see Larimer & Cronce, 2002, 2007 for review). Still, while participants in all conditions showed reductions in alcohol-related problems, albeit non-significantly, participants in the attention-control condition achieved smaller gains than those in two active treatment conditions. Prior research suggests assessment reactivity may play a role in prevention and treatment outcome studies (Kaminer & Burke, 2008; Kypri et al., 2004). Also, there is some evidence to suggest that

the impact of brief interventions on alcohol-related problems emerges at subsequent follow-ups, as in a "sleeper" effect manner. Therefore, given we examined outcomes extending to 6 weeks post-intervention only, this may not have been enough time to observe the effects on alcohol-related problems (Carey et al., 2007).

Mediators

Our second aim was to investigate whether cognitive-behavioral alcohol-refusal coping skills utilization, perceived descriptive norms of alcohol use, drinking refusal self-efficacy and alcohol expectancies would mediate intervention effects. We examined mediators for both alcohol consumption and alcohol-related problems variable. Contrary to prediction, alcohol expectancies, cognitive-behavioral coping skills, drinking refusal self-efficacy, and perceived descriptive norms did not mediate the efficacy of the intervention for the alcohol-related problems. This was due to the fact that we did not find a significant difference between treatment conditions on the alcohol-related problems outcome.

Mediational analyses regarding amount of alcohol consumed produced results more consistent with our predictions. Specifically, we found that alcohol descriptive norms mediated treatment efficacy. This finding is consistent with previous findings (Neighbors et al., 2004, 2006). Our results suggest that individuals who believe that other college students drink heavily tend to consume greater amounts of alcohol as compared to individuals without these beliefs. These results suggest that if changes occur in drinkers' alcohol descriptive norms following the BASICS intervention, those drinkers are significantly more likely to decrease the amount of alcohol they consume. This of course also indicates that alcohol descriptive norms are an important active ingredient in reducing drinking.

Our prediction that post-intervention coping skills would mediate the efficacy of the intervention was supported. Specifically, our results suggest that the more alcohol an individual reported consuming, the fewer coping skills aimed at drinking reduction that particular individual endorsed utilizing. This finding will help clarify inconsistent results in the college drinking literature regarding this construct (Larimer et al., 2007; Martens et al., 2004) by providing further evidence for coping skills as an "active ingredient." Moreover, we aimed to extend those results by showing that participants will learn more alcohol-related behavioral coping skills in the longer intervention than in the shorter one. However, our results did not support that claim. While participants in both active conditions reported using more coping skills at follow-up than did those in the attention-control condition, we did not find a difference between the two interventions. During both 10- and 50-minute interventions we briefly went over a handout with a list of alcohol-related cognitive behavioral coping skills, which participants took home with them and were encouraged to utilize. Perhaps this strategy is sufficient to encourage college students to think about and to practice such strategies, and additional time which was spent during the 50-minute intervention going over each coping strategies was not necessary.

Our prediction for positive alcohol expectancies as possible mediators of intervention efficacy was not supported. However, our results add support to existing findings in college literature regarding the positive association between positive alcohol expectancies and alcohol outcomes (Blume, Schmaling, and Marlatt, 2003; Carey, 1995; Hasking & Oei, 2002; Sher et al., 1996). Still, consistent with a recent meta-analysis of individual interventions for heavy college alcohol drinkers, we did not find significant differences in positive alcohol expectancies between participants receiving active interventions and control condition (Scott-Sheldon, Demartini,

Carey, Carey, 2009). In addition, the lack of support in our data for positive alcohol expectancies as an intervention efficacy mediator is consistent with Borasri and Carey's (2000) work where the researchers, similarly to present study, implemented BASICs for heavy college drinkers in their design. Therefore, our findings add support to their findings. Still, more research is needed in order to provide more robust conclusions.

The prediction that drinking refusal self-efficacy was a possible mediator of intervention efficacy was not supported. While our study was the first to evaluate drinking refusal self-efficacy among college drinkers as a possible mediator, there is some support for this construct among adult population (Hasking & Oei, 2002). The measure we used to assessed drinking refusal self efficacy, the SCQ (Annis & Davis, 1988), is widely used in the adult alcohol literature, however it has not been validated among college heavy drinkers. Therefore, it may not have been the most appropriate tool for us to use in the present study. Our results should be interpreted in light of this limitation.

Moderators

Our third aim was to investigate whether gender, baseline stages of change, and drinking motives will moderate intervention efficacy. First, we assessed gender as a possible moderator for both alcohol consumption and alcohol-related problems outcome. However, contrary to both our prediction and previous findings (see Larimer & Cronce for review, 2007), our results did not support gender as a moderator. One explanation of our findings is that the vast majority of our sample, (i.e. 71%) was female therefore limiting the variability of the sample. Still, our sample was representative of the college student population attending Psychology courses from which we recruited and not the college as a whole. In the future, to have a better chance to

evaluate possible gender differences we would match recruitment by gender in order to have a representative sample of male students.

Second, we investigated baseline readiness to change as a possible moderator. As with the first proposed moderator, our results did not support our prediction and did not replicate preliminary evidence that readiness to change has a moderating effect on treatment efficacy among college student problem drinkers (Carey et al. 2007; Fromme & Corbin, 2004). We believe that the lack of differences in readiness to change in our sample had a detrimental impact on our ability to properly assess this prediction. Specifically, more than 66% of our sample reported being in the Precontemplation stage. While this is consistent with the literature, it limits the variability of our sample. Still, while our data did not support stages of change as a moderator, our results gave some support for this variable as a predictor of alcohol consumption. Specifically, participants in the Precontemplation stage reported significantly fewer drinks consumed per week at follow-up compared to participants in the Contemplation stage**.**

Finally, our prediction that drinking motives would moderate intervention efficacy was not supported. Still, our data led support to an already established finding in the literature that drinking motives predict alcohol outcomes. That is, we found that drinking motives predict alcohol-related problems but not alcohol consumption. This finding is only partially consistent with extant literature as there is some evidence that drinking motives are related to both alcohol consumption and alcohol-related problems (Lewis et al., 2008; MacLean & McLecci, 2000; Martens et al., 2008). Given that our study was the first attempt that we know of to assess drinking motives as a possible moderator, our results are preliminary in nature, and more research is needed in order to arrive at more precise and definite conclusions.

The present study has several limitations. The first limitation involves the validity of self-reports of alcohol use by college student participants, and concerns about confidentiality which might influence self-report. In order to address that shortcoming, we discussed with our participants protections for confidentiality including the Certificate of Confidentiality. Also, we acquired this document from the NIAAA as further protection of participants' confidentiality. In addition, we utilized standardized measures of our outcome variables which have been shown to be reliable and valid in this population in prior research. We considered addition of collateral respondents or other external data sources to verify accuracy of self-report measures. However, some research indicates self-report is more accurate (Chermak et al., 1998; Smith et al., 1995) than collateral data and biochemical markers. Self-report is also more cost-effective than collateral data, and the expense does not appear to be off-set by corresponding benefits (Babor & Higgins, 2000; LaForge, et al., 2005). Additionally, other external sources of information are not readily available or useful for assessing college drinking. Second, given that the vast majority of our sample consisted of Caucasian females, the generalizability of our findings are limited. Still, our sample represents fairly well the Psychology student population which is predominantly female and Caucasian.

Summary

In summary, due to inadequate power, we were not able to fully assess the equivalence of our two active interventions. However, our hypothesis that participants in both treatment conditions will reduce their drinking and drinking-related problems more than participants in the control condition was partially supported. Moreover, our hypothesis that cognitive-behavioral coping skills utilization and perceived descriptive norms will mediate intervention effects was supported as well. However, our hypothesis that baseline readiness to change, gender, and

drinking motives will moderate intervention efficacy was not supported nor was our hypothesis that drinking refusal self-efficacy and positive alcohol expectancies will mediate intervention efficacy.

There are three significant findings in the present study: a) the significant difference in alcohol consumption among treatment participants at follow-up between each of the two treatment conditions and attention-control condition; b) post-intervention alcohol descriptive norms mediated intervention efficacy; and c) post-intervention utilization of behavioral-coping skills mediated intervention efficacy.

Given the limitations of our study and preliminary nature of our findings, future studies replicating our results are crucial in order to arrive at more precise and more robust conclusions. Moreover, prospective investigations of moderators and mediators of intervention efficacy are still very much needed in the heavy college drinkers' literature. Specifically, while there has been some progress made in identifying and establishing support for mediators (i.e. descriptive norms, behavioral coping skills), similar effort is lacking for moderators of intervention efficacy. We added to the literature by providing more support for the efficacy of brief interventions for heavy college drinkers and by prospectively investigating "active ingredients" of intervention efficacy. Still, future studies addressing our limitations regarding investigation of moderators of intervention efficacy are strongly recommended.

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Appendix A

Rutgers Alcohol Problem Inventory

INSTRUCTIONS:
Different things happen to people while 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 *during the last three years* while you were drinking alcohol or as the result of your alcohol use.

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 years?*

1. Not able to do your homework or study for a test.

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

2. Got into fights, acted badly, or did mean things.

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

3. Missed out on other things because you spent too much money on alcohol.

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

4. Went to work or school high or drunk

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

5. Caused shame or embarrassment to someone.

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

6. Neglected your responsibilities.

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

7. Relatives avoided you.

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

8. Felt that you needed more alcohol than you used to use in order to get the same effect.

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

9. Tried to control your drinking by trying to drink only at certain times of the day at certain places.

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

10. Had withdrawal symptoms, that is, felt sick because you stopped or cut down on drinking.

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

11. Noticed a change in your personality

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

12. Felt that you had a problem with alcohol

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

13. Missed a day (or part of a day) of school or work.

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

14. Tried to cut down or quit drinking

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

15. Suddenly found yourself in a place that you could not remember getting to.

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

16. Passed out or fainted suddenly

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

17. Had a fight, argument or bad feelings with a friend.

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

18. Had a fight, argument or a bad feeling with a family member.

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

19. Kept drinking when you promised yourself not to

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

20. Felt you were going crazy.

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

21. Had a bad time

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

22. Felt physically or psychologically dependent on alcohol.

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

23. Was told by a friend or a neighbor to stop or cut down on drinking

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

Appendix B

Daily Drinking Questionnaire (DDQ)

INSTRUCTIONS

For each day of the week, fill in both the number of drinks consumed and the number of hours you typically drink.

Please be sure to fill out the information regarding your gender, weight, and height.

QUESTION 1

For the *past month,* please fill in a number for each day of the week including the *typical number of drinks* you usually consume on that day, and the *typical number of hours* you usually drink on that day.

Number of Drinks	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of Hours							

Weight Gender Height

QUESTION 2: RESIDENCE AND EMPLOYMENT

In the last quarter (or equivalent time period), please circle the most appropriate answers. Please choose one answer for each column. In responding to the question "Paid employment?", please circle the answer closest to the average number of hours you worked during that quarter.

Were you enrolled in college? This college/university Other college/university No

Were you a Greek member? Yes No

Where did you live Greek House Dorm With Parents Apartment Other

Paid employment? No ¼ time ½ time ¾ time Full-time

Appendix C

Readiness to Change Questionnaire (RTCQ)

Please read the sentence below carefully. For each one please circle the answer that best describes how you feel. Your answers will be private and confidential.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1. My drinking is okay as it is.	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. I should cut down on my drinking,	1	2	3	4	5
5. It's a waste of my time thinking about 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.	1	2	3	4	5
10. It's alright for me to keep drinking as I do now.	1	2	3	4	5
11. I am actually changing my drinking habits right now.	1	2	3	4	5
12. My life would still be the same even if I drunk less.	1	2	3	4	5

Appendix D
Drinking Motives Questionnaire (DMQ)

INSTRUCTIONS: Here is a list of reasons people give for drinking alcoholic beverages. Using the response categories below, please indicate how often you drink for each of the following reasons. There are no right or wrong answers to these questions. We just want to know about the reasons why you usually drink when you do.

Response scale

1. Never
2. Almost never
3. Some of the time
4. About half of the time
5. Most of the time
6. Almost always

1. How often do you drink because you like the feeling?

2. How often do you drink because it's exciting?

3. How often do you drink to get high?

4. How often do you drink because it gives you a pleasant feeling?

5. How often do you drink because it's fun?

6. How often do you drink to forget your worries?

7. How often do you drink because it helps you when you feel depressed or nervous?

8. How often do you drink to cheer up when you're in a bad mood?

9. How often do you drink because you feel more self-confident or sure of yourself?

10. How often do you drink to forget about your problems?

11. How often do you drink because your friends pressure you to drink?

12. How often do you drink so that others won't kid you about not drinking?

13. How often would you say you drink to fit in with a group you like?

14. How often do you drink to be liked?

15. How often do you drink so you won't feel left out?

16. How often do you drink because it help you enjoy a party?

17. How often would you say you drink to be sociable?

18. How often do you drink because it makes social gatherings more fun?

19. How often do you drink because it improves parties and celebrations?

20. How often do you drink to celebrate a special occasion with friends?

Appendix E
Protective Behavioral Strategies Survey (PBSS)

INSTRUCTIONS:

Please indicate the degree to which you engage in the following behaviors when using alcohol or "partying."

Never	Very rarely	Sometimes	Most of the time	Always
1	2	3	4	5

1. Determine not to exceed a set number of drinks._____

2. Alternate alcoholic and nonalcoholic drinks._____

3. Have a friend let you know when you have had enough._____

4. Leave the bar/party at a predetermined part._____

5. Stop drinking at a predetermined time._____

6. Drink water while drinking alcohol._____

7. Put extra ice in your drink._____

8. Avoid drinking games._____

9. Drink shots of liquor._____

10. Avoid mixing different types of alcohol. _____

11. Drink slowly rather than gulp or chug._____

12. Avoid trying to "keep up" or out-drink others._____

13. Use a designated driver._____

14. Make sure that you go home with a friend._____

15. Know where your drink has been all the time._____

Appendix F

Drinking Norms Rating Form (DNRF)

INSTRUCTIONS
Please choose one answer for questions 1 and 2

1. Dormitory/residence hall
2. Fraternity
3. Sorority
4. With Parents
5. Own Residence

1. What type of residence do you currently live in?
2. What type of residence do you expect to live in next semester?

Instructions	A. How often they drink	B. How much they drink on a typical weekend evening
We are interested in your estimates of A) *How often* and B) *How much* different types if people drink. For the following questions, please assume whenever possible that you are *rating a typical person of your same sex.* In each of the following situations, please enter the corresponding number, giving one answer for (A) (1-7), and one answer for (B) (1-6).	1. Less than once a month 2. About once a month 3. Two or three times a month 4. Once or twice a week 5. Three or four times a week. 6. Nearly every day 7. Once a day	1. 0 drinks 2. 1-2 drinks 3. 3-4 drinks 4. 5-6 drinks 5. 7-8 drinks 6. More than 8 drinks
3. An average college- bound senior in high school		
4. An average university student		
5. An average college student residing in a fraternity		
6. An average college student residing in a sorority		
7. An average college student residing in dormitory/residence hall		
8. An average college student residing with his/her parents		
9. An average college student residing in his/her own residence		
10. Your closest friends		

Appendix G

Comprehensive Effects of Alcohol (CEA)

1) What would you expect to happen if you were under the influence of alcohol, and
2) whether you think the effect is good or bad

INSTRUCTIONS

A. Choose from "disagree to agree" depending on whether you expect the effect to happen to you *if you were under the influence of alcohol.* These effects will vary, depending on the amount of alcohol you typically consume. *Circle one answer for the first set of numbers after each statement.*

B. Choose from BAD TO GOOD depending on whether you think the particular effect is bad, neutral, good, etc. We want to know whether you think a particular effect is bad or good, regardless of whether or not you expect it to happen to you. Circle only one answer for the last set of numbers after each statement.

Example: 1. I would be…. 1 2 3 4 This effect is 1 2 3 4 5

IF I WERE UNDER THE INFLUENCE FROM DRINKING ALCOHOL:	1 = Disagree 2 = Slightly disagree 3 = Slightly agree 4 = Agree	1 = Bad 2 = Slightly Bad 3 = Neutral 4 = Slightly Good 5 = Good
1. I would be outgoing	1 2 3 4	This effect is 1 2 3 4 5
2. My senses would be dulled	1 2 3 4	This effect is 1 2 3 4 5
3. I would be humorous	1 2 3 4	This effect is 1 2 3 4 5
4. My problems would seem worse	1 2 3 4	This effect is 1 2 3 4 5
5. It would be easier to express my feelings	1 2 3 4	This effect is 1 2 3 4 5
6. My writing would be impaired	1 2 3 4	This effect is 1 2 3 4 5
7. I would feel sexy	1 2 3 4	This effect is 1 2 3 4 5
8. I would have difficulty thinking	1 2 3 4	This effect is 1 2 3 4 5
9. I would neglect my obligations	1 2 3 4	This effect is 1 2 3 4 5
10. I would be dominant	1 2 3 4	This effect is 1 2 3 4 5
11. My head would feel fuzzy	1 2 3 4	This effect is 1 2 3 4 5
12. I would enjoy sex more	1 2 3 4	This effect is 1 2 3 4 5
13. I would feel dizzy	1 2 3 4	This effect is 1 2 3 4 5
14. I would be friendly	1 2 3 4	This effect is 1 2 3 4 5
15. I would be clumsy	1 2 3 4	This effect is 1 2 3 4 5
16. It would be easier to act my fantasies	1 2 3 4	This effect is 1 2 3 4 5
17. I would be loud, boisterous, or noisy	1 2 3 4	This effect is 1 2 3 4 5
18. I would feel peaceful	1 2 3 4	This effect is 1 2 3 4 5
19. I would be brave and daring	1 2 3 4	This effect is 1 2 3 4 5

20. I would feel unafraid	1	2	3	4	This effect is	1	2	3	4	5
21. I would feel creative	1	2	3	4	This effect is	1	2	3	4	5
22. I would be courageous	1	2	3	4	This effect is	1	2	3	4	5
23. I would feel shaky or jittery the next day	1	2	3	4	This effect is	1	2	3	4	5
24. I would feel energetic	1	2	3	4	This effect is	1	2	3	4	5
25. I would act aggressively	1	2	3	4	This effect is	1	2	3	4	5
26. My responses would be slow	1	2	3	4	This effect is	1	2	3	4	5
27. My body would be relaxed	1	2	3	4	This effect is	1	2	3	4	5
28. I would feel guilty	1	2	3	4	This effect is	1	2	3	4	5
29. I would feel calm	1	2	3	4	This effect is	1	2	3	4	5
30. I would feel moody	1	2	3	4	This effect is	1	2	3	4	5
31. It would be easier to talk to people	1	2	3	4	This effect is	1	2	3	4	5
32. I would be a better lover	1	2	3	4	This effect is	1	2	3	4	5
33. I would feel self-critical	1	2	3	4	This effect is	1	2	3	4	5
34. I would be talkative	1	2	3	4	This effect is	1	2	3	4	5
35. I would act tough	1	2	3	4	This effect is	1	2	3	4	5
36. I would take risks	1	2	3	4	This effect is	1	2	3	4	5
37. I would feel powerful	1	2	3	4	This effect is	1	2	3	4	5
38. I would act sociable	1	2	3	4	This effect is	1	2	3	4	5

Appendix H

Situational Confidence Questionnaire (SCQ)

INSTRUCTIONS: Listed below are a number of situations or events in which some people experience a drinking problem.

Imagine yourself as you are right now in each of these situations. Indicate on the scale provided how confident you are that you would be able to resist the urge to drink heavily in that situation.

Circle **100** if you are 100 percent confident right now that you could resist the urge to drink heavily; **80** if you are 80 percent confident; **60** if you are 60 percent confident. If you are more unconfident than confident, circle **40** to indicate that you are only 40 percent confident that you could resist the urge to drink heavily; **20** for 20 percent confident; **0** if you have no confidence at all about that situation.

I would be able to resist the urge to drink heavily

1. If I felt that I had let myself down

   0 20 40 60 80 100

2. If there were fights at home

   0 20 40 60 80 100

3. If I had trouble sleeping

   0 20 40 60 80 100

4. If I had an argument with a friend

   0 20 40 60 80 100

5. If other people didn't seem to like me

   0 20 40 60 80 100

6. If I felt confident and relaxed

   0 20 40 60 80 100

7. If I were out with friends and they stopped by the bar for a drink

   0 20 40 60 80 100

8. If I were enjoying myself at a party and wanted to feel even better

0 20 40 60 80 100

9. If I remembered how good it tasted

0 20 40 60 80 100

10. If I convinced myself that I was a new person and could take a few drinks

0 20 40 60 80 100

11. If I were afraid that things weren't going to work out

0 20 40 60 80 100

12. If other people interfered with my plans

0 20 40 60 80 100

13. If I felt drowsy and wanted to stay alert

0 20 40 60 80 100

14. If there were problems with people at work

0 20 40 60 80 100

15. If I felt uneasy in the presence of someone

0 20 40 60 80 100

16. If everything were going well

0 20 40 60 80 100

17. If I were at a party and other people were drinking

0 20 40 60 80 100

18. If I wanted to celebrate with a friend

0 20 40 60 80 100

19. If I passed by a liquor store

0 20 40 60 80 100

20. If I wondered about my self-control over alcohol and felt like having a drink to try it out

0 20 40 60 80 100

21. If I were angry at the way things had turned out

0 20 40 60 80 100

22. If other people treated me unfairly

0 20 40 60 80 100

23. If I felt nauseous

0 20 40 60 80 100

24. If pressure built up at work because of the demands of my supervisor

0 20 40 60 80 100

25. If someone criticized me

0 20 40 60 80 100

26. If I felt satisfied with something I had done

0 20 40 60 80 100

27. If I were relaxed with a good friend and wanted to have a good time

0 20 40 60 80 100

28. If I were in a restaurant, and the people with me ordered drinks

0 20 40 60 80 100

29. If I unexpectedly found a bottle of my favorite booze

0 20 40 60 80 100

30. If I started to think that just one drink could cause no harm

0 20 40 60 80 100

31. If I felt confused about what I should do

0 20 40 60 80 100

32. If I felt under a lot of pressure from family members at home

0 20 40 60 80 100

33. If my stomach felt like it was tied in knots

0 20 40 60 80 100

34. If I were not getting along well with others at work

0 20 40 60 80 100

35. If other people around me made me tense

0 20 40 60 80 100

36. If I were out with friends "on the town" and wanted to increase my enjoyment

0 20 40 60 80 100

37. If I met a friend and he/she suggested that we have a drink together

0 20 40 60 80 100

38. If I suddenly had an urge to drink

0 20 40 60 80 100

39. If I wanted to prove to myself that I could take a few drinks without becoming drunk

0 20 40 60 80 100

Vita

The author, Magdalena Kulesza received her Bachelor of Arts degree in 2003 from the Stony Brook University in New York. She completed an undergraduate Honor's Thesis concerning coping strategies among individuals with substance abuse problems. Upon graduation, she began working as a research assistant at the New York State Psychiatric Institute at Columbia University. In 2005, she began doctoral program in clinical psychology at Louisiana State University (LSU). She received Master of Arts degree in clinical psychology from LSU in 2007. Currently, she is completing her pre-doctoral internship at Brown University Medical School. After receiving her doctorate degree in August 2011, she will begin a post-doctoral fellowship at the Center for the Study of Health Risk Behaviors in the department of Psychiatry and Behavioral Sciences at the University of Washington.