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The Long-term Effect of a Brief Motivational Alcohol Intervention for Heavy Drinking Mandated College Students

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THE LONG-TERM EFFECT OF A BRIEF MOTIVATIONAL ALCOHOL INTERVENTION FOR
HEAVY DRINKING MANDATED COLLEGE STUDENTS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by
Meredith Terlecki
B.S., B.A. Lafayette College, 2003
M.A., Louisiana State University, 2008
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To my family
for their encouragement and support of my education

To Dan
with love and gratitude

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ABSTRACT

The study evaluated the long-term impact of a brief motivational intervention (BMI) among college undergraduates mandated to treatment relative to heavy drinking volunteer students. Participants ($N = 225$; 61% male) were randomized to a BMI ($n = 115$) or a control group ($n = 110$). Alcohol consumption (drinks per week, drinking frequency, typical drinks, peak drinks), alcohol-related problems, and readiness to change (RTC) were collected at baseline, 4 weeks, 3, 6, and 12 months posttreatment. BMI participants significantly decreased drinks per week (treatment, $\Delta M = 7.33$; control, $\Delta M = 3.60$), typical drinks (treatment, $\Delta M = 1.46$; control, $\Delta M = 0.65$), and peak drinks (treatment, $\Delta M = 2.16$; control, $\Delta M = 0.56$) relative to controls at 4-weeks posttreatment. Decreases in alcohol-related problems approached significance among BMI participants (treatment, $\Delta M = 7.11$; control, $\Delta M = 5.59$; $p < .10$). At 12-months posttreatment, gains for typical drinks and peak drinks were sustained (p 's $< .05$). Decreases in alcohol-related problems among the treatment group became significant over time ($p < .05$). Treatment gains for weekly drinking were marginally significant over time ($p < .10$). As expected, no main effect for referral group, or treatment \times referral group interaction affected BMI outcomes. Contrary to expectation, receiving a BMI did not increase RTC, nor did RTC moderate BMI outcomes. BMIs appear to be equally effective among mandated and volunteer groups over time.

INTRODUCTION

The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* denotes two categories of alcohol use disorders (American Psychological Association [APA], 2000). A diagnosis of Alcohol Abuse is given when one or more of the following criteria are met within a 12-month period: (1) Recurrent use that results in failure to fulfill major role obligations at work, school, or home; (2) recurrent use in physically hazardous situations (e.g., drinking and driving); (3) use that results in recurrent substance-related legal problems; (4) continued use despite recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (APA, 2000). The Alcohol Abuse diagnosis is warranted if the individual's symptoms do not meet criteria for Alcohol Dependence (APA, 2000). A diagnosis of Alcohol Dependence is given when three or more of the following criteria are met within a 12-month period: (1) Tolerance; (2) withdrawal; (3) alcohol is used in larger amounts and/or over a longer period than intended; (4) there is a persistent desire to reduce use or a history of unsuccessful efforts to cut down or control use; (5) significant time is spent obtaining and using alcohol; (6) important social, occupational, or recreational activities are given up or reduced because of alcohol use; (7) there is continued use despite a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol use (APA, 2000).

One-third of students enrolled in college meet *DSM-IV-TR* defined criteria for alcohol abuse and 6% endorse symptoms consistent with alcohol dependence (Clements, 1999; Knight et al., 2001). Despite the prevalence of alcohol use disorders (AUD) in a college sample, less than 4% of students voluntarily seek treatment for alcohol misuse (Clements, 1999; O'Hare, 1997). Because of these staggering facts, heavy alcohol use in college students has been categorized as a major public health concern for which effective interventions are needed (United States Department of Health and Human Services [USDHHS], 2000).

Heavy alcohol use during college is considered to be temporary phase and "rite of passage" (Wechsler, Dowall, Davenport, & Castillo, 1995). For most students, heavy drinking slows significantly after college graduation when students gain more responsibilities such as, a full-time job, marriage, and becoming a parent (Johnston et al., 2005; Walters & Bennett, 2000). However, for a small group of high-

risk students, heavy alcohol use in college can indicate the development of a chronic alcohol use pattern eventually leading to alcohol dependence or other serious alcohol-related medical problems (e.g., liver damage; Jackson, Sher, Gotham, & Wood, 2001; Merline et al., 2004). Annually, the United States spends \$18 million on the treatment and prevention of alcohol use disorders and alcohol-related medical illness or injury (USDHHS, 2000).

In response to these staggering findings, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) Task Force on College Drinking has advocated for the implementation of brief motivational interventions (BMI) on college campuses. BMIs are considered effective early intervention tools to reduce heavy alcohol use and alcohol-related consequences among college students (NIAAA, 2002). Several large randomized clinical trials evaluating the BMI among heavy drinking college student volunteers have reported significant reductions in alcohol use, alcohol-related consequences, or both (for reviews see Larimer & Cronce, 2002, 2007).

In recent years, BMI efficacy research studies have targeted students who are mandated by campus officials to an alcohol treatment program following a campus alcohol policy violation (e.g., drinking and driving, underage intoxication, underage possession). The mandated student population is critical target group for brief alcohol interventions as mandated students report heavier alcohol consumption and more alcohol-related negative problems (e.g., incidents of drunk driving, alcohol “blackouts”) relative to campus norms (O’Hare, 1997; Clements, 1999), as well as lower grades, more heavy drinking days and alcohol-related consequences compared to their non-adjudicated heavy-drinking peers (Tevyaw O’Leary et al., 2004).

Alcohol-related incidents are the primary reason for disciplinary action on university campuses (Barnett et al., 2006; Bergen-Cico, 2000). Thus, college administrators and campus officials play a critical role in the detection of heavy and risky drinkers within a university setting. In fact, the majority of heavy college student drinking behavior is not identified as “at risk” until their use leads to a serious alcohol-related event (e.g., drinking and driving, arrest, emergency medical attention) that merits the attention of campus officials (e.g., the Dean of the college) or community officials (e.g., police). As previously mentioned,

mandated college students report considerably heavier and riskier alcohol consumption even compared to their non-mandated peers, making this population a critical target group for early intervention and prevention programs (Barnett et al., 2004). Integrating BMI programs within the university judicial system may be a highly effective and feasible method of identifying high-risk college student drinkers and intervening with those students who have the greatest likelihood developing a serious alcohol use disorder in the future (Barnett & Read, 2005).

Most colleges and universities have implemented campus-wide programs designed with the intention of reducing risky drinking behavior. Typically, students who violate campus rules for alcohol use are referred to alcohol education (AE) classes offered by the university's residence halls or student health center (Look & Rapaport, 1991; Sadler & Scott, 1993). However, when the alcohol-related treatment outcome data of these programs is evaluated scientifically, they have only been associated with increases in alcohol-related knowledge. Surprisingly, AE programs have not consistently been shown to reduce risky alcohol use or alcohol-related problems, which are the intended goals of the program (Larimer & Cronce, 2002, 2007; Walters & Bennett, 2000; Walters & Neighbors, 2005). Thus, despite the university's best efforts to educate students about the consequences of heavy alcohol consumption, their alcohol use patterns still remain dangerously elevated following the disciplinary sanction (Hustad et al., 2008; Wechsler et al., 2002). Developing effective interventions for mandated student drinkers warrants further investigation (Barnett et al., 2004; 2007).

Brief Motivational Interventions among College Students

Motivational Enhancement Techniques. Borsari and Carey (2005) argue that students are inherently aware of the risks and consequences of heavy drinking, but appear to be unmotivated to reduce their drinking. According to the transtheoretical Stages of Change model, behavior change is a gradual process occurring in a series of five clearly defined stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska, DiClemente, & Norcross, 1992). According to this model, most college student drinkers would be considered "precontemplators" (i.e., they are not aware of the need to reduce alcohol use and may not be aware that their current drinking patterns are considered risky; Vik, Cellucci, &

Ivers, 2003). Miller and Rollnick (1991; 2002) contend that ambivalence about behavior change is a natural part of the change process. They propose the most effective components of an alcohol treatment program are helping the client resolve ambivalence about behavior change, enhancing the client's self-efficacy for making significant behavioral changes, and helping the client move through the stages of change toward the goal of reducing risky or problematic use. This clinical interviewing style is referred to as motivational interviewing (MI), and these techniques attempt to help the client recognize his/her own need to change current behavior (Miller & Rollnick, 1991; 2002).

Miller and Rollnick's (1991; 2002) MI approach appears to be particularly appealing for college students, because students do not typically view their drinking as being problematic or in need of change (Baer, Stacy, & Larimer, 1991). In addition, MI techniques are non-confrontational and appear to be effective among mandated student populations who may be defensive about their current drinking behavior or resistant to being lectured about their alcohol use. Thus, MI may help students stay engaged in a personalized discussion about the effects of alcohol, which may lead to awareness of the need to reduce risky drinking, and higher self-efficacy do to so.

Personalized Normative Feedback. The strongest predictor of alcohol consumption among college student populations is the perception of peer drinking behavior (Perkins, Haines, & Rice, 2005). This finding is concerning as college students significantly overestimate peer alcohol consumption and significantly underestimate the severity of alcohol-related consequences (i.e., alcohol black out; Borsari & Carey, 2003; Mallett et al., 2006). Mallett and colleagues (2006) found undergraduate drinkers with the greatest misperceptions about the number of drinks they would need to consume to experience a serious alcohol-related consequence also reported the heaviest alcohol consumption. Thus, BMIs including corrective normative information on peer alcohol use and identify objective risks associated with heavy alcohol consumption (e.g., alcohol overdose) are highly recommended methods of reducing drinking (NIAAA, 2002).

The Brief Alcohol Screening and Intervention for College Students (BASICS) is a Tier 1 (i.e., an effective individually-based) alcohol intervention for treating college drinking (Dimeff et al., 1999; NIAAA,

2002). The BASICS program combines MI techniques with cognitive-behavioral skills training and personalized normative feedback regarding peer drinking behavior as describe above. BASICS follows a harm reduction model, where the goal is not necessarily to achieve total abstinence but to facilitate significant reductions in high-risk alcohol use and decrease alcohol-related problems (Dimeff et al., 1999). BASICS is conducted in two 50-minute sessions. The first session includes an assessment of the student's current drinking behavior and provides basic information on alcohol use (e.g., the legal blood alcohol content [BAC]). Between sessions, the student is asked to monitor his/her drinking behavior on alcohol monitoring cards provided by the interviewer. The second 50-minute session is geared toward delivering personalized feedback based on the student's current drinking behavior in relation to other students (peer drinking norms comparison), and the student is given strategies to reduce risky drinking behavior. The personalized feedback also includes information on the student's beliefs about alcohol (e.g., "*Alcohol makes me more outgoing*"), an estimation of typical and peak BAC, a description of the student's personal risk factors associated with alcohol use (e.g., family history of alcohol use disorders), and current ongoing alcohol-related problems (Dimeff et al., 1999).

Several controlled outcome studies have reported that BASICS produces clinically significant reductions in alcohol use and alcohol-related consequences (Baer et al., 2001; Larimer & Crouce, 2002; 2007; Larimer et al., 2001; Marlatt et al., 1998; Roberts et al., 2000) in screened, high-risk college student drinkers with small to medium effect sizes (.21 to .48 for follow-up periods between 6-weeks and 4-years; Baer et al., 2001). Murphy and colleagues (2001) found that heavier drinking students who received BASICS reported greater reductions in drinking compared to students who were randomly assigned to AE or to an assessment only control group. Borsari and Carey (2000) reported that college student binge drinkers who received a BASICS intervention reported significant reductions from baseline in their alcohol consumption at a 6-week follow-up.

Brief Interventions among Mandated College Students

BASICS-style BMIs also appear to be an effective method for decreasing alcohol consumption, alcohol-related negative consequences, or both in mandated students (Larimer & Crouce, 2002, 2007).

Referring alcohol policy violators to a BASICS-style intervention instead of AE may help reduce risky drinking, promote behavior change, or decrease disciplinary recidivism on college campuses (Larimer & Cronce, 2002). In order to incorporate systematic BMIs into the disciplinary process for handling alcohol policy violators, more research is needed to evaluate their long-term impact among mandated students.

The available literature on BMI-style interventions for mandated college students has been limited by the lack “true” control groups (i.e., wait-list control, natural history control). Barnett and colleagues (2004) randomly assigned mandated students to either: 1) AE (using the CD-ROM, Alcohol 101); or 2) a BMI. Students in the BMI condition were also randomly assigned to receive or not receive a 1-month booster session, which was an abridged version of the original BMI intervention. At three months post-treatment, both treatment groups reported drinking on significantly fewer occasions, fewer “binge” drinking episodes, and less alcohol consumption overall. Significant between groups differences were not apparent for any alcohol use outcome. However, more students in the BMI plus booster condition self-referred to counseling after treatment than did students in the AE group (22% vs. 4%), implying that the BMI effectively induced interest in behavior change. In this particular case, the BMI presumably made students aware of their current risky drinking behavior and facilitated the initial steps to implementing behavior change, consistent with the MI approach.

In a similar study, Borsari and Carey (2005) evaluated a BMI relative to AE among high-risk mandated students (i.e., students who endorsed extremely heavy binge drinking behavior). Three months post-treatment, students in the BMI condition reported fewer alcohol problems than did the AE group. These treatment effects were maintained at a six months post-treatment follow-up assessment. Additionally, at the 6-month follow-up, both groups reported significant decreases in heavy drinking episodes, while only the BMI group reported decreased typical BAC. White and colleagues (2006) compared an in-person BMI to a written feedback only condition among mandated students. At a follow up assessment three months post-treatment, both groups reported lower alcohol use and fewer alcohol-related problems, although, differences between groups were not significant.

In a similar group-based intervention, Fromme and Corbin (2004) evaluated the Lifestyle Management Class (LMC) among a sample of mandated and volunteer college students. The LMC is considered a group format BMI utilizing cognitive-behavioral skills to reduce risky alcohol use. Fromme and Corbin (2004)'s addition to the extant literature is important as it included control groups of both mandated and volunteer students, a component which had been lacking in previous designs. In the study, students were randomly assigned to the LMC or to an assessment only control group (mandated students were assigned to a brief wait-list condition). At the 6-week post-test assessment, all groups reported significantly decreased alcohol consumption, showing natural changes in student drinking behavior overtime. The LMC-assigned participants reported a significant decrease in the frequency of drinking and driving. However, a significant treatment \times time interaction was not detected for alcohol use or related problems. Overall, the researchers found the program comparably effective in both mandated and volunteer students. LaBrie and colleagues replicated this finding among a group-based MI intervention for mandated female (2007) and male (2011) heavy drinkers, although these designs contained no control group.

Taken together, mandated students appear to be amenable to the BMI platform, but it is unclear whether these interventions sufficiently reduce alcohol-related harm among the majority of students. The aforementioned RCTs are the most methodologically rigorous available, however the extant body of literature is not without limitation. First, the failure to include adequate control groups among individually-based intervention efficacy studies make it difficult to separate the intervention effect from other factors unrelated to treatment (e.g., the effect of disciplinary action or naturalistic changes over time; Barnett & Read, 2005; Campbell, 1969). Fromme and Corbin (2004) is a unique study that included a WLC group of mandated students. Women who had been assigned to the WLC group significantly reduced alcohol use from pre- to post-test, suggesting the behavior change may have resulted from factors independent of the intervention (e.g., due to the adversity of the event that resulted in disciplinary action or because students have been reprimanded and are being assessed/monitored; Barnett et al., 2004). Morgan and colleagues (2008) found students mandated to a BMI made significant decreases in their alcohol use prior to receiving the intervention, an effect presumably due to the disciplinary process. However, Hustad and colleagues

(2008) found citation alone to have only a minor influence on drinking behavior among mandated college students who have violated a campus alcohol policy. These particular findings highlight the importance of designing studies in a way to better control for potential historical, naturalistic, or maturational changes so these effects are not misinterpreted as treatment outcomes.

Second, there are inconsistencies in treatment outcomes. Borsari and Carey (2005) reported significant between-group reductions of alcohol-related problems 6-months posttreatment (between group effect size = 0.39). White and colleagues (2006) reported decreased drinking (i.e., drinks per week) and alcohol-related problems within groups at a 3-month follow-up. However, significant differences between-groups (i.e., BMI and PNF) was not detected until 15-months post-intervention, providing partial support of a “sleeper effect” among mandated students receiving treatment (White et al., 2007). In contrast, LaBrie et al. (2007) reported significant decreases in alcohol use and alcohol-related problems at a 12-weeks follow-up period for women only. Later, these findings were replicated among men (LaBrie et al., 2011). Similarly, between-groups differences in alcohol use or frequency of consumption were not observed at a 3-month post-test (Barnett et al., 2004) and at 12-months posttreatment, mandated students who received the intervention reported *heavier* typical drinking and *increased* drinking frequency (Barnett et al., 2007). This finding raises concerns over the potential for sustained BMI effects among mandated students. Fromme and Corbin (2004) did not find an intervention effect on alcohol consumption, but did report decreased alcohol-impaired driving in the LMC group at the 6-week post-test, which disappeared by the 6-month follow-up.

Differences in the composition of study groups among the individual research studies may have contributed to the discrepant findings. Of those, five studies included who were referred to treatment following either a campus alcohol or drug policy (Fromme & Corbin, 2004; Hustad et al., 2008; Morgan et al., 2008; White et al., 2006; 2007). One study included only higher-risk students (i.e., heavy drinking participants; Borsari & Carey, 2005). One study included higher risk mandated women (La Brie et al., 2007) and the men (La Brie et al., 2011). Others did not include a minimum drinking criterion (Fromme & Corbin, 2004) or excluded from the analyses the heaviest drinkers and those most at risk for continued heavy

drinking (Morgan et al., 2008). Thus, future research dissemination efforts warrant evaluation of which mandated students are most likely to benefit from a mandated BMI.

A third shortcoming of the existing literature is limited attention to individual characteristics that may affect how well and how quickly mandated students respond to a BMI. One hypothesis regarding the aforementioned discrepant treatment outcomes is differential interest in and motivation to change risky drinking behavior at treatment entry. This intra-individual construct has been conceptualized as readiness to change (RTC) in the treatment literature. In the extant literature, it has not been determined if individually-based BMIs are capable of producing significant reductions in alcohol consumption and alcohol problems in all mandated students who enter treatment, or only those students who are highly motivated to change their risky drinking behavior prior to entering treatment, but after receiving the disciplinary sanction. Mandated students with high baseline RTC report better treatment outcomes for alcohol use (Carey et al., 2007; Fromme and Corbin, 2004), suggesting that BMIs may more effective among participants with high baseline RTC (i.e., RTC moderated treatment outcomes). This finding is consistent with brief alcohol intervention outcomes for voluntary students and non-student populations (DiClemente, Doyle, & Donovan, 2009; Shealy, Murphy, Borsari, & Correia, 2007). However, it is interesting that students who received the group-based BMI did not report increased RTC from baseline to post-test, which contradicts the theoretical assumption that MI strategies help facilitate behavior change by increasing RTC and commitment to make behavior changes. Still, RTC appears to have an indirect effect on intervention response in mandated students (Carey, Carey, Maisto, & Henson, 2006; Carey, Henson, Carey, & Maisto, 2007). Only one study has collected pre- and post-test RTC measures in order to evaluate mechanisms or moderators of change among mandated student drinkers following a BMI (see Fromme & Corbin, 2004). In the larger body of literature on RTC, it is unclear whether RTC can be considered a mechanism of behavior change (Borsari, Murphy, & Carey, 2009). Addressing this limitation may help university administrators identify high-risk mandated student drinkers that may benefit from a stand-alone treatment, or perhaps offer an alternative treatment for repeat alcohol policy offenders via a stepped-care approach for handling alcohol-policy violators on campus.

Lastly, it has been assumed that mandated students will respond to an individually based brief MI intervention in a way that is similar to what has been reported for high-risk student volunteers. Fromme and Corbin (2004) is the only available study directly comparing mandated and voluntary students in a group-based MI intervention. However, it should be noted that there were significant baseline differences in alcohol use between referral groups and the mandated group drank significantly more than did the volunteers. In the pilot study of the current study, the BMI appeared to have a similar impact among mandated and volunteer students who met heavy drinking criteria (Terlecki, Larimer, & Copeland, 2010). Additional research is warranted to determine if a BMIs are comparably effective among both group of students, or if the mandated students may respond differently due to increased resistance or hostility (Barthames, Borsari, Husted & Barnett, 2010), or because their alcohol use is being assessed or monitored post-disciplinary infraction (Barnett & Read, 2005).

A final limitation in this area is knowledge of the duration of treatment effects among mandated students. To our knowledge, no BMI efficacy study has collected longitudinal data on the impact of a BMI among mandated and voluntary students to determine if the BMI is indeed comparably effective in the long-term. Before BMIs can be integrated into the standard campus disciplinary procedure for handling alcohol policy violators, they must be shown to be as effective as they have been reported for volunteer students. Furthermore, there must be some compelling evidence indicating that mandated students report sustained treatment gains over time. This study represents the first study to our knowledge to directly compare the efficacy of an individually based brief MI intervention among equally heavy drinking mandated and voluntary students.

Current Study Aims

The primary goal of the study is to build on prior intervention trials to further explore the conditions under which individually-based BMI approaches may decrease heavy alcohol consumption and alcohol-related consequences among mandated college students. The overall goal of the project is to assess the impact of an empirically supported brief alcohol intervention (i.e., BASICS; Dimeff et al, 1999) among high-risk mandated college students using a randomized controlled design.

Evaluation of BASICS Efficacy

Aim 1. To evaluate the efficacy of a BASICS-style brief alcohol intervention for reducing risky alcohol use and alcohol-related problems among mandated students and student volunteers.

Aim 1a. To evaluate the impact of a BMI among mandated students relative to no treatment (a wait-list mandated control group), and their volunteer peers on typical weekly alcohol consumption, frequency of consumption, typical quantity per drinking occasion, peak drinks per occasion, and alcohol-related consequences at the 4-week post-test assessment. This aim determined if the BMI was indeed effective among mandated students relative to their equally heavy drinking volunteer peers. Based on findings in the literature and results from the pilot data of the proposed study (Terlecki et al., 2010), it is hypothesized that the BMI groups will report significantly less weekly alcohol consumption, frequency of consumption, typical consumption, peak consumption, and alcohol-related problems relative to the control groups. No significant difference is expected to be detected between referral groups.

Aim 1b. To evaluate whether BASICS treatment outcomes are sustained equally over time among mandated and volunteer students. Long-term (i.e., 3- to 12-month follow-up assessments) treatment outcomes were compared among mandated and voluntary treatment groups relative to the voluntary control group over time (4-week, 3-, 6-, 12-months). Both treatment groups were expected to report significant and sustained decreases overtime on outcome measures of alcohol use, frequency of alcohol consumption, typical drinks, peak drinks, and alcohol-related problems relative to the volunteer control group. No statistically significant differences were expected to be found at any assessment point between the mandated and voluntary treatment groups.

Readiness to Change

Aim 2. To evaluate readiness to change (RTC) as a mechanism of behavior change among mandated students. The BMI's influence on RTC from baseline to 4-week post-test was evaluated to determine: a) if the BMI increases RTC (Aim 2a); and b) if baseline RTC moderates response to treatment across referral groups (Aim 2b). As per the literature, RTC is not expected to increase among students who receive the BMI. However, RTC is hypothesized to moderate BMI efficacy, such that high baseline RTC will be

associated with greater treatment gains on alcohol-related outcome variables among students who receive the intervention. Mandated students are hypothesized to have elevated baseline RTC relative to volunteers (Fromme & Corbin, 2004); although, it is not clear if this baseline difference will differentially affect the way mandated students respond to the intervention.

METHOD

Participants

Full-time undergraduate students aged 18-24 years old were recruited to participate in an alcohol intervention ($N = 550$). Recruitment took place from fall 2007 to spring 2010 semesters at a large, public, state university. Inclusion criteria were: (1) drinking at least monthly and consuming at least 5 drinks per drinking occasion (4 drinks for women) in the past month as measured by the Daily Drinking Questionnaire (DDQ; Collins et al., 1985) and Quantity/Frequency Index (QFI; Dimeff et al., 1999); (2) endorsing three alcohol-related problems on 3 to 5 occasions in the past 3 years on the Rutgers Alcohol Problem Inventory (RAPI; White & Labouvie, 1989), and (3) reporting a score of 6 or greater on the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993). Students who requested more intensive alcohol treatment or reported a history of severe and persistent alcohol related symptoms ($n = 2$) were excluded and referred to appropriate treatment. Five-hundred twenty of the recruited students attended the screening appointment and completed the screening measures, of which 309 met eligibility criteria (59.4%). Two-hundred fifty-five eligible students enrolled in the longitudinal trial, of which 88% completed the baseline assessment measures and interview ($n = 225$). Figure 1 contains recruitment and enrollment data. No significant differences were found in the enrollment rate or demographic characteristics by semester (all p 's $< .05$). Participants were fairly ethnically representative of LSU, which includes 79% Caucasian students, 9% African American, 5% other/unknown, 3% Asian, 3% Latino, and 0.4% American Indian. In the present sample, participant ethnicity was slightly less diverse and included: 89% Caucasian, 6% African American, 2% Latino, 2% Asian, 1% other/unknown, and 0.4% American Indian.

Mandated Students. The university's Office of Judicial Affairs referred students ($n = 188$) who had violated the campus alcohol policy to research personnel. All interested mandated students were screened for heavy alcohol use ($n = 158$) to determine eligibility for the longitudinal trial (see Screening). Mandated students reporting more than one disciplinary referral related to alcohol or drug use were excluded from research participation prior to completing screening measures ($n = 2$).

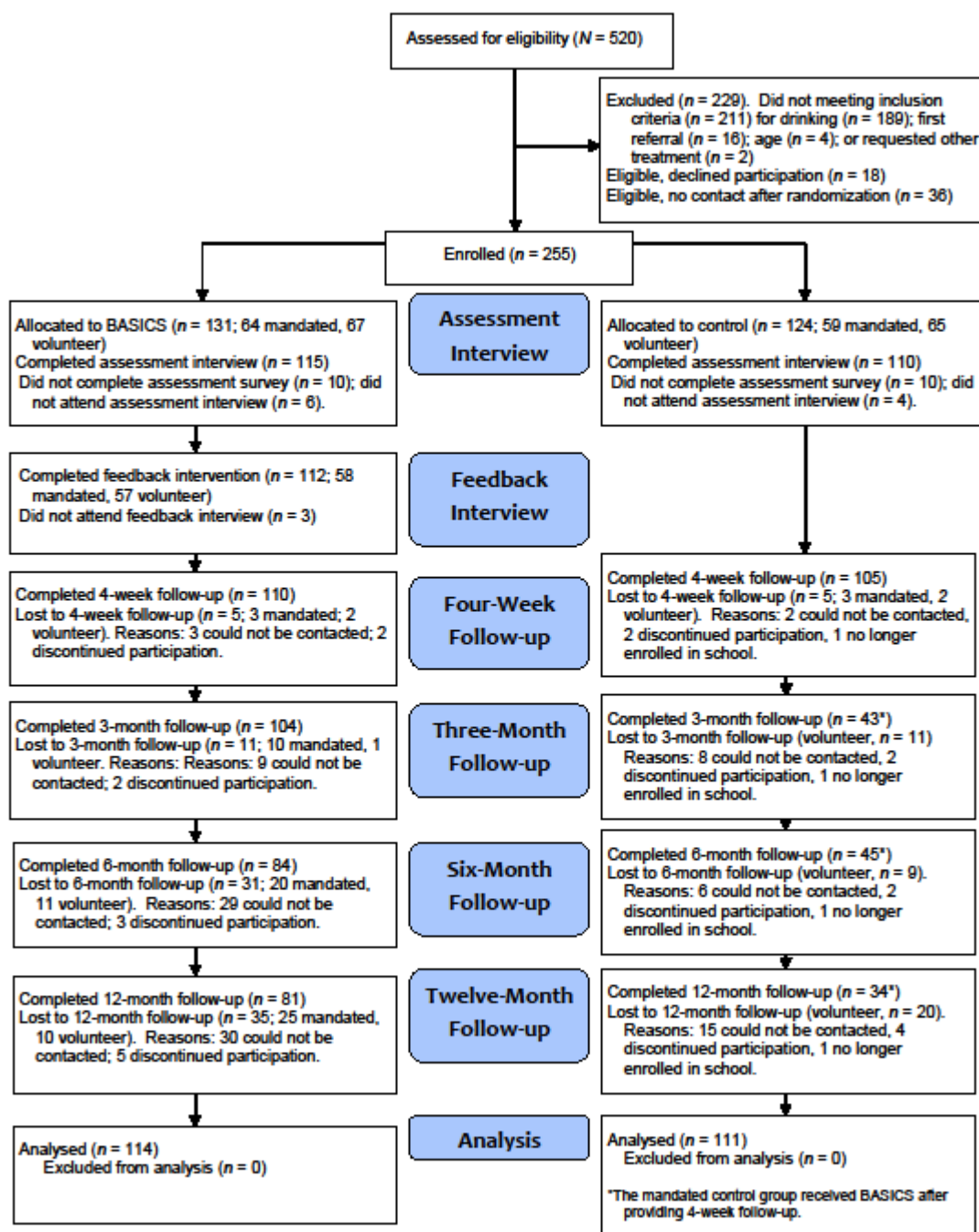


Figure 1: CONSORT diagram for screening and study procedures.

Research participation through the 4-week post-test assessment fulfilled students' mandatory alcohol intervention requirement. Research participation was voluntary and students could decline with no penalty by filling out a notification form. Eleven students declined research participation prior to screening and completed the university's AE class (treatment as usual). Seventy-eight percent of screened mandated students ($n = 123$) enrolled in the longitudinal trial, of which 114 completed the baseline assessment. Mandated students who did not respond to e-mail and/or phone messages or enroll in the study were informed that they would be referred back to the Dean of Judicial Affairs with no disciplinary penalty ($n = 61$).

Heavy Drinking College Student Volunteers. Volunteer participants ($n = 362$) were screened for heavy drinking and alcohol-related consequences using the abovementioned criteria (see Participants). Students who endorsed previous alcohol-related violations of the campus alcohol policy were excluded ($n = 16$). Research volunteers were able to participate in the study through the LSU Department of Psychology's subject experiment pool. Following screening, eligible students were contacted via e-mail to participate in the longitudinal study ($n = 156$). A series of reminder emails to non-responders was employed to achieve the sample size. To ameliorate the potential problem of differential attrition by referral group, volunteer participants elected to receive course credit toward their psychology courses or a lottery entry for \$300. Extra credit was offered in a "lump sum" of 5 pts (2 pts for the assessment interview, 2 pts for the feedback interview, 1 pt for the post-test, and later 1 pt for each follow-up) to improve the retention rate among student volunteers and mimic the "compensation schedule" for mandated students (i.e., fulfilling a disciplinary requirement after the 4-week post-test assessment was collected). Eighty-three percent of eligible students enrolled in the longitudinal trial ($n = 130$), of which 112 completed the baseline assessment.

Power Analysis

Power to detect differences was determined for the following principal alcohol-related treatment outcome variables: 1) weekly alcohol consumption; 2) weekly frequency of alcohol consumption; 3) typical quantity per drinking occasion; 4) peak quantity per drinking occasion as reported on the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985) and Quantity/Frequency Index (Dimeff et al., 1999); and 5)

number of alcohol-related problems as reported on the Rutgers Alcohol Problem Index (White & Labouvie, 1989). Statistical power associated with the proposed analyses was based on a small to medium effect size (Cohen's $d = 0.25$), which is consistent with the literature (e.g., Marlatt et al., 1998).

Procedure

Screening. Participants were asked to read and sign the consent form. Screening measures consisted of demographic characteristics; the Rutgers Alcohol Problem Inventory (RAPI; White & Labouvie, 1989); Daily Drinking Questionnaire (DDQ; Collins et al., 1985); and Quantity/Frequency Index (QFI; Dimeff et al., 1999; see Measures). Mandated participants were given the Alcohol Dependence Scale (ADS; Skinner and Horn, 1984) to screen for more chronic or pervasive alcohol use disorders. All participants were given a self-report questionnaire to determine if they had encountered previous alcohol-related disciplinary actions or endorse a significant history of alcohol-use problems that may require more intensive treatment.

Participants who appeared to have symptoms of a significant alcohol use disorder (e.g., physiological alcohol dependence) were referred to more intensive treatment as appropriate. Eligible students were contacted by email to schedule the baseline assessment meeting and the intervention. A series of reminder e-mails to non-responders was used to achieve the sample size. Students who did not respond to e-mail were contacted by telephone.

Randomization to Treatment. Eligible students were assigned to the BASICS intervention ($n = 131$) or to an assessment only (AO) control group intervention ($n = 124$; mandated students were assigned to a brief wait-list control [WLC]). To reduce baseline differences in demographic characteristics and/or drinking outcome measures between treatment conditions, urn randomization was employed (Stout et al., 1994; Wei, 1978; 1988). Urn randomization designs are ideal for clinical trials with a small sample size and as the sample size increases, this process approximates standard randomization (Hedden, Woolson, & Malcom, 2006). Participants were assigned to treatment conditions using a computer-based urn randomization to ensure balancing on gender and current Greek membership status. The proposed number of covariates is appropriate for the proposed sample size (Stout et al., 1994).

Baseline Assessment. Eligible participants met in person with a trained graduate student (see Treatment Integrity) for 50-minutes to complete consent forms for the treatment phase of the study (see Appendix A) and the Brief Drinker Profile (BDP; Miller & Marlatt, 1984). All participants were asked to complete self-report measures of alcohol use and consequences, perceived norms, alcohol outcome expectancies, protective behaviors measure, and readiness to change. All measures except the BDP and TLFB were completed online using a secure web server to increase the ease of data entry and enable the production of the graphic feedback utilized for brief interventions (see Appendix B). Internet data collection was employed to improve cost-effectiveness of the trial (Green & Frost, 1997; Moore, Soderquist, & Werch, 2005) and to reduce manual data entry-related error (Cloud & Peacock, 2001; Green & Frost, 1997). Online screening studies and brief alcohol interventions have demonstrated acceptability and emerging efficacy (Kypri et al, 2004; Walters et al., 2005) for general adults and students. In addition to completing these web assessments, participants in the treatment group were asked to keep track of their daily drinking for approximately 2 weeks using monitoring cards provided by the interviewer.

Intervention. Each 50-minute feedback intervention was individually tailored based on the information collected at baseline. Each session involved a review of personalized normative graphic feedback consistent with the BASICS framework. The intervention covered the following topics in each session: a) evaluation of typical drinking patterns as recorded on the alcohol monitoring and baseline assessments of drinking behavior; b) comparison of typical patterns of alcohol use and perceived norms to actual campus norms of same-age peers; c) review of the biphasic effects of alcohol; d) personalized review of drinking consequences; and e) placebo and tolerance effects of alcohol. Participants received written information on strategies to reduce heavy drinking and received a BAC card based on the participant's self-reported weight (see Appendix C; Dimeff et al., 1999). The interventions were conducted according to the MI procedures (Miller & Rollnick, 1991, 2002) and delivered by fully trained graduate students (see Treatment Integrity) in clinical psychology following a written manual (Dimeff et al., 1999) and supervision by Drs. Amy Copeland and Mary Larimer (BASICS consultant). Eighty-seven percent of enrolled students completed the feedback interview ($n = 222$).

Treatment Integrity. The study interventionist completed a two-day intensive BASICS training workshop at the University of Washington, Seattle in the research laboratory that developed the BASICS program. Study interventionists received ongoing clinical supervision in the intervention by Amy L. Copeland, Ph.D. in her ongoing collaboration with Mary E. Larimer, Ph.D., at the University of Washington, an expert in the field of brief alcohol interventions for college students.

Post-Test Assessment. Four weeks post-intervention, students completed post-test measures consisting of the RAPI (White & Labouvie, 1989), DDQ (Collins et al., 1985), Readiness to Change Questionnaire (RTCQ; Rollnick et al., 1992) and QFI (Dimeff et al., 1999). To ensure that post-test and wait-list measures were collected at the same time for mandated students the WLC group completed the same self-report measures 6-weeks¹ after assessment. This period took into account two weeks of self-monitoring of alcohol use between the assessment interview and the feedback interview plus a four-week waiting period. After completing post-test measures, the WLC group received the intervention. The post-test measures were emailed to participants using several repeated email reminders. Volunteers who completed the post-test were eligible to earn an additional extra credit point for their psychology courses. Mandated students who completed the post-test received an official notification indicating that they had satisfied their disciplinary requirement. A member of the Office of Judicial Affairs staff was notified when students completed the program. Students were given reminders via email, phone, and/or other contacts that the student provided to increase the study's follow-up rate. Since students are comfortable with computers and the internet, it was convenient for them to do the internet based follow-up assessments without having to make an appointment at the clinic. Ninety-seven percent of the 222 participants who received BASICS completed the 4-week post-test assessment ($n = 215$ total; 108 mandated, 107 voluntary). The participant follow-up rate was relatively consistent with the literature (see Borasi & Carey, 2008; Marlatt et al., 1998).

¹ The study's wait-list period did not exceed the University's alcohol education class wait-list. Therefore, we believe WLC participants were in no greater risk of experiencing alcohol-related harm than if they did not participate.

Follow-up Assessment. Follow-up assessments were collected 3-, 6-, and 12-months post-intervention. Follow-up and post-test assessments were identical; however, both mandated and volunteer students who completed follow-up assessments were entered into a \$300 cash prize drawing. The mandated WLC group did not receive follow-up assessments as they received the intervention after providing the 4-week post-test assessment. Of the 169 participants in the remaining three groups (mandated BASICS, volunteer BASICS, volunteer control) eighty-seven percent ($n = 147$ total; 48 mandated, 99 voluntary) completed the 3-month follow-up assessment. Seventy-eight percent ($n = 129$; 38 mandated, 91 voluntary) completed the 6-month follow-up assessment. Seventy-two percent ($n = 115$ total; 49 mandated, 66 voluntary) completed the 12-month follow-up assessment.

Measures

Participants completed questionnaires and consent forms at the Louisiana State University Psychological Services Center. The confidentiality of research data was assured with a Certificate of Confidentiality from the U.S. Department of Health and Human Services. Demographic information, family history, comprehensive effects of alcohol, and severity of alcohol dependence was collected only at baseline and used to create the personalized feedback forms within the treatment condition. Primary outcome variables were collected at the assessment interview and all subsequent assessments measures.

Demographic Characteristics and Drinking History. Demographic information including age, sex, ethnic background, height, weight, living arrangement, year in school, full-time/part-time enrollment status, involvement in the Greek system, previous alcohol-related citations, and previous alcohol-related treatment were collected via self-report during the screening appointment. The date and reason for sanction was collected for mandated students.

The Alcohol Use Disorder Identification Test. The AUDIT (Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) is a 10-item self-report measure developed by the World Health Organization (WHO) to identify current harmful and hazardous drinking (Babor, Higgins-Biddle, Saunders, & Monterio, 2001). Total scores range from 0 to 40. An AUDIT cut-off score of 6 or greater demonstrates 91%

sensitivity and 60% specificity in the detection of high-risk drinkers in a college sample (Kokotailo et al., 2004; see Appendix D). The AUDIT demonstrated good internal consistency in the sample ($\alpha = .89$).

Alcohol Dependence Scale. The ADS (Skinner & Horn, 1984) is a 25-item self-report measure designed to assess the symptoms of physical dependence on alcohol (see Appendix E). The ADS appeared to have adequate internal consistency in the sample ($\alpha = .82$).

The Brief Drinker Profile. The BDP (Miller & Marlatt, 1984) is a structured interview designed to assess family history of alcohol problems, history of conduct disorder, and personal drinking history (see Appendix F for sample items).

Rutgers Alcohol Problem Inventory. The RAPI (White & Labouvie, 1989) is a 23-item self-report measure constructed to assess alcohol-related negative consequences (see Appendix G). Students were asked to rate items on a 5 point Likert-scale to determine alcohol's role in their personal, social, and academic functioning, including frequency and severity of alcohol-related problems in the last month as an alcohol outcome measure. RAPI total scores range between 0 and 115. This scale has been shown to be a reliable discriminator between clinical and normal samples of college age drinkers and has demonstrated internal consistency in college students ($r = .92$; Borsari & Carey, 2000). The measure is widely used to assess alcohol-related problems in this area of research (Baer et al., 2001; Borsari & Carey, 2005; Marlatt et al., 1998; White et al., 2006). The RAPI had adequate internal consistency in the sample ($\alpha = .86$).

Daily Drinking Questionnaire. The DDQ (Collins et al., 1985) is a self-report measure that retrospectively assesses average weekly drinking frequency and quantity over the last month (see Appendix H). The measure asks students to record the number of drinks typically consumed each day during the week and the time spent drinking each day during the last month. Scoring produces continuous measures of the number of drinking days per week (frequency) and total drinks per week (quantity). One-week test-retest correlations have been calculated for estimates of typical drinking ($r = 0.93$; Collins, Carey, Sliwinski, 2002; Miller et al., 1998). The RAPI has been evaluated for stability of reported drinking between baseline and 6-weeks for heaviest ($r = .82$) and typical drinking weeks ($r = .56$) by Borsari and colleagues (1999).

Quantity/Frequency Index. The QFI (Dimeff et al., 1999) is a self-report measure designed to assess a student's drinking behavior in terms of quantity and frequency of their alcohol consumption on a typical occasion and peak drinking occasion within the past month (see Appendix I). The QFI quantity items are scored 1 (0 drink), 2 (1–2 drinks), 3 (3–4 drinks), 4 (5–6 drinks), and so on through 11 (more than 19 drinks). The QFI is effective in measuring changes in drinking patterns (Marlatt, Baer, & Larimer, 1985).

The Readiness to Change Questionnaire. The RTCQ (Rollnick et al., 1992) is a 12-item self-report measure assessing motivation to change based on Prochaska and DiClemente's stages of change model (see Appendix J). Continuous scores are calculated by summing 4 test items that load into three subscales, "precontemplation," "contemplation," and "action." A final continuous score is established by summing the "contemplation" and "action" subscales and subtracting the "precontemplation" subscale (Rollnick et al., 1992). The measure demonstrates adequate internal consistency, test-retest reliability, and strong predictive validity (Heather, Rollnick, & Bell, 1993). The RTCQ items demonstrated adequate internal consistency in the sample when scored continuously ($\alpha = .85$) and among each subscale ($\alpha = .65$ precontemplation; $\alpha = .73$ contemplation; $\alpha = .87$ action). These values are consistent with findings in the literature (Harris, Walters, & Leahy, 2008).

The Drinking Norms Rating Form. The DNRF (Baer et al., 1991) is a 10-item self-report instrument to assess a student's perception of alcohol use among their peers (see Appendix K). DNRF results are presented on the participant's personalized graphic feedback.

Protective Behavioral Strategies Survey. The PBSS (Martens et al., 2005) is a 25-item self report instrument assessing the extent to which students who engage in various cognitive-behavioral strategies designed to reduce harm associated with alcohol consumption (see Appendix L). Strategies the participant currently engages in are included in the personalized feedback. Items the participant endorses are discussed within the feedback interview.

The Comprehensive Effects of Alcohol. The CEOA (Fromme, Stroot, & Kaplan, 1993) is a 38-item self-report measure that includes positive and negative alcohol outcome expectancies (see Appendix M). Using a 4-point Likert, participants are asked to disagree (1) or agree (4) with each alcohol effect (i.e.,

"*I would feel relaxed*"), and then rate the perceived effect on a 5-point scale from 1 (bad) to 5 (good). Items with which the participant agrees or slightly agrees and rates as bad, slightly bad, slightly good, and good are included in the participant's personalized feedback form.

Alcohol Monitoring Cards. This measure is a wallet size card used to document daily drinking behavior (Dimeff et al., 1999). Each card includes basic instructions on how to record the type and quantity of alcohol consumed as well as columns for various situational and contextual factors to facilitate the documentation process (see Appendix N).

DATA ANALYSIS

Missing Data

Attrition bias was evaluated to determine if baseline characteristics differed between dropouts and completers. An intent-to-treat strategy was employed, such that all participants who were randomized and provided baseline assessment data were included in the appropriate analyses ($n = 225$). Regression models are tolerant to missing data, unequal sample sizes, and are therefore recommended for use in longitudinal RCTs.

Preliminary Analyses

Standardized scores of aggregate variables and variable distributions were examined to identify skew, kurtosis, and outliers of greater than three standard deviations (Tabachnick & Fidell, 2001). Linearity, homoscedasticity, and homogeneity of variance assumptions were checked prior to conducting the primary analyses. Inflated experiment-wise error rates were controlled using modified Bonferroni corrections (Dubey & Armitage-Parmar; Holland & Copenhaver, 1988; Sanhok, Huque, Dubey 1997).

Primary Analyses

Aim 1. Linear growth model (LGM) analyses were conducted to evaluate immediate (Aim 1a) and long-term (Aim 1b) change in alcohol-related treatment outcome variables (weekly quantity, weekly frequency, typical drinks, peak drinks, and alcohol problems) over time by treatment condition (BASICS, control) and referral group (mandated, volunteer). Models were developed to control for baseline differences and within-subject correlations for each subject, which allowed for a more tolerant method to handle attrition. Models employed a random intercept for each subject and a random effect for time, which allowed study outcomes to be correlated across time points for each study subject (i.e., an individual regression line is created for each subject across all time points). However, with time added as a random factor, the models failed to converge, even with number of iterations expanded to 500. Thus, time was included as a fixed factor in subsequent analyses. Assumptions about the expected effects of change over time among treatment and control groups influenced model development. First, the volunteer control group was expected to decrease drinking over time without receiving any formal intervention (Borsari & Carey, 2005; Marlatt et al.,

1998). Thus, change over time in the target dependent variables within the intervention conditions of interest to the study aim were modeled against naturalistic change over time within the volunteer control condition (i.e., slope of the volunteer control group). Following, an aggregate treatment condition was added (for both mandated and volunteer students who received BASICS) to evaluate the change in the dependent variable over time relative to volunteer controls. Second, the largest change in dependent variables was hypothesized to occur between baseline and the 4-week post-test assessment (Borsari & Carey, 2005; Marlatt et al., 1998). Although change was hypothesized to be maintained between 4-week and 12-month follow-up among treatment groups, the slopes representing change over time within the control group was not (i.e., different slopes over time, which is not supported with standard linear growth models). Thus, Aim 1a evaluates initial change in the dependent variables from baseline to 4-week post-test. Aim 2a evaluates sustained change in the dependent variables from the 4-week post-test through the 12-month follow-up assessment. Analyses were conducted in a step-wise manner for each predictor variable. The predictor variables were retained if the likelihood ratio indicated significant improvement in the model. Models were constructed using Level 1 (within-subjects) and Level 2 (between-subjects model) variables. Models were compared to evaluate fit.

The Level 1 within-subjects model reflected the average value of the selected dependent variable. Level 1 variables were hypothesized within-groups predictors of change in the dependent variables, such as time, condition, sex, referral group, and Greek system membership. Time was dummy coded (0 = baseline; 1 = 4-week follow-up; 3 = 3-month follow-up; 6 = 6-month follow-up; 12 = 12-month follow-up). Referral group was dummy coded (0 = mandated, 1 = volunteer). Greek system membership was dummy coded (0 = current member, 1 = former/never member). Sex was dummy coded (0 = male, 1 = female).

Level 2 variables included between-groups predictors of change in the dependent variables, allowing for the examination of interactions between groups consistent with the study hypotheses. Between-groups predictors of the interaction of time \times condition and referral group \times condition were evaluated.

Aim 1a. Separate growth models were developed to evaluate immediate change in alcohol-related treatment outcome variables (weekly quantity, weekly frequency, typical drinks, peak drinks, and alcohol problems), with time (baseline, 4-week post-test), treatment condition (BASICS, control), and referral group

(mandated, voluntary), controlling for sex and Greek system membership. The time \times treatment and treatment \times referral group were evaluated.

Aim 1b. To evaluate long-term intervention efficacy and change over time, growth models were developed to assess sustained change over time after receiving the intervention (4-week post-test, 3-month, 6-month, 12-month follow-up), among the remaining 3 groups (treatment group: mandated treatment, voluntary treatment, voluntary control), controlling for sex and baseline Greek status membership. Separate models were run for each alcohol-related treatment outcome variable. Level 1 within groups variables were identical for Aim 1a and Aim 1b. However, two alternative Level 2 models were constructed in Aim 1b. Model A was constructed to establish intervention efficacy overtime regardless of referral condition. In this model, condition was dummy coded to establish the effect of the intervention over time relative to no-treatment (0 = volunteer control, 1 = volunteer BASICS, 1 = mandated BASICS). In addition, this approach helped to eliminate the potential effect of referral group within the control condition, which would have overestimated naturalistic change over time in the dependent variables. Model B was conducted as an alternative model, utilizing additional information of participant referral group. In Model B, treatment condition was dummy coded (0 = volunteer control, 1 = volunteer BASICS, 2 = mandated BASICS) to evaluate whether referral group affected intervention efficacy over-time.

Aim 2. The purpose of Aim 2 is to evaluate Readiness to Change. Moderated regression analyses were developed to evaluate change in RTC over time by condition (Aim 2a). RTC was also evaluated as a treatment moderator (Aim 2b).

Aim 2a. To evaluate the impact of the intervention on RTC scores over time, regression analyses were conducted. In the model, continuous post-test RTC served as the dependent variable. In Step 1, baseline continuous RTC and sex were added. In Step 2, dummy coded treatment condition (0 = control, 1 = treatment) and referral group (0 = mandated, 1 = volunteer) were added. In Step 3, the two-way interaction of treatment condition \times referral group was added. The latter two steps helped ensure that any effect detected in Step 3 cannot be attributed to shared variance with the variables entered into Steps 1 and 2 (Cohen & Cohen, 1983).

Aim 2b. To evaluate the moderating effect of RTC on intervention outcomes, separate moderated regressions were run for each dependent variable. In the models, 4-week post-test values of the alcohol-related treatment outcome variable (i.e., weekly quantity, weekly frequency, typical drinks, peak drinks, or alcohol-related problems) served as dependent variable. In Step 1, baseline scores of the alcohol-related outcome variable (i.e., weekly quantity, weekly frequency, typical drinks, peak drinks, or alcohol-related problems) and sex were added. In Step 2, baseline mean centered RTC continuous score, dummy coded treatment condition (0 = control, 1 = treatment), and referral group (0 = mandated, 1= volunteer) were added. In Step 3, the two-way interactions of interest were added: $RTC \times$ treatment condition and $RTC \times$ referral group. The latter step helped ensure that any effect detected in Step 3 cannot be attributed to shared variance with the variables entered into Steps 1 and 2 (Cohen & Cohen, 1983).

RESULTS

Preliminary Analyses

Analysis of individual alcohol-related treatment outcome variables and variable distributions revealed no significant skew, kurtosis, or outliers (Tabachnick & Fidell, 2001). Preliminary analyses were conducted to evaluate baseline equivalence between groups. Chi-square analyses were conducted with treatment condition (BASICS, control), referral group (mandated, voluntary), or retention status (completer, noncompleter) as factors for categorical variables. Continuous dependent variables were evaluated with separate analyses of variance (ANOVA) with treatment condition, referral group, or retention status as fixed factors. Continuous dependent variables of alcohol consumption were expected to change by gender and were evaluated with separate analyses of covariance (ANCOVA) with treatment condition and referral group as fixed factors with gender as a covariate.

Descriptive variables and primary dependent variables by treatment condition and referral group are presented in Tables 1 and 2. Preliminary analyses revealed no significant differences between treatment conditions on age, sex, ethnicity, year in school, living arrangement, Greek system membership, drinks per week, drinking frequency, typical drinks, peak drinks, or RTC (all p 's > .10). The control condition reported significantly higher baseline alcohol-related problems ($M = 16.49$, $SD = 12.73$) relative to the treatment condition ($M = 12.81$, $SD = 9.13$), controlling for sex $F(4, 220) = 6.21$, $p < .05$. No significant differences were found between referral groups on age, ethnicity, year in school, living arrangement, Greek system membership, drinks per week, drinking frequency, typical drinks, peak drinks, or alcohol-related problems (all p 's > .10). Mandated students were more likely to be male (76.7%) relative to volunteer students (42.9%), $\chi^2(1) = 27.86$, $p < .00$. Sex was added as a covariate in treatment outcome and RTC moderation analyses to account for this difference. Continuous baseline RTC scores only approached significance between referral groups (mandated, $M = -0.96$, $SD = 5.57$; volunteer, $M = -2.38$, $SD = 5.46$; $F(4, 220) = 2.86$, $p < .10$).

Table 1: Baseline demographics characteristics.

Variable	Mandated Students		Volunteer Students		<i>p</i>
	BASICS (<i>n</i> = 58)	Control (<i>n</i> = 56)	BASICS (<i>n</i> = 57)	Control (<i>n</i> = 54)	
Demographics					
Sex, male, %	72.4 ^{a,b}	80.4 ^{c,d}	49.1 ^{a,c}	40.7 ^{b,d}	.00
Race, White, %	93.1	91.1	82.5	88.9	ns
Residence, off-campus, %	70.7	66.1	86.0	70.4	ns
Age, years, mean (SD)	20.12 (1.53)	20.14 (1.69)	20.24 (1.73)	20.00 (1.47)	ns
Fraternity/sorority					
Membership, %	43.1	46.4	29.8	40.7	ns
Class (fresh./soph.), %	48.3	44.6	47.4	46.3	ns
Screening variable					
AUDIT score	11.60 (4.98)	12.59 (5.40)	12.49 (4.44)	12.79 (5.22)	ns
Reason for referral					
Drunk in public					
<i>n</i>	20	13			
%	34.5	23.2			
Underage possession					
<i>n</i>	10	15			
%	17.2	26.8			
DUI					
<i>n</i>	11	10			
%	19.0	17.9			
In the presence of alcohol					
<i>n</i>	5	7			
%	8.6	12.5			
Emergency room					
<i>n</i>	3	4			
%	5.2	7.1			
Assault					
<i>n</i>	3	1			
%	5.2	1.8			
Vandalism					
<i>n</i>	0	1			
%	-	1.8			
Other					
<i>n</i>	6	5			
%	10.3	8.9			

Notes. The “*p*” column indicates which baseline variable showed significant differences between groups. In a given row, values that share the same superscript letter indicate a significant between-groups difference. Fresh./soph. = freshman/sophomore; AUDIT = Alcohol Use Disorder Identification Test; DUI = driving under the influence.

Table 2: Baseline and follow-up drinking variables scores overtime among mandated and volunteer students assigned to BASICS or a control group.

Variable	Mandated Students		Volunteer Students	
	BASICS (n = 58)	Control (n = 56)	BASICS (n = 57)	Control (n = 54)
Drinking variables				
Quantity				
Baseline	18.21 (10.76)	18.07(11.99)	17.13 (8.28)	16.78 (7.83)
4-week	10.53 (7.38)	13.32 (9.04)	9.61 (7.06)	14.44 (7.50)
3-month	10.83 (8.95)	-	8.91 (5.86)	13.49 (6.74)
6-month	11.60 (7.85)	-	8.33 (5.41)	14.42 (6.48)
12-month	10.29 (9.06)	-	8.94 (6.40)	11.94 (4.59)
Frequency				
Baseline	3.24 (1.20)	3.27 (1.51)	3.37 (1.25)	3.57 (1.60)
4-week	2.64 (1.27)	3.00 (1.58)	2.73 (1.15)	3.25 (1.58)
3-month	2.77 (1.35)	-	2.51 (1.21)	2.98 (1.56)
6-month	3.14 (1.53)	-	2.37 (1.06)	3.24 (1.70)
12-month	2.61 (1.41)	-	2.31 (0.89)	2.58 (1.37)
Typical drinks				
Baseline	4.48 (1.94)	5.16 (2.43)	4.77 (2.06)	4.67 (1.83)
4-week	3.27 (1.34)	4.31 (2.43)	3.04 (1.54)	4.29 (1.55)
3-month	3.35 (1.49)	-	2.96 (1.22)	3.60 (1.45)
6-month	3.55 (1.59)	-	2.89 (1.14)	4.07 (1.59)
12-month	3.29 (1.58)	-	3.19 (1.45)	3.41 (1.52)
Peak drinks				
Baseline	6.22 (2.64)	6.18 (2.24)	5.98 (1.82)	5.78 (1.93)
4-week	4.11 (1.69)	5.34 (2.34)	3.82 (1.78)	5.56 (1.75)
3-month	4.17 (1.83)	-	3.69 (1.73)	4.88 (1.62)
6-month	4.53 (1.98)	-	3.50 (1.55)	5.22 (1.77)
12-month	4.06 (1.81)	-	3.78 (1.62)	4.65 (1.74)
Alcohol problems				
Baseline	11.89 (9.08)	16.19 (13.28)	13.74 (9.17)	16.80 (12.25)
4-week	5.09 (4.26)	9.50 (7.95)	5.62 (6.03)	12.19 (10.49)
3-month	6.94 (7.35)	-	7.89 (7.74)	8.77 (7.48)
6-month	7.32 (7.05)	-	8.67 (9.77)	11.16 (8.53)
12-month	6.26 (6.58)	-	6.43 (7.25)	8.50 (6.93)
Readiness to Change				
Baseline	-1.78 (6.31)	-0.64 (6.59)	-1.98 (5.22)	-2.28 (5.75)
4- week	0.07(5.26)	-0.02 (5.36)	-1.46 (5.83)	-0.45 (5.49)

Note. Values represent original mean scores (standard deviations) on measures of alcohol use and alcohol-related problems. RTC = Readiness to Change.

Attrition analyses indicated that participants lost to the 12-month follow-up assessment were significantly more likely to be former/never Greek system members (71% noncompleters), $\chi^2 (2) = 13.80, p < .00$, and mandated students (38% noncompleters; 18% volunteer noncompleters), $\chi^2 (1) = 11.70, p < .00$.

Greek system membership was evaluated as a factor in the primary longitudinal analyses (Aim 1b) and subsequent attrition analyses. Noncompleters reported significantly lower baseline peak drinks ($M = 5.41$, $SD = 1.93$) relative to completers ($M = 6.32$, $SD = 2.22$), $F(3, 221) = 7.02$, $p < .01$, controlling for sex and Greek system membership. No significant differences were found between completers and noncompleters for treatment condition assignment, age, sex, race, ethnicity, year in school, living situation, or baseline measures of weekly quantity, weekly frequency, typical drinks, alcohol problems, or RTC (all p 's $> .10$). Missing data at the 12-month follow-up assessment did not significantly exceed the projected 30% (32% was missing) and as a result, missing outcome data was not imputed for any follow-up assessment period to protect the integrity of the analyses.

Treatment Fidelity

A review of individual treatment sessions was conducted to evaluate therapist adherence to the BASICS protocol. The following core BASICS components were addressed in 100% of the intervention sessions: (a) a review of the participant's alcohol consumption pattern; (b) a discussion of peer drinking norms patterns; (c) estimates of the participant's blood alcohol levels (BALs). The following components were reviewed at a rate of 97 to 100% of sessions: (a) a review of the participant's negative experiences with alcohol (e.g., alcohol blackouts, drinking and driving); (b) a review of the effects and consequences of alcohol tolerance; (c) a discussion of the biphasic effects of alcohol. In terms of participant interest in BASICS, 85% of participants randomized to treatment completed baseline self-report measures and attended the assessment interview. In terms of participant adherence to BASICS, 96% of participants in the treatment condition utilized the alcohol monitoring cards to record consumption between the assessment and feedback interview; 98% of participants who completed the intervention also completed the 4-week follow-up assessment.

Primary Analyses

Aim 1a. Intent to treat analyses were conducted across all participants providing baseline data ($n = 225$). Growth models were constructed to evaluate immediate change in alcohol-related treatment outcome variables (weekly quantity, weekly frequency, typical drinks, peak drinks, and alcohol problems) with time

(baseline, 4-week post-test), treatment condition (BASICS, control), and referral group (mandated, voluntary), controlling for sex and Greek system membership. Growth models were constructed with model comparisons using the full maximum likelihood estimation procedure. One predictor, time, was initially entered as a random effect based on the hypothesis that there would be individual differences over time on alcohol-related treatment outcome variables regardless of treatment condition or referral group. The initial models constructed with time as a random effect failed to converge even with maximum iterations set to 500, thus, final models employed time as a fixed effect (Tabachnick & Fidell, 2007). Greek status was added to the initial models to control for Greek system membership-related participant attrition; however, the variable did not contribute to the model and was removed from the final models for each dependent variable.

Table 3 presents fixed effect estimates and significance tests for the growth models. Results indicate that over time, without receiving any formal intervention, participant's consumed 2.32 fewer drinks per week, decreased peak drinking about 1 drink per occasion, and reported 2.61 fewer alcohol problems from baseline to the 4-week post-test (all p 's < .05). Assignment to treatment significantly predicted further lower values for drinks per week, typical drinks, and peak drinks from baseline to the 4-week follow-up beyond what was observed within the control group (all p 's < .01). Assignment to treatment had a marginally significant effect on post-test alcohol problems (p < .10) and did not significantly predict reductions in drinking frequency. Specifically, treatment assignment was associated with consuming 5.14 fewer drinks per week, 1-2 fewer drinks per typical occasion, 2-3 fewer drinks per peak occasion, and 2.56 fewer alcohol problems at the 4-week post-test. These estimates are above and beyond what was predicted for the control group. Being male was associated with consuming 4.16 more drinks per week, 1 drink more per typical condition, 1-2 drinks more per peak occasion, and reporting 2.56 more alcohol problems than were females. Referral group was not a significant predictor of change over time among any alcohol-use variable nor was the interaction between referral group and treatment condition. Fixed effects estimates further confirm the lack of baseline differences between treatment and control groups among alcohol-consumption related variables and reflect the marginally significant baseline differences between treatment conditions at baseline (i.e., the BASICS intercept did not significantly differ from the control intercept).

Table 3: Fixed effect estimates and significance tests for the Hierarchical Linear Growth models for drinks per week, drinking frequency, typical drinks, peak drinks, and alcohol-related problems.

Variable	Drinks per week β (SE)	Drinking frequency β (SE)	Typical drinks β (SE)	Peak drinks β (SE)	Alcohol problems β (SE)
<i>Estimates of intervention effects at the 4-week post-test assessment (n = 225)</i>					
Intercepts	19.53 (1.77)**	3.58 (0.30)**	4.86 (0.36)**	6.45 (0.39)**	14.55 (1.94)**
Gender (0 = Male, 1 = Female)	-4.16 (1.14)**	-0.22 (0.19)	-0.58 (0.23)**	-1.11 (0.25)**	-2.61 (1.25)*
Control slope	-2.32 (1.09)*	-0.33 (0.19) [†]	-0.39 (0.28)	-0.32 (0.08)**	-4.72 (1.21)**
BASICS intercept	-0.09 (1.50)	-0.25 (0.25)	0.08 (0.31)	0.10 (0.35)	-3.11 (1.64) [†]
Referral group intercept (0 = mandated, 1 = volunteer)	-0.28 (1.35)	0.13 (0.23)	0.15 (0.27)	-0.01 (0.29)	0.70 (1.48)
Intervention slope	-5.14 (1.32)**	-0.27 (0.22)	-1.08 (0.34)**	-1.94 (0.38)**	-2.56 (1.47) [†]
<i>Estimates of long-term intervention effects through the 12-month follow-up assessment (n = 169)</i>					
Intercepts	17.44 (1.24)**	3.59 (0.24)**	4.86 (0.26)**	6.34 (0.30)**	12.91(1.39)**
Gender (0 = Male, 1 = Female)	-3.17 (0.90)**	-0.37 (0.18)*	-0.55 (0.19)**	-0.82 (0.22)**	-0.84 (0.91)
Control slope	-0.86 (0.37)*	-0.13 (0.65)*	-0.27 (0.07)**	-0.32 (0.08)**	-0.88 (0.43)*
Intervention intercepts					
Model A					
BASICS	-6.11 (1.30)**	-0.70 (0.26)**	-1.51 (0.28)**	-2.05 (0.33)**	-6.92 (1.55)**
Model B					
BASICS, volunteer	-6.39 (1.44)**	-0.75 (0.28)**	-1.59 (0.30)**	-2.16 (0.35)**	-6.30 (1.62)**
BASICS, mandated	-7.03 (1.09)**	-0.86 (0.22)**	-1.75 (0.23)**	-2.40 (0.26)**	-4.87 (1.10)*
Intervention slope	0.76 (0.44) [†]	0.09 (0.08)	0.27 (0.08)**	0.29 (0.22)**	1.35 (0.52)**

Note. ** $p < .01$. * $p < .05$. [†] $p < .10$. BASICS = *Brief Alcohol Screening and Intervention for College Students* (Dimeff et al., 1999). Model A refers to the model in which both treatment conditions were combined and entered as a single treatment condition. Model B refers to the model in which the mandated BASICS and volunteer BASICS treatment groups were entered as separate factors.

Estimated model fit indices are presented in Table 4. Fit comparisons (i.e., $\Delta -2 \log L$ estimates) between the full Level 2 models and the intercepts only models showed that the addition of the between-groups effect significantly predicted changes in the dependent variables over time better than did intercepts only or time alone. Specifically, Level 2 models significantly contributed to better estimates of weekly drinking (i.e., $2381.407 - 2254.106 = 127.301$, $\Delta df = 6$; which exceeds the critical χ^2 value for 6 df , $p < .05$), typical drinks ($1348.282 - 1283.849 = 64.433$, $\Delta df = 6$, $p < .01$), peak drinks ($1453.355 - 1352.239 =$

101.116, $\Delta df = 6, p < .01$), and alcohol-problems (2449.718 - 2317.709 = 132.009, $\Delta df = 6, p < .01$), were better estimated by the addition of Level 2 predictors than was time alone. Weekly drinking frequency was not better predicted by the addition of Level 2 predictors as no significant treatment effect was found.

Table 4: Estimated model fit indices.

Model	Weekly <u>Drinks</u> -2 log <i>L</i>	Weekly <u>frequency</u> -2 log <i>L</i>	Typical <u>drinks</u> -2 log <i>L</i>	Peak <u>drinks</u> -2 log <i>L</i>	Alcohol <u>problems</u> -2 log <i>L</i>
<i>Estimates of intervention effects at the 4-week post-test assessment (n = 225)</i>					
Intercepts (df = 1)	2381.407	1154.719	1348.282	1453.355	2449.718
Level 1 (df = 5)	2237.633	1091.532	1292.959	1375.493	2326.200
Level 2 (df = 7)	2254.106	1092.079	1283.849	1352.239	2317.709
<i>Estimates of long-term intervention effects through the 12-month follow-up assessment (n = 169)</i>					
Intercepts (df = 1)	3773.157	1922.159	2020.934	2243.973	3804.644
Level 1 (df = 4)	3566.468	1739.096	1817.723	2026.970	3707.306
Level 2					
Model A (df = 6)	3549.890	1738.625	1803.861	2010.158	3697.860
Model B (df = 7)	3547.544	1739.550	1804.480	2010.123	3694.139

Note. Model A refers to the model in which both treatment conditions were combined and entered as a single treatment condition. Model B refers to the model in which the mandated BASICS and volunteer BASICS treatment groups were entered as separate factors.

Aim 1b. Growth models were conducted to evaluate the sustained long-term impact of BASICS among the remaining three groups ($n = 169$; mandated BASICS, volunteer BASICS, and volunteer control) as the mandated WLC group was lost following the 4-week post-test. Level 1 predictors included intercepts of time (4-week, 3-month, 6-month, 12-month), sex (0 = male, 1 = female), and aggregate treatment condition (0 = control, 1 = treatment). Treatment was initially evaluated on an aggregate level to determine whether receiving treatment (independent of referral group) contributed to additional significant change over time in the dependent variables beyond naturalistic change over time (i.e., volunteer control group). Models predicted significant additional decreases in weekly drinks, drinking frequency, typical drinks, peak drinks, and alcohol-related problems over-time within the control group (all p 's < .05; see Table 3). Further, being

male significantly predicted heavier weekly drinking (i.e., being male was associated with consuming 3.17 more drinks per week, 1-2 more drinks per typical and peak occasions), and more frequent drinking (i.e., ½ an occasion more per week), but did not predict significantly higher alcohol-related problems.

In terms of evaluating the sustained impact of treatment over time between groups, two alternative Level 2 models were constructed to evaluate treatment by time interactions. Model A was constructed to determine if receiving treatment significantly predicted additional changes in the dependent variables better than did time alone (i.e., Level 1). Model B was constructed to further evaluate the impact of referral group on treatment outcomes over time. Model B determined whether being mandated to BASICS differentially predicted sustained treatment outcomes over time relative to the volunteer BASICS group.

Model A. Evaluation of the control slope presented in Table 3 suggests students decrease drinking by nearly one drink per assessment period (i.e., 0.86 drinks), 0.13 fewer drinking occasions per week, 0.27 fewer typical drinks, 0.32 fewer peak drinks, and 0.88 fewer alcohol problems per assessment period. Thus, among the 4 posttreatment assessment periods, three different contrasts are made to calculate change in the variable from the 4-week post-test to the 12-month follow-up assessment (i.e., $-0.86 \text{ drinks per week} \times 3 = -2.58$ additional fewer drinks over time). Comparison of the treatment slope to the control slope for each dependent variable provides information regarding the treatment \times time interaction within the treatment condition. Predicted change over time between intervention and control group can thus be estimated by adding the estimated intervention slope to the estimated control slope. Models indicated a sustained treatment \times time interaction, such that over time, treatment assignment produced significant change over time in typical drink consumption (0.27), peak drink consumption (0.29), and alcohol-related problems (1.35) over the 12-month assessment period (all p 's $< .05$). The treatment \times time interaction only approached significance for weekly drinking ($p < .10$). Specifically, the treatment group was predicted to consume 1-2 fewer drinks on typical drinking occasions, 3-4 drinks on peak drinking occasions, report 6.92 fewer alcohol-related problems, drink on 1 occasion less per week, and consume 6.11 fewer drinks per week, and relative to the control group. The treatment condition was expected to maintain significantly different slopes from the control group through the 12-month follow-up. For measures of typical and peak alcohol

consumption, the slope for treatment approached zero, which suggests that treatment gains were maintained over time. Further, the treatment slopes for weekly drinking continued to be marginally negative over time for weekly drinking (i.e., $-0.86 + 0.76 = -0.10$). Treatment participants continued to make significant reductions in their drinking from 4-week through 12-month follow-up assessment.

Fit analyses indicated that Model A Level 2 predictors described changes to the dependent variables over time significantly better than did time alone for the following variables: weekly drinking ($\Delta -2 \log L = 223.267$; $\Delta df = 5, p < .01$), drinking frequency ($\Delta -2 \log L = 183.534$; $\Delta df = 5, p < .01$), typical drinks ($\Delta -2 \log L = 217.073$; $\Delta df = 5, p < .01$), peak drinks ($\Delta -2 \log L = 233.815$; $\Delta df = 5, p < .01$), and alcohol-problems ($\Delta -2 \log L = 106.784$; $\Delta df = 5, p < .01$).

Model B. An alternative Level 2 predictor model was constructed to evaluate the effect of treatment over time on the dependent variables while taking into account the effect participant referral group. The purpose of Model B was to further evaluate Level 2 effects of treatment and treatment \times time interactions by referral group (i.e., mandated BASICS v. volunteer BASICS). In Model B, both treatment groups were modeled against the volunteer control group. The fit of Model B was evaluated against the fit of Model A. Fit comparisons between models were conducted to determine if the addition of referral group to the model explained any additional variance treatment outcomes over time.

Results indicate that across all alcohol-use treatment outcome variables, referral group and the interaction of referral group \times condition did not significantly contribute to the model. Specifically, the change in intercept from volunteer BASICS to mandated BASICS was not significantly different for total drinks, drinking frequency, typical drinks, peak drinks, or alcohol-problems (see Table 3). Volunteer BASICS students reported consuming 6.39 fewer drinks per week, 1-2 fewer drinks per typical occasion, 2-3 fewer drinks per peak occasion, reducing drinking frequency by approximately one occasion per week, and reporting 6.30 fewer alcohol-related problems. Mandated BASICS students followed a similar pattern of consuming 7.03 fewer drinks per week, 1-2 fewer drinks per typical occasion, 2-3 fewer drinks per peak occasion, reducing drinking frequency by approximately one occasion per week, and reporting 4.87 fewer alcohol-related problems per month. Fit evaluation of Model B relative to Model A indicated that the

addition of referral group to Model B marginally improved prediction of alcohol problems only ($\Delta -2 \log L = 3.721$, $\Delta df = 1$, $p < .10$). Referral group did not significantly contribute to model fit for weekly drinks, drinking frequency, typical drinks, or peak drinks (all p 's $< .10$; see Table 4).

Readiness to Change as a Treatment Moderator

Aim 1a. Regression analyses supported the hypothesis that treatment condition would not significantly predict change over time in RTC, when controlling baseline RTC scores, $\beta = -0.085$, $t = -1.351$, $p = ns$. No significant main effect of referral group was observed on post-test RTC scores, $\beta = -0.022$, $t = -0.331$, $p = ns$. The interaction of treatment condition and referral group was also not significant on post-test measures of RTC, $\beta = -0.049$, $t = -0.452$, $p = ns$.

Aim 2b. To determine if baseline RTC predicted enhanced BASICS treatment outcomes, bivariate relationships were examined prior to conducting the primary regression analyses. Significant bivariate relationships were found between baseline RTC and baseline weekly drinks ($r = -.17$, $p < .01$) and baseline typical drinks ($r = -.16$, $p < .05$), such that higher baseline alcohol consumption was associated with lower RTC. A marginally significant bivariate relationship was found between baseline RTC and baseline alcohol-related problems ($r = .13$, $p < .10$), indicating that students higher in RTC also reported slightly more alcohol-related problems. No significant relationships were found for baseline RTC and baseline weekly frequency ($r = .01$, $p = ns$) or baseline RTC and baseline peak drinks ($r = -.10$, $p = ns$).

Bivariate correlations were also conducted to evaluate the relation between 4-week follow-up RTC and 4-week follow-up alcohol variables using the full sample. Higher follow-up RTC was significantly related to lower follow-up weekly quantity ($r = -.25$, $p = .00$), lower follow-up typical drinks ($r = -.27$, $p = .00$), lower follow-up drinking frequency ($r = -.20$, $p = .01$), lower follow-up peak drinks ($r = -.31$, $p = .00$), but not related to follow-up alcohol-problems ($r = .05$, $p = .50$).

Moderation analyses were conducted to evaluate the effect of baseline RTC on BASICS alcohol-related treatment outcome variables. Results indicate that baseline RTC did not have a significant main effect on post-test alcohol-related problems ($\beta = -.017$, $t = -.269$, $p = ns$); although, a significant interaction between baseline RTC and referral group was found ($\beta = .190$, $t = 2.685$, $p < .01$). The interaction was

further evaluated using a reduced model that included only the original main effects (Step 2) and the interaction of interest (Step 3), $F_{\text{change}}(6, 208) = 9.723, p < .01$. Follow-up tests of simple slopes (Holmbeck, 2002) indicated that the simple slopes for each referral group were not significantly different from zero (mandated, $\beta = .117, t = 1.507, p = \text{ns}$; volunteer, $\beta = .125, t = 1.463, p = \text{ns}$).

Moderation analyses revealed no significant main effect of baseline RTC on post-test weekly drinking ($\beta = -.089, t = -1.542, p = \text{ns}$), no significant interaction of RTC \times condition ($\beta = .020, t = -0.273, p = \text{ns}$), participant \times RTC ($\beta = .116, t = 1.619, p = \text{ns}$). Moderation analyses of measures of post-test weekly frequency also revealed no significant main effect for baseline RTC ($\beta = -.074, t = -1.23, p = \text{ns}$), no significant RTC \times condition interaction ($\beta = -.046, t = -0.597, p = \text{ns}$), or participant \times RTC interaction ($\beta = .149, t = 1.983, p = \text{ns}$). Similarly, no significant main effect was observed for baseline RTC on measures of post-test peak drinks ($\beta = -.069, t = -1.148, p = \text{ns}$), no significant interaction of RTC \times condition ($\beta = .011, t = 0.143, p = \text{ns}$), participant \times RTC ($\beta = .093, t = 1.236, p = \text{ns}$). Lastly, moderation analyses of measures of post-test typical drink consumption revealed no significant main effect for baseline RTC ($\beta = -.091, t = -1.50, p = \text{ns}$), no significant RTC \times condition interaction ($\beta = .131, t = 1.704, p = .090$), or participant \times RTC interaction ($\beta = .025, t = .335, p = \text{ns}$).

In lieu of the above findings, exploratory analyses were conducted to evaluate the role of change in RTC as a treatment moderator. In these moderated regression analyses, the follow-up alcohol outcome served as the dependent variable. In Step 1, baseline alcohol outcome variable, sex, referral group, and baseline RTC were added. In Step 2, dummy coded treatment condition and mean centered follow-up RTC score were added. In Step 3, the interaction between treatment condition and follow-up RTC score was added. Similar to the previous moderation regression results, the interaction between treatment condition and change in RTC also did not significantly predict follow-up typical alcohol use ($\beta = -.01, t = -.13, p = .88$), peak alcohol use ($\beta = .11, t = 1.32, p = .19$), weekly drinks ($\beta = .04, t = .54, p = .59$), drinking frequency ($\beta = -.08, t = -.94, p = .35$), or alcohol-related problems ($\beta = .04, t = .42, p = .67$).

DISCUSSION

This study examined the short-term impact and long-term sustained efficacy of BASICS among mandated students relative to equally heavy drinking volunteer students. The study was unique in that it included heavy drinking mandated and volunteer control groups, allowing for the examination of true treatment effects over time in comparison to naturalistic behavior change. Results of the present study are encouraging as the intervention produced immediate reductions in alcohol-use behaviors of weekly drinking, typical alcohol consumption, peak alcohol consumption, and marginal reductions in alcohol-related problems. More importantly, referral group status did not significantly contribute to or detract from the models, implying that mandated students responded to the intervention similar to their heavy drinking volunteer counterparts.

The longitudinal component of the study showed that the reductions in typical drinks and peak drinks were sustained at the 12-month follow-up for both mandated and volunteer BASICS groups. Furthermore, there was a trend for treatment participants to continue to reduce their drinking over the 12-month assessment period. It should be noted that, over time, the volunteer control group reduced drinking quantity, frequency, typical drinks, peak drinks, and alcohol-problems. Thus, in the absence of receiving a formal intervention, it appears that overtime, students decrease drinking behavior which is consistent with the established literature. Thus, on an aggregate level, BASICS appears to be effective at accelerating these naturalistic decreases in heavy drinking and alcohol-related problems among volunteer and mandated college students. This finding is important as it shows that mandated BASICS appears to offer some degree of short-term protection from the risks of heavy drinking and alcohol-related problems among at-risk college students during their formal college years. This finding contributes to the literature regarding long-term BMI trials among mandated students. The present findings conflict with Barnett and colleagues (2007) findings that mandated students increased drinking and heavy drinking 12-months post-intervention. However, our findings agree with Carey et al. (2007) that the BMI's effect at reducing most alcohol-related treatment outcome variables are sustained through the 12-month follow-up. Additional follow-up research regarding the duration of the effect is still warranted for mandated student drinkers.

With respect to RTC, although it was hypothesized that the intervention would not directly contribute to gains in RTC, it was hypothesized that RTC would facilitate the efficacy of the intervention. Specifically, students with high baseline RTC would report stronger treatment gains. Indeed, in the present sample, BASICS was not associated with direct gains in RTC among a combination sample of mandated and volunteer students. This finding was consistent with study hypothesis and other findings (Fromme & Corbin, 2004). Although mandated students reported marginally higher RTC at baseline than did volunteers, higher RTC did not lead to significantly larger reductions in alcohol use or alcohol-problems over time within the mandated group. Nor did gains in RTC appear to significantly moderate the impact of the intervention on reducing weekly drinking, drinking frequency, peak drinks, typical drinks, or alcohol-problems in general. However, using the same RTC measure, Carey et al. (2007) reported that mandated students higher in motivation respond better to a BMI. Of note, the research sample in Carey et al. (2006, 2007) was majority female. Female mandated college students have been found to have higher motivation for behavior change post-disciplinary sanction relative to males (Carey & DeMartini, 2010). The present sample was primarily male, especially within the mandated sample, which may have affected the role of RTC within the treatment samples. Although the present moderation analyses were conducted controlling for gender differences in RTC, future research should be sensitive to gender as an important variable in treatment outcome analyses utilizing RTC as a treatment moderator.

The present study's findings must be considered in light of its limitations. First, the data collected was largely based on self-report, which is subject to error. To help improve self-report validity, the addition of collateral respondents or other external sources to verify the accuracy of self-report measures was considered. However, some research indicates that self-report is more accurate than collateral data (Borsari & Carey, 2005; Marlatt et al., 1998; Smith et al., 1995; Chermak et al., 1998). Borsari and Carey (2005) utilized collateral reports of alcohol use with mandated students and found a moderate correlation (r s ranged from .43 to .57) and most self-reports contained higher estimates than did collateral reports. These researchers found no significant differences between self-report and collateral reports that would indicate that mandated students systematically misinform researchers about their alcohol use. A further advantage to

self-report is improved cost-effectiveness as the expense of collateral data does not appear to be off-set by corresponding benefits (Babor et al., 2000; LaForge et al., 2005). Lastly, non-self-report measures of alcohol use are not available or useful for assessing college drinking behavior (e.g., biomarkers).

Another concern with the validity of self-reported alcohol use by college students, especially among students who are mandated to alcohol interventions, could have been concerns about confidentiality. Because confidentiality enhances the reliability and validity of self-report data (Babor et al., 1987; Darke, 1998), participants were reminded that all data are confidential. In addition to the discussion of protections for confidentiality referred to above, we acquired a Certificate of Confidentiality from the National Institute on Alcohol Abuse and Alcoholism as further protection of participant confidentiality.

Participant attrition poses a significant problem to longitudinal research. The analyses presented herein were conducted in order to minimize the impact of attrition on study results. Intent to treat analyses were conducted to ensure that all students that provided baseline data were included in the analyses so as not to introduce survivor bias. Secondly, analyses were conducted to evaluate baseline differences between responders and non-responders to ensure that those most likely to benefit from treatment (i.e., heavy drinkers) did not withdraw from research participation. Analyses of completers relative to noncompleters indicated that students who were lighter drinkers, mandated students, and former/never Greek system members were more likely to withdraw from participation. Thus, the intervention appeared to appeal to the target population of heavy drinkers, although the attrition of more mandated students relative to volunteer students could have influenced results. This latter finding warrants further investigation in the literature. Further, future analyses may be warranted to impute all missing data using last observation carried forward (LOCF) to avoid survivor bias. In sum, the results of the current study might not generalize to less heavy drinking mandated students, all mandated students, or lighter drinking students in general. Additional research regarding research for mandated student attrition in longitudinal trials might inform future prevention efforts within this high-risk population.

An additional limitation of this study could be that the study interventionist was not blind to treatment assignment or study hypotheses. Studies using one primary interventionist run the risk of

unintentionally biasing treatment delivery. All students met with a student interventionist for the assessment interview. The current design would be strengthened if the interventionists were blind to treatment condition and study hypotheses. Although, previous studies have found no differences between peer- and professionally-lead interventions in terms of outcomes, independent raters found professionally-lead programs of higher-quality and greater treatment adherence (Fromme & Corbin, 2004). Furthermore, no significant differences were detected in intervention content between treatment groups.

In conclusion, study findings suggest that BASICS-style BMIs appear to be as effective for reducing risky alcohol use among heavy drinking mandated and volunteer students in a similar fashion. This is the first documented study to utilize a heavy drinking volunteer group as a treatment comparison group to help reduce the risk of misinterpreting naturalistic or disciplinary event-related reductions in drinking behavior as treatment effects among mandated students. The present study contributes to the research literature of identifying effective intervention programs that could potentially be utilized within a standardized disciplinary process for handling alcohol policy violators on university campuses. Additional research evaluating the feasibility and effectiveness of BASICS style programs operated by the campus judicial system will be the next step in this line of research.

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APPENDIX A
CONSENT FORM

Consent for Initial Assessment, Feedback Interview, Post-Test, and Follow-Ups

- Study Title: Differences in mandated and never-mandated college students' drinking behavior.
- Performance Sites: This study will be conducted at the Louisiana State University Psychological Services Center (PSC), 33 Johnston Hall.
- Contacts: The Principal Investigator, Amy L. Copeland, Ph.D., can be reached at 225-578-4117, Monday-Friday between 9:00 a.m. and 5:00 p.m. Additional research staff can be contacted at 225-578-1494, M-Th between 8:00 a.m. and 8:00 p.m. and Friday between 8:00 a.m. and 4:30 p.m.
- Purpose of the Study: The proposed study is designed to contribute to the existing literature on alcohol use in college students. We are evaluating self-report measures of alcohol use, negative consequences, and readiness to change in mandated and never-mandated heavy college study drinkers before and after a brief alcohol intervention.

Subjects

Inclusion Criteria

In order to participate in the study, participants must be referred to college or community officials for violating the campus alcohol policy or volunteer for participation from a research study pool at the Department of Psychology or campus recruitment and a) report drinking at least monthly and consume at least 5-6 drinks on one drinking occasion in the past month; or b) endorse three alcohol-related problems on 3 to 5 occasions in the past 3 years; c) can provide a voluntary informed consent; d) age 18-24.

Exclusion Criteria

Students who do not meet above criteria will be excluded from participation. In addition, students who have had multiple disciplinary referrals related to alcohol or drug use, request more intensive treatment for drug or alcohol problems, report a history of severe and persistent alcohol or drug related symptoms including physiological dependence, and primarily use other substances will not included in the sample and will be referred to appropriate treatment as necessary.

Number: The maximum number of subjects enrolled in this study will be 465.

Study Procedures

The study requires that you attend two 50 minute appointments. Both appointments will take place at LSU's Psychological Services Center (PSC), 33 Johnston Hall. The first appointment will be the intake interview. During the intake interview you will meet with a clinician who will ask you questions about your family, social, educational, and drug/alcohol use history. You will also complete a series of self-report assessments about your alcohol and drug use. The second appointment will be a feedback interview during which you and a clinician will review and discuss the self-report measures collected in the previous appointment. The feedback interview will take approximately 50 minutes. Four weeks after completing the feedback interview, you will be asked to complete a brief series of self-report measures on your alcohol use.

If you agree to participate in this study, the following will occur:

- 1) You will be randomly (by chance) assigned to receive the intervention within 10 days (immediate intervention group) or after about 4 weeks (wait-list control group).
- 2) First appointment: You will be asked to come to the PSC for the assessment interview where you will meet with a clinician for approximately 50 minutes. The clinician will ask you questions including your personal and family history of drug and alcohol use. You will be asked to complete self-report measures that assess your perceptions of alcohol use among your peers and alcohol expectancies (beliefs about alcohol's effects).
- 3) If you were assigned to the immediate intervention group, you will be asked to come back to the PSC within 10 days to complete the feedback interview. If you were assigned to the wait-list control group, you will be asked to return to the PSC in approximately 4 weeks to complete the feedback interview and some additional self-assessment measures.
- 4) Second appointment: During the second appointment you will be asked to return to the PSC to meet with a clinician for approximately 50 minutes. During the session, you will receive feedback on the self-assessment measures you completed during the first appointment. You and the clinician may discuss topics such as your alcohol consumption, the risks and benefits associated with drinking, your perception of alcohol consumption among your peers, as well as strategies to help reduce risky drinking behavior.
- 5) Post-test: You will be asked to return to the clinic approximately 4 weeks after the second appointment to complete a brief series of post-test measures (10-15 min).
- 6) Follow-up: All experimental groups will be asked to return to the clinic at the following time periods: 3 months, 6 months, 12 months, and 24 months to complete a brief series of self-report measures (10-15 min).
- 7) Due to the length of the study and to ensure that we will be able to reach you, we will ask you to fill out a locator form with 5 different and reliable ways to contact you.

Benefits: You will be contributing to our knowledge regarding alcohol substance use that may help other alcohol and substance users in the future. In most cases, your study participation will fulfill your disciplinary requirements.

Risks/Discomforts: Possible loss of confidentiality. You might feel uncomfortable disclosing and discussing personal information.

Measures taken to reduce risk: Study participation is voluntary. All personal information obtained in this study will be kept confidential unless release is legally compelled (i.e., a court ordered subpoena). To help keep information about you confidential, we have applied for a Confidentiality Certificate from the Department of Health and Human Services (DHHS). The Confidentiality Certificate will protect the investigators from being forced, in cases such as a court order or subpoena, to tell anyone that is not connected with this study about your participation in this study.

Information collected in this study will not be connected in any way to your academic, judicial, or disciplinary record. Referring sources and their staff (e.g.,

Office of Judicial Affairs, Office of Residence Life, etc) will not have access to identifiable data collected in this study. Data collected in this study will not be used to influence or determine the disciplinary or judicial actions regarding your case.

Once all data have been collected, participant names and phone numbers will be destroyed. During the study, participants will be assigned a random number, and this number will be the only link between their name, phone number, and data. All completed forms/data will be kept in a locked filing cabinet in the Archives Room at the PSC which is kept locked at all times and is accessible only to the PI (also director of the PSC, PSC staff/therapists). In addition, the data collectors will be trained in confidentiality.

Right to Refuse: Participation in this study is voluntary, and you may withdraw from the study at any time without jeopardizing your academic standing at the LSU. If you have violated LSU's alcohol policy and have been referred to a college or community official for disciplinary action, withdrawing from the study will not adversely affect your referral status. We cannot guarantee that your disciplinary requirements will be fulfilled by your participation in the study.

Privacy: Results of this study may be published, but no names or identifying information will be included in the publication. All personal information obtained in this study will be kept confidential unless release is legally compelled. Once all data have been collected, your name and telephone number will be destroyed. During the study, you will be assigned a random number, and this number will be the only link between your name, phone number, and your responses. Your forms will be kept in a locked filing cabinet in a locked office. Only research staff members will have access to data files or other research related information. The information collected in this research study will not be linked to your academic or judicial records at LSU.

Financial Information: Participants will not be compensated for the assessment interview, feedback interview, or post-test. However, participants will receive compensation via a lottery-style cash and prize drawing for completing follow-up measures. Drawings will be held at 3-, 6-, 12-, and 24-months. In addition, participants who complete all four follow-up measures will be entered into a grand prize drawing.

Withdrawal: Participants may withdraw from the study at any time without adversely affecting their relationship with LSU and the research staff.

Removal: Aside from obvious disruption, harm, or threat of harm to other study participants or members of the research team, participants will not be dropped from the study.

Alternatives: If you do not wish to participate in the present study, we will provide a list of referrals of alternative treatment programs on campus and in the community, but we cannot attest to their efficacy.

Unforeseeable Risks: As with any study, confidentiality is a concern, however, confidentiality risk is unlikely given the steps we have taken to ensure that participant identifying information is kept confidential.

Certificate of Confidentiality: The researchers in this study have applied for a Certificate of Confidentiality from the Department of Health and Human Services (DHHS). This certificate will cover all of the data collected in this study. The certificate protects the identities of research participants from any person not connected with the research itself. This

protection includes “any civil, criminal, administrative, legislative, or other proceedings whether Federal, State, or local” (quoted from the certificate). The only exception to the confidentiality of the information you provide concerns the sexual of physical abuse of a child or elder, or threatened harm to yourself or others. If the information on current child/elder abuse is given to the researchers, or if there are threats to harm yourself or others, the researchers are required to report this to the authorities. The obligation to report includes alleged or probable abuse as well as known abuse. Except for these requirements, the Certificate of Confidentiality means that the information provided by you cannot be used in any criminal or legal proceedings.”

Study-associated injury or illness:

If you are experiencing medical problems that appear to be more serious than typical, acute alcohol withdrawal, you will be instructed to seek the advice of your physician.

Study-related illness or injury:

Participants are instructed to seek necessary medical care from their physician and contact the Principal Investigator, Dr. Amy Copeland (578-4117) in the event of a study-related illness or injury.

New Findings:

Any significant new findings developed from the study data or independent sources during the course of research which may influence your willingness to continue in the study will be explained to you.

Signatures:

“The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225)578-8692. I agree to participate in the study described above and acknowledge the researchers’ obligation to provide me with a copy of this consent form if signed by me.”

Participant Signature

Date

Witness Signature

Date

APPENDIX B

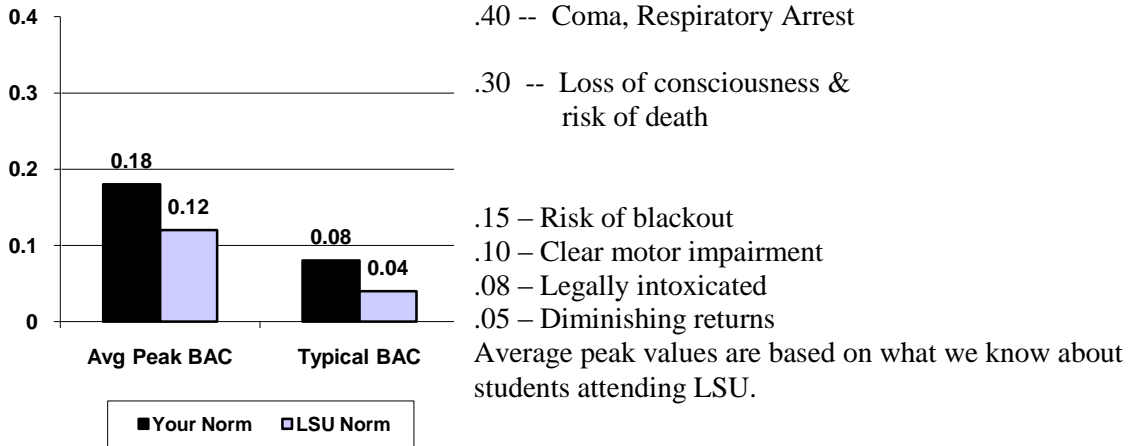
PERSONALIZED FEEDBACK

Jane Doe's Drinking Profile: According to the information you gave us, the number of occasions you drank (frequency) was: 3-4 times a month. On the weekends, you drank an average of 7-8 drinks per occasion.

Level of Intoxication: Blood Alcohol Concentration (BAC) is an indicator of the extent to which alcohol is affecting your body and behavior. BAC is like a thermometer- the higher it is, the greater the intoxication. How high your BAC gets depends on your weight, the strength and number of drinks you have, and how quickly you drink.

Factors that may <u>increase</u> BAC:
Drinking on an empty stomach
Using alcohol with other drugs
Emotional states / menstrual cycle phase
Fatigue, dehydration, illness

Factors that do <u>not</u> affect BAC:
Coffee and other stimulants
Exercise
A cold shower
Fruit juices, special concoctions, or supplements



Estimated highest BAC during a typical week: 0.08 %
 Estimated highest BAC during your heaviest drinking episode: 0.18 %

Drinking Norms: This is what you told us you believed to be the average frequency and quantity of alcohol consumed by students your age, as well as the actual drinking norms for LSU students. You said that a typical university student drinks once or twice a week and consumes five to six drinks per drinking occasion. Most students think other students drink more than they actually do. Most college students drink 2 or fewer drinks when they drink.

Based on the information we collected, it looks like you drink about 20 drinks per week, which makes your percentile ranking about 91. This means that you drink as much or more than 91 percent of college students nationwide.

Beliefs About the Effects of Alcohol: You listed the following alcohol effects as “good” and “likely to occur” when you consume alcohol:

- I would be outgoing
- I would be humorous
- It would be easier to express my feelings
- I would be friendly
- I would feel unafraid
- My body would be relaxed
- I would feel calm
- It would be easier to talk to people

Does Alcohol really do these things? Research suggests many of the social effects of alcohol and based on myths, placebo effects, and expectations we bring to the drinking situations.

Alcohol-Related Problems: You indicated the following alcohol-related consequences had occurred in the prior year

- Felt that you needed more alcohol than you used to use in order to get the same effect
- Missed a day (or part of a day) of school or work

You can minimize the effects of alcohol by choosing to drink less or not at all.

Alcohol-Financial Costs: Based upon your typical quantity and frequency of alcohol use, you are typically spending the following, depending on your choice of alcohol:

Domestic Beer (cans): \$600.00 per semester

Mixed Drinks: \$1,200.00 per semester

Weight: You indicated that in a typical weekend night you are getting the following amount of calories from alcohol:

840 calories

It would require 168 minutes of brisk walking, or 91 minutes on the Stairmaster, or by running roughly 7.7 miles to expend this number of calories consumed during each typical drinking occasion.

Alcohol and Sexual Behavior: You indicated that you have had the following alcohol-related sexual experiences:

- I would enjoy sex more
- When I drink enough alcohol to feel the effects, I have sex with people that I wouldn't have sex with when I was sober.
- When I drink enough alcohol to feel the effects, I am more likely to do something sexually that is risky.

Alcohol doesn't improve sexual enjoyment or performance. You can reduce your risks of unwanted sexual experiences by being selective about if and how much to drink, especially on first dates or at larger parties. Use the buddy system to watch out for friends. Keep an eye on your drinks.

Alcohol Dependence: You acknowledged the following experiences, which are associated with a pattern of dependency:

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

Based upon the data provided, we estimate your level of alcohol tolerance to be:

MODERATE

Tolerance means needing more alcohol to get the same effect as you used to get at lower levels. Tolerance reduces pleasurable effects of alcohol and makes drinking more expensive. It can also be a sign that you are becoming dependent on alcohol.

Family History: We consider your risk based on family history to be:

HIGH

Most people have heard that having a family history of alcohol problems increases your risk of alcohol problems yourself. While this is true, it's also true that being aware of your drinking and making lower-risk decisions about drinking now can lessen your risk of developing an alcohol problem in the future.

Perceived Risk: Your concern about your current drinking habits appears to be:

LOW

Protective Factors: These are some things you are doing to avoid negative consequences from drinking:

- Avoid trying to "keep up" or out-drink others
- Use a designated driver
- Know where you drink has been at all times

These are some other strategies you might use to reduce negative effects of drinking:

Switch between alcohol and non-alcoholic look-alike beverages.

Determine, in advance, not to exceed a set number of drinks.

Choose not to drink alcohol. Eat before and/or during drinking.

APPENDIX C

BLOOD ALCOHOL CONTENT (BAC) CARD

BAC for 150-pound male

Number of Drinks	0 hr	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr
1	.025	.009	0	0	0	0	0
2	.050	.034	.018	.002	0	0	0
3	.075	.059	.043	.027	.011	0	0
4	.100	.084	.068	.052	.036	.020	.004
5	.125	.109	.093	.077	.061	.045	.029
6	.150	.134	.118	.102	.086	.070	.054
7	.175	.159	.143	.127	.111	.095	.079
8	.200	.184	.168	.152	.136	.120	.104
9	.225	.209	.193	.177	.161	.145	.129
10	.250	.234	.218	.202	.186	.170	.154

APPENDIX D

ALCOHOL USE DISORDER IDENTIFICATION TEST

INSTRUCTIONS: Please circle the answer that is correct for you.

1. How often do you have a drink containing alcohol?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

2. How many drinks containing alcohol do you have on a typical day when you are drinking?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

3. How often do you have six drinks or more on one occasion?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

4. How often during the last year have you found that you were not able to stop drinking once you have started?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you because of drinking?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

0	1	2	3	4
Never	Less than monthly	Monthly	Weekly	Daily or almost daily

9. Have you or someone else been injured as a result of drinking?

0	1	2
No	Yes, but not in the last year	Yes, during the last year

10. Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?

0	1	2
No	Yes, but not in the last year	Yes, during the last year

APPENDIX E

ALCOHOL DEPENDENCE SCALE

Instructions: Carefully read each question and the possible answers provided. Answer each question by checking the one choice that is most true for you. The word “drinking” in a question refers to “drinking alcoholic beverages.” These questions refer to the past 12 months. Please answer all questions.

1. How much did you drink the last time you drank?
0 _____ Enough to get high or less
1 _____ Enough to get drunk
2 _____ Enough to pass out
2. Do you often have hangovers on Sunday or Monday mornings?
0 _____ No
1 _____ Yes
3. Have you have the “shakes” when sobering up? (hands tremble, shakes inside)
0 _____ No
1 _____ Sometimes
2 _____ Almost every time I drink
4. Do you get physically sick (e.g., vomit, stomach cramps) as a result of drinking?
0 _____ No
1 _____ Sometimes
2 _____ Almost every time I drink
5. Have you had the “DT’s” (delirium tremens), that is, seen, felt, or heard things that aren’t really there; felt very anxious, restless or overexcited?
0 _____ No
1 _____ Sometimes
2 _____ Several times
6. When you drink, do you stumble about, stagger and weave?
0 _____ No
1 _____ Yes
2 _____ Several times
7. As a result of drinking, have you felt overly hot and sweaty (feverish)?
0 _____ No
1 _____ Once
2 _____ Several Times
8. As a result of drinking, have you seen things that were not really there?
0 _____ No
1 _____ Yes
2 _____ Several Times
9. Do you panic because you fear you may not have a drink when you need it?

- 0 _____ No
- 1 _____ Yes

10. Have you had blackouts (“loss of memory” without passing out) as a result of drinking?

- 0 _____ No, Never
- 1 _____ Sometimes
- 2 _____ Often
- 3 _____ Almost every time

11. Do you carry a bottle with you or keep one close at hand?

- 0 _____ No
- 1 _____ Some of the time
- 2 _____ Most of the time

12. After a period of abstinence (not drinking), do you end up drinking heavily again?

- 0 _____ No
- 1 _____ Once
- 2 _____ Almost every time

13. In the past 12 months, have you passed out as a result of drinking?

- 0 _____ No
- 1 _____ Once
- 2 _____ More than once

14. Have you had a convulsion (fit) following a period of drinking?

- 0 _____ No
- 1 _____ Once
- 2 _____ Several times

15. Do you drink throughout the day?

- 0 _____ No
- 1 _____ Yes

16. After drinking heavily, has your thinking been fuzzy or unclear?

- 0 _____ No
- 1 _____ Yes, but only a few hours
- 2 _____ Yes, for one or two days
- 3 _____ Yes, for many days

17. As a result of drinking, have you felt your heart beating rapidly?

- 0 _____ No
- 1 _____ Once
- 2 _____ Several times

18. Do you almost constantly think about drinking alcohol?

- 0 _____ No
- 1 _____ Yes

19. As a result of drinking, have you heard “things” that were not really there?
0 No
1 Once
2 Several times
20. Have you had weird and frightening sensations when drinking?
0 No
1 Once or twice
2 Often
21. As a result of drinking, have you “felt things” crawling on you that were not really there (e.g., bugs, spiders)?
0 No
1 Once
2 Several times
22. With respect to blackouts (loss of memory):
0 Have never had a blackout
1 Have had blackouts less than an hour
2 Have had blackouts that last several hours
3 Have blackouts that last for a day or more
23. Have you ever tried to cut down on your drinking and failed?
0 No
1 Once
2 Several times
24. Do you gulp drinks (drink quickly)?
0 No
1 Yes
25. After taking one or two drinks, can you usually stop?
0 Yes
1 No

APPENDIX F

BRIEF DRINKER PROFILE

(Selected sample items)

Development of Drinking Problems:

About how old were you when you took one or more full drinks? _____

About how old were you when you first became intoxicated? _____

Family History of Drinking Problems:

How would you describe the drinking habits of your mother _____ your father _____?

0 = client does not know; 1= nondrinker (abstainer); 2 = occasional or light social drinker; 3 = moderate or average social drinker; 4 = moderate or average social drinker; 5 = problem drinker (at any time in life); 6 = alcoholic (at any time in life).

Do you have any blood relatives whom you regard as having been a problem drinker or alcoholic?

	Number of Male	Number of Females
Parents?	_____ x 3 = _____	_____ x 3 = _____
Brothers/ Sisters?	_____ x 3 = _____	_____ x 3 = _____
Grandparents?	_____ x 3 = _____	_____ x 3 = _____
Uncles/Aunts?	_____ x 3 = _____	_____ x 3 = _____
First Cousins?	_____ x 3 = _____	_____ x 3 = _____

TOTAL SCORES Males: _____ FEMALES: _____

Were you raised by your biological parents? _____Y _____ N

APPENDIX G

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 month 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 H

DAILY DRINKING QUESTIONNAIRE

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 I

QUANTITY FREQUENCY INDEX

INSTRUCTIONS: Carefully read and answer the following questions about your alcohol use. Please try to answer as accurately and honestly as possible. Your answers will be kept CONFIDENTIAL. They will NOT be revealed to the referring office or made available to other departments to influence your disciplinary status.

1. Think of the occasion you drank the most this past month. How much did you drink?
 1. 0 drinks
 2. 1-2 drinks
 3. 3-4 drinks
 4. 5-6 drinks
 5. 7-8 drinks
 6. 9-10 drinks
 7. 11-12 drinks
 8. 13-14 drinks
 9. 15-16 drinks
 10. 17-18 drinks
 11. 19 or more drinks

2. On a given weekend evening, you much alcohol do you typically drink? Estimate for the past month.
 1. 0 drinks
 2. 1-2 drinks
 3. 3-4 drinks
 4. 5-6 drinks
 5. 7-8 drinks
 6. 9-10 drinks
 7. 11-12 drinks
 8. 13-14 drinks
 9. 15-16 drinks
 10. 17-18 drinks
 11. 19 or more drinks

3. How often in the past month did you drink alcohol?
 1. Never
 2. Monthly
 3. 2-3 times per month
 4. 2-3 times per week
 5. Daily

APPENDIX J

READINESS TO CHANGE QUESTIONNAIRE

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 K

DRINKING NORMS RATING FORM

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
<p>We are interested in your estimates of A) <i>How often</i> and B) <i>How much</i> different types if people drink. For the following questions, please assume whenever possible that you are <i>rating a typical person of your same sex</i>. 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).</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 L

PROTECTIVE BEHAVIORS STRATEGIES SURVEY

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 time. _____
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. Avoid drinking 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 you go home with a friend. _____
15. Know where your drink has been at all times. _____

APPENDIX M

COMPREHENSIVE EFFECTS OF ALCOHOL

- 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 N

ALCOHOL MONITORING CARD

Date	Start time	End time	Number of drinks			Total # of drinks	Situation
			Beer	Wine	Liquor		

VITA

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