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### Authors

Borsari, Brian  
Hustad, John TP  
Mastroleo, Nadine R  
[et al.](#)

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## Alcohol Use and Problems in Mandated College Students: A Randomized Clinical Trial Using Stepped Care

Brian Borsari<sup>a,b</sup>, John T.P. Hustad<sup>c</sup>, Nadine R. Mastroleo<sup>b</sup>, Tracy O’Leary Tevyaw<sup>a,b</sup>, Nancy P. Barnett<sup>b</sup>, Christopher W. Kahler<sup>b</sup>, Erica Eaton Short<sup>b</sup>, and Peter M. Monti<sup>a,b</sup>

<sup>a</sup>Mental Health and Behavioral Sciences Service, Department of Veterans Affairs Medical Center, 830 Chalkstone Avenue, Providence, RI 02908

<sup>b</sup>Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Brown University, Box G-S121-4, Providence, RI 02912

<sup>c</sup>Penn State College of Medicine, Department of Medicine, HO34, 500 University Drive, PO Box 850, Hershey, PA 17033

### Abstract

**Objective**—Over the past two decades, colleges and universities have seen a large increase in the number of students referred to the administration for alcohol policies violations. However, a substantial portion of mandated students may not require extensive treatment. Stepped care may maximize treatment efficiency and greatly reduce the demands on campus alcohol programs.

**Method**—Participants in the study ( $N = 598$ ) were college students mandated to attend an alcohol program following a campus-based alcohol citation. All participants received Step 1: a 15-minute Brief Advice session that included the provision of a booklet containing advice to reduce drinking. Participants were assessed six weeks after receiving the Brief Advice, and those who continued to exhibit risky alcohol use ( $n = 405$ ) were randomized to Step 2, a 60–90 minute brief motivational intervention (BMI) ( $n = 211$ ) or an assessment-only control ( $n = 194$ ). Follow-up assessments were conducted 3, 6, and 9 months after Step 2.

**Results**—Results indicated that the participants who received a BMI significantly reduced the number of alcohol-related problems compared to those who received assessment-only, despite no significant group differences in alcohol use. In addition, low risk drinkers ( $n = 102$ ; who reported low alcohol use and related harms at 6-week follow-up and were not randomized to stepped care) showed a stable alcohol use pattern throughout the follow-up period, indicating they required no additional intervention.

**Conclusion**—Stepped care is an efficient and cost-effective method to reduce harms associated with alcohol use by mandated students.

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Tens of thousands of college students receive campus alcohol violations and mandatory alcohol interventions each year (Hoover, 2003; Porter, 2006). Common alcohol violations include possession of alcohol, being in the presence of alcohol, behavioral problems while intoxicated, and alcohol-related medical complications (Barnett, Borsari, Hustad, Tevyaw, et al., 2008) and most colleges require students who are found to violate the campus’s alcohol policy to complete either public service or an alcohol intervention, with the expectation that participation in these activities will reduce the likelihood of future heavy drinking episodes

(Wechsler et al., 2002). As a result, campus administrators have made increased efforts to reduce heavy episodic drinking by citing students who violate campus alcohol policy.

Over the past decade, substantial advances have been made in the field of prevention science that focuses on alcohol use interventions for mandated students. The empirically supported interventions for mandated students range from multi-session groups to web interventions to brief motivational interventions (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Crouce & Larimer, 2011; Larimer & Crouce, 2007). Given all the intervention options available, it is important to establish methods that maximize efficacy and efficiency.

### **Heterogeneity of Mandated Students**

Given the number of interventions implemented with mandated students, some confusion exists regarding who is appropriate for which intervention. Research indicates not all mandated students demonstrate the same degree of risky alcohol use. For example, Barnett and colleagues (2008) combined data from four separate clinical trials of brief interventions with mandated students, and used cluster analysis to identify three profiles that are indicative of the heterogeneity of the mandated student population. The largest proportion of students belonged to a profile that was characterized by a pattern of relatively low heavy drinking and alcohol-related problems, very low drinking in the referral incident, and low responsibility for and aversiveness of the incident (labeled the “Why Me?” cluster). The second largest proportion belonged to a “Bad Incident” cluster, characterized by low scores for heavy drinking and problems and high levels of incident drinking, responsibility, and aversiveness. The “So What?” profile was characterized by high heavy drinking and alcohol-related problems, moderate incident drinking and responsibility, and low aversiveness. Therefore, the mandated student population appears to be a heterogeneous one, for which a “one size fits all” intervention approach may not be appropriate. Instead, it may be helpful to provide empirically supported interventions according to presenting student characteristics or to provide interventions in increasing doses, starting with a lower dose/minimal intervention followed by a more intensive intervention for individuals who continue to exhibit risky behaviors. Two interventions have shown particular promise in the college setting: Brief Advice and Brief Motivational Interventions (BMIs).

### **Efficacy of Brief Advice and Brief Motivational Interventions (BMIs) with Mandated Students**

#### **Brief Advice**

Brief Advice (also referred to as a minimal intervention or simple advice), is defined as “the shortest or least intense activity that has a therapeutic or preventive effect” (Babor, 1994, p. 1128). Consisting of one contact with the individual, brief advice prescribes change in a healthy direction but does not specify a personalized way to achieve this objective. Feedback regarding the risks associated with alcohol use in 5 to 15 minute minimal interventions incorporating such feedback has been linked to reduces alcohol use in adults (see Miller & Rollnick, 2002, Chapter 18). Brief Advice has also been linked to reductions in alcohol use and associated problems in college students screened for alcohol problems in a university emergency room (Helmkamp et al., 2003) and health clinics (Fleming et al., 2010; Schaus et al., 2009). This research indicates that a 15-minute Brief Advice addressing risks associated with drinking and providing tips to reduce alcohol may be an appropriate and effective initial intervention for mandated college students, but has not been tested.

### **Brief Motivational Interventions (BMIs)**

BMIs are currently the standard individual intervention that has been supported by empirical work. The Brief Alcohol Screening and Intervention for College Students (Dimeff, Baer, Kivlahan, & Marlatt, 1999) was the first empirically tested BMI developed for use with college students, and uses individualized personal feedback sessions to enhance students' motivation to change high-risk drinking behaviors and reduce alcohol-related consequences. Since then, BMIs such as BASICS have been implemented in approximately 1,100 sites across the country, and BASICS is on the Substance Abuse and Mental Health Services Administration (SAMHSA) National Registry of Evidence-based Programs and Practices (SAMHSA, 2008). BMIs are frequently delivered in 1 to 2 individual meetings (one-on-one) that are approximately 50 minutes long (Carey, Scott-Sheldon, et al., 2007). The majority of intervention research conducted with mandated students has used MI strategies to support shifts toward less risky drinking behaviors. Mandated students who have received individual BMIs delivered by advanced graduate students or professional counselors have consistently shown lower alcohol consumption and alcohol-related problems relative to control conditions over follow-up time periods ranging from 6 weeks to 15 months (e.g., Borsari & Carey, 2005; Carey, Carey, Henson, Maisto, & DeMartini, 2011; Carey, Scott-Sheldon, Elliott, Bolles, & Carey, 2009; White, Mun, Pugh, & Morgan, 2007). That said, BMIs are more treatment and resource intensive than Brief Advice, as the sessions are longer and the counseling staff requires more advanced training.

Given the above research findings, BMIs appear to work best in reducing college student alcohol use and consequences. However, given the heterogeneity of mandated college students, the considerable resources required to implement BMIs, and research suggesting brief advice appears to also facilitate reductions in college students, stepped care may be a useful strategy to determine how to provide the appropriate level of intervention to this heterogeneous group.

### **A Stepped Care Intervention Model**

Stepped care (also known as an adaptive treatment strategies; Collins, Murphy, & Bierman, 2004) is a dynamic, performance-based procedure in which individuals who do not respond to an initial, low intensity level of treatment, are then provided a more intensive treatment (Sobell & Sobell, 2000). This is in contrast to a branching adaptive treatment strategy, in which individuals may be immediately provided with a more intensive intervention if it is not appropriate or possible to attempt a lower-intensity intervention (e.g., drug courts; Marlowe et al., 2012). Within a stepped care framework, different levels of interventions are linked together, with clinical guidelines used to determine referrals to higher levels of care. Theoretically, individuals who respond to initial intervention efforts within a reasonable amount of time do not require further treatment, while those who remain in a predetermined risk range are referred to a higher "step," which consists of a more intensive intervention. Therefore, stepped care is consistent with the Institute of Medicine's (1990) recommendation that no one treatment will work for everyone and that individual considerations should be taken into account (e.g., severity of alcohol use and problems, prior response to treatment). Implementing stepped care properly is a challenge, as clear and consistent guidelines need to be established in order to avoid providing inadequate care. If properly implemented, however, the advantages of stepped care include treating a wide range of symptom severity, reducing the negative effects of inappropriately assigned treatment, conserving resources by assigning individuals only the amount of care that they require, providing opportunities to implement treatment recommendations and identify areas of difficulty, and facilitating an individualized course of treatment that is likely to increase compliance and satisfaction with care (Sobell & Sobell, 2000).

Although not initially designed to evaluate stepped care specifically, one study conducted with volunteer college students used a stepped care approach in one of the intervention conditions. In this study, Marlatt et al. (1998) provided a brief motivational intervention (BMI) to incoming college students exhibiting risky alcohol use. One year later, students who continued to drink at risky levels ( $n = 56$ ) were contacted by phone and offered encouragement and assistance in reducing their alcohol use, and interested students received an additional intervention ( $n = 34$ ; 61%). Results indicated that students receiving the initial BMI reduced alcohol use and problems, with effects remaining through 2- and 4-year follow-ups (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001). Although the efficacy of the supplemental sessions was not evaluated, the willingness of the students to receive a subsequent intervention provides support for the potential feasibility of stepped care with college students.

We are aware of one previous study that formally evaluated a stepped care approach for college student drinking. Borsari and colleagues (2007) conducted a pilot study ( $n = 43$ ) that implemented stepped care with students mandated to attend an alcohol program. There were two steps of intervention in this project: All students received Step 1, a baseline assessment and a 15-minute minimal intervention. Four weeks later, all participants were re-assessed using a brief web-based survey. Students who reported continued risky alcohol use (labeled non-responders) were randomized to receive a 45–60 minute BMI (Step 2), or an assessment control condition. No group differences at follow-up were detected at 10 weeks post-baseline. That said, the project demonstrated the feasibility of using stepped care to deliver interventions of increasing intensity with a mandated sample. Furthermore, students who reported low levels of alcohol use at baseline maintained low-risk drinking throughout the study, highlighting that not all mandated students require an intervention as intensive as a BMI.

## The Current Study

Given the lack of research on how to systematically implement efficacious interventions to reduce alcohol use and consequences of mandated students, the purpose of this study was to conduct an efficacy trial of stepped care. The design, modeled after our earlier work, provided a minimal intervention (brief advice) to all participants, followed by a short assessment 6 weeks later, after which participants who met criteria for sustained high-risk drinking were randomly assigned to a one-session BMI or to an assessment only control group. We hypothesized that individuals receiving the supplemental BMI would reduce their drinking and alcohol-related problems significantly more than individuals receiving assessment only. Consistent with the stepped care approach, we also hypothesized that participants who did not report risky drinking at the 6-week assessment would maintain low-risk drinking through the 9-month assessment.

## Method

### Design

This study implemented stepped care with mandated college students at a University in the Northeast US. There were two steps of intervention. All participants received Step 1, a Brief Advice session. Mandated students reporting continued risky alcohol use 6 weeks later were randomized to (a) Step 2, a 60-minute BMI or (b) an assessment only control condition (AO). Participants then completed 3, 6 and 9 month follow-ups via web assessment.

### Participants

Prospective participants were undergraduate students age 18 years and older, who violated campus alcohol policy at a four-year, private liberal arts university in the Northeast.

Students ( $N = 982$ ) who were found to be in violation of campus alcohol policies were referred to the Office of Health and Wellness (OHW) for mandatory counseling following adjudication by campus judicial affairs staff. Of these students, 598 (61%) agreed to participate in the research study and provided informed consent (see Figure 1 for enrollment diagram). Students who declined to participate ( $n = 384$ ) in the project received treatment as usual from the OHW; this treatment consisted of a 15–30 minute individual discussion of their referral incident and alcohol use. The majority of those who refused to participate (70%) cited time constraints as their reason (the baseline assessment and intervention took 20–30 minutes longer than treatment as usual). Other reasons for not participating were: “not interested,” “past research participant,” and “no reason.” There were no gender differences in the students who agreed to participate (68% male) and those who did not (70% male;  $\chi^2(1) = 0.5851, p = .59$ ). In addition, the university did not make adjustments in what were considered violations of alcohol policy over the course of the project, which would have impacted referral rates and severity.<sup>1</sup> The university Institutional Review Board of Brown University and the study site approved all procedures.

**Recruitment**—Recruitment took place from September 2005 to April 2009. Upon arriving at OHW, students were invited to participate in a research study examining whether “different ways of talking about alcohol with students referred for alcohol-related infractions at this University will help reduce alcohol misuse and alcohol-related problems.” If the student was interested, s/he was provided information by OHW staff about the project. The student was informed that participation entailed completing a baseline assessment and receiving a 15-minute Brief Advice session. The student was informed that responses to the assessment would be protected by a Certificate of Confidentiality, and would not be shared with the university. Students were provided detailed information about the assessment schedule. Because the follow-up assessments were completed using web-based surveys, all potential participants were provided detailed information regarding procedures implemented to protect the security of their responses. The consent form instructed students that “you may be asked to return to participate in a second phase of the project 6–8 weeks after your baseline assessment and initial intervention,” and this may include a “60–90 minute intervention during which you will be provided with a personalized feedback form that provides information about your drinking, alcohol-related consequences, and other information.” Students were told they would receive \$15 for the baseline assessment, \$40 for the 6-week assessment, and \$25, \$35 and \$60 for the 3, 6 and 9-month assessments, respectively.

## Measures

**Demographic information**—Participants provided information regarding their gender, age, weight, year in school, and race/ethnicity.

**Alcohol use**—Alcohol use outcome variables were obtained using the *Alcohol and Drug Use Measure* (Borsari & Carey, 2000, 2005). Number of heavy drinking episodes was obtained using a gender-specific question that asked participants to report the number of

<sup>1</sup>It is of note that AlcoholEdu, an online alcohol education program ([www.outsidetheclassroom.com](http://www.outsidetheclassroom.com)) was administered to all incoming students, starting in 2008. Therefore, we tracked which students completed AlcoholEdu over the course of the study: 206 students participated in the study when AlcoholEdu was offered, and it was completed by 162 of them: 31/40 (77%) of the lower risk students, and 66/78 (85%) students in the AO condition, and 65/88 (74%) students in the BMI condition. Regarding exposure to AlcoholEdu, there were no differences in the rates of receiving AlcoholEdu in the three groups ( $\chi^2(2) = 3.165, p = .367$ ), nor of the rates of receiving AlcoholEdu in the BMI and AO group ( $\chi^2(1) = 2.873, p = .09$ ). It is also possible that AlcoholEdu may have had a synergistic effect with the Brief Advice and BMI. Therefore, we also examined whether participation in AlcoholEdu significantly interacted with the Brief Advice and/or BMI in predicting the main outcomes of the study, and it did not (all  $p$ 's > .10). Therefore, participation in AlcoholEdu did not appear to significantly moderate the effects of the Brief Advice and/or BMI in those students who reported completing it.

times they consumed 5 or more drinks for males (4+ for females) in the past month. This measure also recorded the number of drinks prior to the citation event and the maximum number of drinks, as well as the amount of time spent drinking for each of those episodes to calculate the students' estimated peak and event BAC (pBAC and evBAC, respectively), using the Matthews & Miller (1979) equation and an average metabolism rate of 0.017 g/dL per hour.

**Alcohol-related problems**—Alcohol-related consequences were assessed at baseline and all follow-ups by the 48-item *Young Adult Alcohol Consequences Questionnaire* (YAACQ; Read, Kahler, Strong, & Colder, 2006). Dichotomous items (yes/no) are summed for a total number of alcohol-related consequences experienced in the past month. For subsequent analyses we used the *Brief-Young Adult Alcohol Consequences Questionnaire* (B-YAACQ; Kahler, Strong, & Read, 2005), a 24-item subset of the YAACQ that was created using item response theory analysis to extract those items that most efficiently capture a single dimension of alcohol problems with non-redundant items spread across a continuum of severity. The B-YAACQ has been found to be reliable yet sensitive to changes in alcohol use over time (Kahler, Hustad, Barnett, Strong, & Borsari, 2008) and has demonstrated high internal consistency in research with college students ( $\alpha = .89$ ; Kahler et al., 2005) as well as in this sample ( $\alpha = .89$ ).

**Participant Satisfaction**—This 12-item measure, adapted from the Client Satisfaction Questionnaire (Larsen, Attkisson, Hargreaves, & Nguyen, 1979), recorded the participant's perception of the interventions. It was completed at the end of the Brief Advice ( $\alpha = .82$ ) and BMI ( $\alpha = .85$ ), and was used to evaluate whether the interventions were perceived as acceptable and useful (e.g., would you recommend a session such as this to other students like yourself?). This measure has been used previously with mandated students (Borsari & Carey, 2005; Borsari et al., 2007).

**Recidivism**—Participants were asked whether they had been mandated for another alcohol violation since the last assessment, and if so they were asked how many times this had occurred (Borsari et al., 2007).

## Interventions

**Step 1: Brief Advice**—The manualized Brief Advice was administered by the OHW peer (i.e., fellow college student) counselors. In previous research, peers have delivered considerably complex, multi-session BMIs found to be as effective (Fromme & Corbin, 2004) or more effective (Larimer et al., 2001) than BMIs delivered by professionals. At the beginning of the session, the peer counselor facilitated discussion of the events leading to the referral incident, the reactions of friends and family, and any changes the student had made to his or her drinking as a result. The peer counselor prompted each participant to describe the key events that led to the referral incident, what and how much he/she drank, what happened during and after drinking, and the social environment (e.g., who they were with, where they were). The peer counselor then provided a 12-page booklet containing educational information on what constitutes a standard drink, guidelines for sensible drinking (for legal-aged drinkers, no more than 14 drinks per week for men, 7 for women, or 1 per day max for women, 2 per day max for men), indicators of risky drinking, information on what to expect should one decide to make a change in drinking, specific behavioral strategies to cut down on drinking, and a list of further resources for change (from Cunningham, Wild, Bondy, & Lin, 2001). The Brief Advice session was mostly didactic, but the peer counselors did solicit personal information from participants often using open-ended questions. Throughout the session, participants were given the opportunity to ask questions

or discuss their personal alcohol use with the peer counselor. The average time of the Brief Advice sessions were 14.07 minutes ( $SD = 4.59$ ).

**Step 2: Brief Motivational Intervention**—Adapted from previous interventions with college students (Dimeff et al., 1999), this manualized BMI has resulted in significant reductions in alcohol use and problems with mandated and non-mandated students in other trials (Borsari & Carey, 2000, 2005; Carey, Henson, Carey, & Maisto, 2009). The BMIs were delivered by seven master's-level and doctoral-level professional clinicians, rather than peer counselors. This decision was made because when this project was developed only one study had shown peers could effectively reduce drinking behaviors with non-mandated college students (Larimer et al., 2001) and professional counselors had consistently had better ratings of intervention delivery than peer counselors in a group intervention with mandated students (Fromme & Corbin, 2004).

At the beginning of the BMI, the participant was given a personalized report that provided feedback from the participant's responses to the baseline and six-week follow-up. The participant then engaged in a discussion of topics such as normative quantity/frequency of drinking, BAC and tolerance, alcohol-related consequences (reported at baseline and also the recent 6-week assessment), influence of setting on drinking, and alcohol expectancies. The participant was also provided with educational information related to their personal experiences (e.g., discussing the relationship between BAC and the participant's alcohol-related consequences), introduced to harm reduction as a way to minimize or eliminate alcohol-related consequences, and encouraged to generate a personal goal. If the participant was interested in making changes to his/her drinking, options for change were discussed during the session. Throughout the BMI, interventionists followed the four principles of Motivational Interviewing (MI): express empathy, develop discrepancy, roll with resistance, and support self-efficacy for change (see Miller & Rollnick, 2002). The BMIs averaged 52.5 minutes ( $SD = 12.12$ ).

### Interventions: Training and Supervision

**Step 1: Brief Advice**—Interventionists trained and supervised by BB, JTPH, or NM, and were required to perform three role-plays of the Brief Advice Intervention before beginning the study. Training focused on becoming familiar with the didactic information and basic MI strategies (e.g., asking open-ended questions, avoid confrontation and labeling students). The brief advice manual contained 16 topics that the peer interventionists were instructed to address during training and supervision. Peer counselors attended weekly group supervision meetings (0.5–1.0 hours) that addressed issues that arose during the course of the study. In addition, all Brief Advice sessions were tape recorded and reviewed. Following review of completed Brief Advice sessions, peer counselors received on-going, individual feedback on their intervention delivery skills to ensure treatment adherence.

**Step 2: Brief Motivational Intervention**—To ensure the consistent delivery of the BMI, interventionists received an intervention manual, and two full days of training on MI (conducted by BB), including didactic information and role-play exercises. Interventionists completed supervised, full session, role-plays until they met study threshold of competency. For supervision, each week a project supervisor reviewed one randomly selected audiotape of a session and then provided written feedback to the interventionist. This feedback included suggestions regarding the use of BMI techniques as well as adherence to the protocol.



## Data Analysis Plan

First, we conducted ANOVAs and chi-square tests to examine group differences and evaluate success of randomization to BMI and AO groups. Then, to test our primary aims, we ran models comparing those assigned to BMI at 6 weeks to those assigned to AO at 6 weeks on the following variables assessed at 3, 6, and 9 months: number of days of heavy alcohol use, peak BAC, and number of alcohol-related problems. Analyses were conducted using generalized estimating equations (GEE; Liang & Zeger, 1986) using PROC GENMOD in SAS (SAS Institute Inc., 1997). GEE provides an extension of regression analyses to repeated or correlated data, allows inclusion of participants with missing data, and is flexible in its ability to handle a range of dependent variable distributions. GEE analyses covaried the baseline value of the respective dependent variable and gender and included a linear effect of time. All participants, including those with missing data, were included in these analyses. Treatment condition was dummy coded using AO as the reference group. Time was centered so that we could evaluate the main effect of treatment and the time X treatment interaction in one simultaneous model; the time X treatment interaction indicates whether treatment effects became more or less pronounced over time. Peak BACs that exceeded 0.40% were recoded to 0.40% (given that values exceeding such a threshold are unlikely to be reliable and would normally result in coma or death), and the distribution for this variable was normal. Both number of heavy drinking days and number of alcohol-related problems represent count data and therefore were analyzed using a negative binomial distribution and logit link function to account for overdispersion.

## Results

### Preliminary Analyses

Participants were 67% male, 96% Caucasian, and 68% first-year students with a mean age of 18.68 ( $SD = 0.78$ ).<sup>2</sup> They had been cited for possession of alcohol (78.18%), being in the presence of alcohol (12.14%), alcohol-related behavior (e.g., vandalism, fighting, public intoxication) (9.30%), and alcohol-related medical complications (0.38%). All 598 students who agreed to participate completed a 45-minute baseline assessment immediately prior to receiving the Step 1 Brief Advice. Participants received \$15 for the completion of the baseline assessment. After baseline, over the course of the study, a total of 13 students withdrew due to medical issues, transferring institutions, or personal choice. In addition, 13 participants did not complete the 6-week assessment, were identified as “lost,” and never randomized. All participants who were not withdrawn or lost completed the 6-week follow-up web assessment ( $n = 582$ ; 97%).

### Stepped Care Assignment

Consistent with a stepped care strategy, the tailoring variables in this project were heavy drinking episodes and alcohol-related problems. The decision rule was that students who reported risky alcohol use at the 6-week follow up (4 or more heavy drinking episodes and/or a score of 5 or more on the YAACQ) were identified as high risk drinkers and were eligible for Step 2, a 60–90 minute brief motivational intervention (BMI).

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<sup>2</sup>There are two primary reasons for this percentage of first year students. First, at this school and many others, living on campus is mandatory for first year students. This increased the students' contact with Resident Assistants and campus police who refer the majority of students to the AIRP. Second, first year students appear to be at particular risk for consequences, most likely due to the mix of newfound freedom from parental supervision, access to alcohol, role of alcohol in college socialization, and other factors (see Borsari, Murphy & Barnett 2007 for a review). An informal survey of 19 publications with mandated students revealed the percentage of first year students ranged from 47–79%. In addition, the percentage of males in these studies ranged from 49% to 100%, so the 68% observed for this study is not atypical.

Regarding the development of the decision rule, when the current project was developed, previous research with a convenience sample of non-mandated students indicated 44% of college students reported binge drinking 1–2 times per week (Wechsler et al., 2002). As mandated students tend to be heavier drinkers (Barnett & Read, 2005), we assumed that after receiving Step 1 mandated students would continue to drink slightly above average levels. That assumption, and the use of a 4 week recall period, led to the cutoff of 4 or more heavy drinking episodes in the past month. Regarding alcohol-related problems, our initial pilot (Borsari et al., 2007) had used a cutoff score of 2 on the Young Adult Alcohol Problems Screening Test (YAAPST; Hurlbut & Sher, 1992). This cutoff had resulted in 68% of the sample using a cutoff being eligible for a BMI. We had decided to use the YAACQ in this project, given the wider continuum of problems it assesses (Kahler et al., 2005). To do so, we examined scores from Kahler and colleagues' 2005 study, which recruited non-mandated college students and used a 12-month recall period for the YAACQ. We then conservatively estimated that using a score of 5 or more on the YAACQ in the past month would result in approximately 25% of the sample being identified as eligible for a Step 2 BMI.

As can be seen in Figure 1, of the 582 participants who completed the 6-week assessment, 2 students withdrew and it was discovered at the end of the project that 16 students had been misclassified and were removed from the sample<sup>3</sup>. Of the 564 remaining students, 102 (20%) participants were identified as low risk and did not meet inclusion criteria for the Step 2 intervention (i.e., continued heavy drinking behaviors). Of the 462 (80%) who were deemed high-risk and were randomized to receive a BMI or Assessment only (AO), 57 students had completed their 6-week assessment over the summer break and were also removed from the current analyses.<sup>4</sup>

Of the remaining 405 participants, 43 (10%) met the Step 2 criterion for risky drinking (4 or more binge episodes in past six weeks), 87 (22%) met the Step 2 criterion for minimum YAACQ score (5 or more endorsed items on the YAACQ) or and 275 (68%) met both Step 2 criteria. Of these participants, 211 were randomly assigned to receive a BMI and 194 were assigned to assessment-only. Urn randomization (Stout, Wirtz, Carbonari, & Del Boca, 1994), using gender and race as blocking variables, was used to randomly assign these participants to the BMI or an assessment-only control.

Of the 211 students randomized to receive Step 2 intervention, 191 (91%) received a BMI. Of the 20 students who did not complete a BMI, 1 withdrew from the study, and 19 did not show up for their appointments and were referred back to the OHW to complete their obligation. The average number of days from randomization to BMI completion was 22 days.

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<sup>3</sup>Specifically, 9 high-risk students were misclassified as low-risk students, 5 low-risk students were misclassified as high-risk students and randomized to assessment-only, and 2 low-risk students were misclassified as high-risk students and received a BMI. These misclassifications were due to human error. As the study was completed, we decided that the most conservative analytic approach was to drop these 16 students from the subsequent analyses. That said, we did conduct two sets of exploratory outcome analyses – (a) one that kept the misclassified students in the database; and (b) another that re-classified the 9 high-risk students in the AO group and the 5 low-risk students into the low-risk group. The 2 students who had been provided a BMI were dropped, as they could not be logically assigned to the AO or low-risk group. Results of these 2 sets of supplemental analyses did not significantly differ from the presented analyses.

<sup>4</sup>As these randomizations were completed during the summer, completion of an in-person Brief Motivational Intervention (BMI) was not possible. Therefore, these individuals were instead randomized to either a phone-BMI (n = 36, 23 completed) or assessment only (n = 21). We decided to conservatively exclude these individuals from the subsequent analyses due to the unique circumstances of the timing of their randomization. Supplemental analyses including these 57 individuals did not change the results of the main outcomes.

## Success of Randomization

There were no significant differences between these two conditions on demographics, on key baseline variables, or on drinking-related variables at 6 weeks ( $ps > .10$ ). As can be seen in Table 1, the low risk group consistently reported lower levels of alcohol use and problems than those participants randomized to the BMI and AO conditions.

## Intervention Integrity and Fidelity

Independent raters coding sessions using scales with demonstrated reliability and validity is considered the “gold standard” of measurement of treatment fidelity (see Baer et al., 2007).

**Step 1: Brief Advice**—As the Brief Advice sessions were not designed to incorporate motivational interviewing, and the peer interventionists were not formally trained in MI, it would have been inappropriate to code the process of the Step 1 sessions. However, we did examine whether the peer counselors discussed the information in the booklets during the session. Coding of a random selection of 109 Step 1 sessions (18%), stratified across all years of the study, indicated that 14 or more of the 16 topics had been addressed in 83% of the sessions.

**Step 2: Brief Motivational Intervention**—Intervention fidelity was measured by coding 161 (83%) sessions using the Motivational Interviewing Skills Code (MISC 2.1; Miller, Moyers, Ernst, & Amrhein, 2008). Fidelity assessment included double-coding 50 sessions (approximately 33%) with ICC scores ranging from 0.66 to 0.98 identifying good coder reliability (Cicchetti, 1994). Generally, therapists demonstrated high levels of MI-consistent (MICO) skills, such as complex reflections, affirmations, and open questions ( $M = 99.71$ ,  $SD = 4.79$ , range = 20–184), and low levels of MI-inconsistent (MIIN) behaviors, such as confrontation and warning ( $M = 1.5$ ,  $SD = 2.84$ , range = 0–15). In terms of adherence to global constructs, therapists were rated highly on levels of acceptance ( $M = 5.24$ ,  $SD = 1.1$ , range = 1–7), empathy ( $M = 5.11$ ,  $SD = 1.33$ , range = 1–7), and “MI Spirit” ( $M = 4.75$ ,  $SD = 1.7$ , range = 1–7). The approximate 99 to 1 ratio of MICO vs. MIIN skills, as well as the high global ratings, indicates the interventionists implemented MI when delivering the BMIs.

Regarding the content of the BMIs, there were 10 topics on the personalized feedback form that the interventionist could address. Session codings indicated that seven or more of the topics were addressed in 94% of the sessions, and all 10 topics were addressed in 72% of the sessions. These percentages are comparable to those in previous work implementing the BMI with mandated students (Borsari & Carey, 2005)

## Participant Satisfaction

**Step 1: Brief Advice**—Ratings for the Brief Advice were very high, with 88% of the participants reporting they were satisfied with the session, 76% feeling the information provided was useful, 73% stating they would recommend the session to another student like themselves, and 92% stated they would recommend the brief advice session to a friend who was in need of help with his or her drinking. Participants’ ratings of the peer interventionist were also high, with 95% or more reporting the peer interventionist was organized and well prepared, knowledgeable about the topic, explained the information thoroughly, and made him/her feel comfortable. The ratings of the session itself were somewhat lower on items describing the intervention as informative (84% agreed), whether the interventionist influenced the participant’s opinion (60%), and whether the interventionist influenced the participant’s future behaviors (58%).

**Step 2: Brief Motivational Intervention**—Ratings for the BMI were also very positive, with 93% of the participants reporting they were satisfied with the session, 92% feeling the information provided was useful, 88% recommending the session to another student like themselves, and 95% stated they would recommend the brief advice session to a friend who was in need of help with his or her drinking. The participants' ratings of the BMI interventionist also were high, with at least 90% or more of the participants reporting that the interventionist was organized and well prepared, knowledgeable about the topic, explained the information thoroughly, and made him/her feel comfortable. The ratings of the session itself were somewhat lower on items describing the intervention as informative (89% agreed), whether the interventionist influenced the participant's opinion (62%), and whether the interventionist influenced the participant's future behaviors (60%).

### Follow-up Assessments

Participants received telephone or email reminders to complete web-based follow-up assessments. As can be seen in Figure 1, 471 out of 505 (93%) eligible participants completed the 3-month follow-up; 468 out of 505 (89%) eligible participants completed the 6-month assessment; and 473 out of 505 (94%) eligible participants completed their 9-month assessment.

### Attrition Analyses

Attrition analyses were conducted to detect if there were any significant differences between the participants who completed the surveys and those who did not. A series of *t*-tests revealed the 16 participants who did not complete the 6-week follow-up assessment were not significantly different from the other participants in demographics or the three outcome variables (past month number of heavy drinking episodes, pBAC, and number of alcohol consequences at baseline). Regarding missed assessments throughout the study, 81% of the sample completed the assessments at 6-weeks and 3, 6 and 9 months; 11% completed 3 out of 4, 5% completed 2 out of 4, and only 3% missed the 3-, 6-, and 9-month follow-up assessments. There were no differences among the three conditions in the number of missed assessments ( $\chi^2_{(6)} = 4.91, p = .55$ ). Participants with missing data were more likely to be male than those with complete data,  $\chi^2(1, N = 445) = 6.65, p = 0.01$ . Therefore, we included gender as a covariate in all analyses, although it did not show a significant association with any of the drinking outcomes. Therefore, there is little indication of selective attrition between the intervention conditions.

### Main Outcomes

Figures 2, 3 and 4 show the primary drinking related outcomes at baseline, 6 weeks, 3 months, 6 months, and 9 months for the three groups: low risk, AO, and BMI. The linear effect of time from baseline to 9 month follow-up was nonsignificant for heavy drinking days, peak BAC, and B-YAACQ,  $p > .46$ . The effect of BMI compared to AO in the GEE model predicting number of heavy drinking days (IRR = 0.97, 95% CI = 0.88–1.07,  $p = .58$ ) at 3, 6, and 9 months was nonsignificant, as was the effect on pBAC ( $B = -0.051, SE = 0.067, d = -.07, 95\% CI = -0.18 - .084, p = .46$ ). In both models, the BMI X time interaction was nonsignificant,  $p$ 's = .40 and .27, respectively (Figures 2 & 3). In contrast, the main effect of BMI on the number of problems endorsed on the B-YAACQ was significant (IRR = 0.84, 95% CI = 0.74–0.94,  $d = 0.23, p = .002$ )<sup>5</sup>, indicating a 16% reduction in the

<sup>5</sup>There are no established methods for converting an IRR to an absolute effect size such as *d* (Deeks, Higgins, & Altman, 2008). Therefore, we calculated *d* by re-running the GEE model specifying a normal distribution for BYAACQ scores rather than a negative binomial distribution.

incidence rate of problems in BMI compared to AO. The BMI X time interaction was nonsignificant ( $p = .27$ ), indicating that the effect of BMI persisted over time (Figure 4).

### Recidivism

As can be seen in Table 2, the low-risk group had low rates of recidivism throughout the follow-ups. In total, 60 participants received a second infraction after the 6-week assessment. The high-risk drinkers, as would be expected, had greater rates of being referred for subsequent alcohol infractions. However, the BMI group received significantly fewer infractions over the course of the 9 month follow-up than the participants in the assessment-only group.

### Discussion

This study is, to our knowledge, the first large-scale evaluation of stepped care with mandated college students. This project contributes to the growing literature on reducing risky drinking in mandated students in several ways. First and foremost, the study demonstrates that the stepped care approach is feasible and effective in reducing alcohol-related problems in mandated students. Individuals who did not respond to a peer-delivered Brief Advice session did reduce their alcohol-related consequences following a professionally delivered BMI with reductions maintained at nine months. Second, individuals receiving the BMI were also less likely to receive subsequent referrals for violating alcohol policy, which has clear implications for the administrative and counseling resources of college campuses. Third, the students who were identified as being low-risk drinkers at the six-week assessment continued to report low levels of alcohol use and problems throughout the 9-month follow-up period. This confirms that a more intensive BMI with these cases would not have been an efficient allocation of resources. Taken together, these findings support the implementation of stepped care in the college setting.

Of particular interest was the decrease in alcohol-related problems in the absence of reductions in heavy episodic drinking episodes and peak BAC. There are a couple of explanations for this finding. First, alcohol use and consequences do not have a monotonic relationship, and research has revealed different etiological pathways of alcohol consumption and consequences (see Hustad, Carey, Carey, & Maisto, 2009; Neal & Carey, 2007). Therefore, the observed reduction in consequences did not require a commensurate reduction in drinking. Second, the YAACQ may have been more sensitive to changes in alcohol-related problems than the other measures commonly used in the research literature such as the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) and the YAAPST. In fact, the YAACQ was developed in order to assess a wider continuum of problems than the YAAPST and RAPI, both of which contained items that were rarely endorsed by college students (see Kahler et al., 2005). Third, our BMI focused extensively on alcohol related problems and harm reduction. Of course, reductions in alcohol consumption as a way to reduce consequences was also a primary focus, but it was our clinical experience that excessive focus on reducing alcohol use did not engage the students as much as discussion of personal consequences of use, and how to avoid these in the future. Therefore, it is possible that receiving the BMI focused on reducing problems in the context of alcohol use increased the participant's motivation to use protective strategies to avoid a wide range of consequences. It is also telling that the same pattern of reductions in problems but not risky drinking was evident in previous research with a nearly identical intervention (Borsari & Carey, 2005).

The trends in recidivism also favored the BMI group. It is possible that the observed reductions in recidivism (and alcohol-related problems) may have been related to extraneous factors and not a function of the actual intervention. For example, previous research has

suggested that being cited for an alcohol policy violation might serve as an intervention for some mandated students (Carey, Henson, et al., 2009; Morgan, White, & Mun, 2008). Specifically, being cited might motivate some students to decrease their alcohol use without the assistance of an alcohol intervention. In light of the importance of the citation, we investigated the role of the citation in the current study (Hustad et al., 2011). Results suggested that participants, on average, modestly reduced their alcohol consumption after the citation. Specifically, participants reduced the amount of alcohol consumed on a typical week by an average of 1.18 drinks per week (or an average reduction of 0.17 drinks per day) from average weekly consumption patterns two weeks before to the citation to the average weekly consumption for the two weeks following the citation. Similar modest effects for the citation were also found for the amount of alcohol consumed on the same day of the week as the citation and the maximum amount of alcohol consumed for the two week period before and after the citation. Thus, in this sample, the citation exerted only a minor effect on drinking, further indicating that a subset of mandated students may not require additional intervention. It is also interesting to note that there was not a significant effect of the intervention on recidivism until between 6 and 9 months following the BMI. As one would expect citation effects to be more immediate, perhaps this reduction was indicative of a delayed (or “sleeper”) effect of BMIs that has been observed in other research with mandated students (White et al., 2007). It is possible that the in-person BMI led to a deeper processing of the provided information or verbal commitments to reduce alcohol use and problems, both of which contributed to the observed reductions in recidivism and alcohol-related problems.

Conducting this project demonstrated the difficulty in striking a balance between practicality and comprehensive delivery of interventions, which has direct implication for the translation of efficacious results into effective practices in the college setting. Specifically, the selection of criteria for this study highlights a central issue in the implementation of stepped care: identifying who is eligible for the next step of care. Our decision rule turned out to be very inclusive: In our sample, over 75% of the students were eligible for Step 2. The resources of the project, and the randomization of approximately half of the participants to an assessment-only group, permitted the retention of these tailoring variables and decision rule throughout the project. However, a college counseling center with fewer resources may not have been able to accommodate all of the students identified as risky drinkers following a brief advice session.

The unexpected rates of eligibility for a “stepped up” intervention indicates each institution should take institutional resources into account when establishing a stepped care model. Put simply, the best approach is to carefully choose the tailoring variables and decision rules that will determine if someone gets a more intensive step of care. On campus, this may pose a problem when variables related directly to alcohol policy (e.g., students receiving another referral are assigned to receive a BMI) may not represent risky drinking if then citation is not indicative of actual use (e.g., being in the presence of alcohol vs. public intoxication). As a result, students may be inappropriately referred for alcohol-related stepped care. To minimize such an occurrence, perhaps the clusters developed by Barnett and colleagues (2008) could be used as a guide. For example, the “Why Me” and “Bad Incident” group may not require an intervention of the same intensity as the “So What?” group, as their alcohol use is typically less risky, however, students who had a high level of incident drinking, such as those in the “Bad Incident” group may require some clinical evaluation and response. Granted, these rules will differ by campus, but should still be based on site characteristics, resources, and empirical guidelines for risk.

The purpose of this study was to evaluate the efficacy of one potential stepped care model for alcohol use, one that used a peer-delivered Brief Advice session and “stepped up” care to

a more intensive BMI. Given the attention focused on college drinking over the past 15 years, there are now a variety of interventions that could be incorporated into stepped care in the college setting. For example, initial and less intensive steps of care could include alcohol intervention delivered over the internet (see Walters, Wright, & Shegog, 2006 for review). Computer-delivered alcohol interventions (CDAs) have also emerged as a promising approach to reduce risky drinking given their broad reach and limited administrative burden (Zisserson, Palfai, & Saitz, 2007). Several empirically supported multi-component CDAs exist and these interventions often include a combination of strategies to reduce alcohol use (e.g., alcohol education, alcohol norms clarification, alcohol expectancy challenges, decisional balance, and harm reduction strategies), and a recent meta-analysis indicated that CDAs have evidence of efficacy (Carey, Henson, et al., 2009). In addition, more intensive modalities of treatment have shown promise. Single and multi-session group motivational interventions have shown promise with both volunteer and mandated students (e.g., Fromme & Corbin, 2004; LaBrie, Thompson, Huchting, Lac, & Buckley, 2007).

Our findings suggest many promising directions of research. First, the efficiency and efficacy of a stepped care model can be weakened by the inappropriate designation of a tailoring variable or decision rule at any step of intervention (Collins et al., 2004). Therefore, continued development and refinement of the appropriate tailoring variables to assess, their measurement, and the decision rules will be valuable in the dissemination of stepped care in the college setting. For example, in our study, an alternate decision rule would have been to recommend more intensive treatment for students reporting particular types of consequences (e.g., blackouts, being injured as a result of drinking) rather than using a summary of problems. Second, it will also be important to identify the characteristics of individuals that respond to the different interventions that can be implemented in a stepped care model, from brief advice to multi-session groups. Fortunately, over the past decade there has been increased interest in identifying mechanisms of behavior change, defined as processes or events that lead to therapeutic improvement (Kazdin, 2007; Kazdin & Nock, 2003; Nock, 2007). For example, in the college setting, BMIs have been found to be less effective with college students who are impulsive (Feldstein Ewing, LaChance, Bryan, & Hutchison, 2009) or have poor self-regulation skills (Carey, Henson, Carey, & Maisto, 2007). In addition to the identification and examination of moderators of treatment, more attention is being directed toward the in-session interactions of the interventionist and client during the session and their link to subsequent behavior change. For example, Glynn & Moyers (2010) used an ABAB design in which the therapists switched back and forth between change talk evocation (CT) and functional analysis (FA) style. Students engaged in more change talk during the CT portion of the session than in the FA, indicating that therapist behaviors can significantly influence one of the proposed mechanisms of behavior change of motivational interviewing, client change talk. Taken together, the improved understanding of how and for whom interventions work can only improve stepped care models.

## Limitations

This study is not without limitations. First, we used self-report data and did not collect collateral verification. However, collateral and participant self-report of alcohol use is only moderately correlated in college students, with participants reporting more high-risk drinking and more alcohol-related problems than collaterals (Borsari & Muellerleile, 2009; Laforge, Borsari, & Baer, 2005). Therefore, the lack of evidence of systematic underrepresentation of drinking, time and expense required to obtain collateral reports, and the use of procedures to enhance accurate self-report informed our decision not to use collaterals. Second, the sample was predominately White and was collected at a small liberal arts school in the northeast. Findings may not generalize to schools with different demographic

characteristics and/or campuses with different alcohol policies and enforcement strategies. Third, we were unable to evaluate the efficacy of stepped care relative to no stepped care (i.e., treatment as usual). We had considered implementing this design, but rejected it because it would be unethical to refuse students prompt attention following an alcohol violation. This design also would have limited the external validity of the findings, as other campus administrations would likely have the same concerns. However, the use of an assessment-only control for Step 2 was determined to be acceptable because all students received a Step 1 intervention (standard care at the study site), and were referred for more intensive treatment if necessary. Fourth, at the time we conducted the study there was no sensitivity or specificity data available to justify using a YAACQ cutoff of 5 or more. Ideally, future research will establish the utility of this criterion in future efforts implementing stepped care with mandated students. A final limitation is that we were unable to evaluate the effect of assessment reactivity on outcomes – it is possible that completing web surveys every three months may have influenced the participants' drinking behaviors (see Clifford & Maisto, 2000).

In sum, this project demonstrated that mandated college students exhibiting risky alcohol use returned to receive the more intensive BMI, and reported a subsequent reduction in alcohol-related problems and administrative referrals. Furthermore, the low-risk group did not demonstrate a significant increase in alcohol use or problems, indicating that provision of a more intensive intervention to these individuals would not have been the most efficient use of resources. Putting this study in a larger context, given the increasing cost of health care and decreasing budgets in higher education, stepped care is a promising and efficient way to provide interventions to heterogeneous populations. It is hoped that this project will inform the development and implementation of stepped care algorithms in a variety of settings as well as the selection of interventions to be used in future applications of stepped care.

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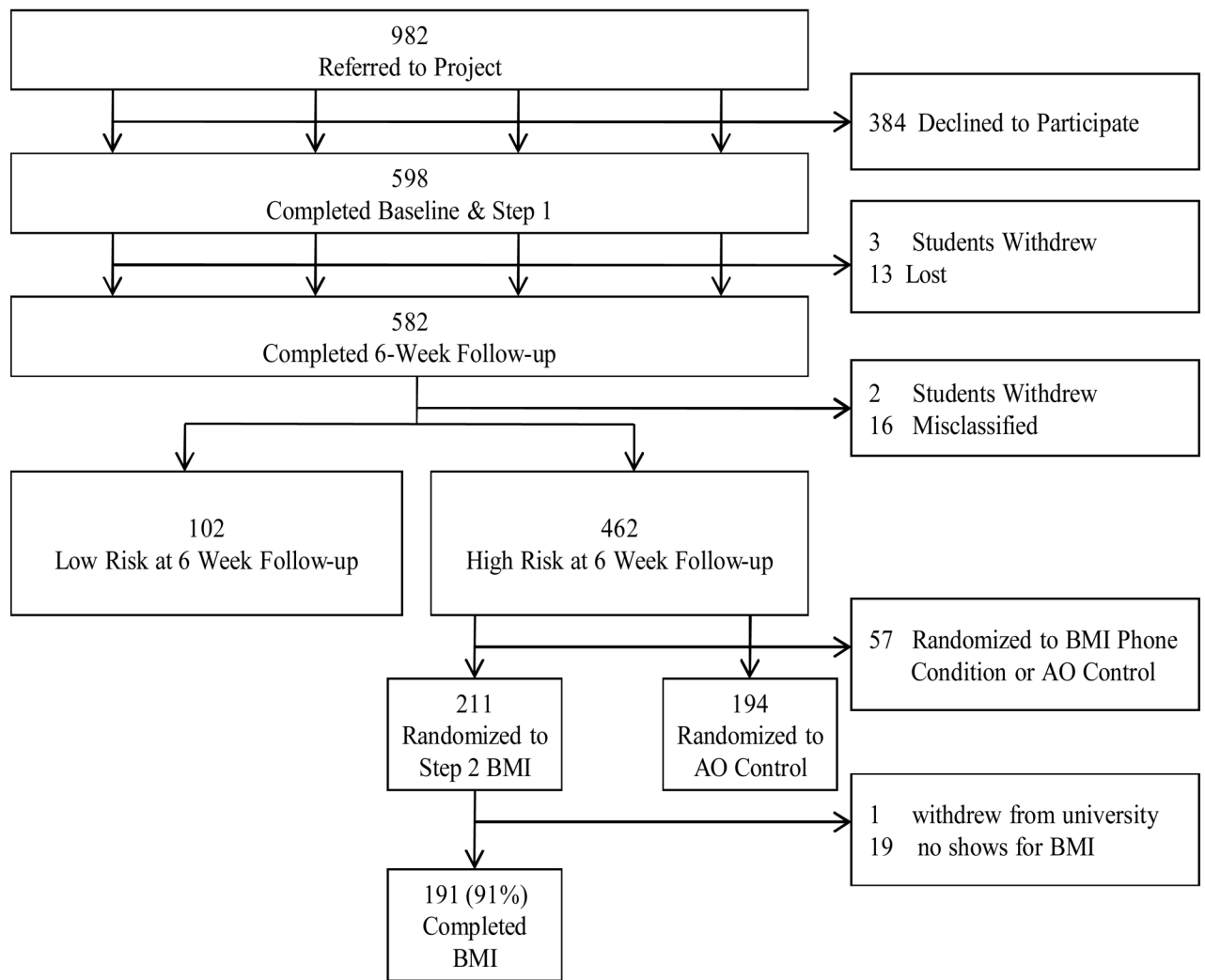
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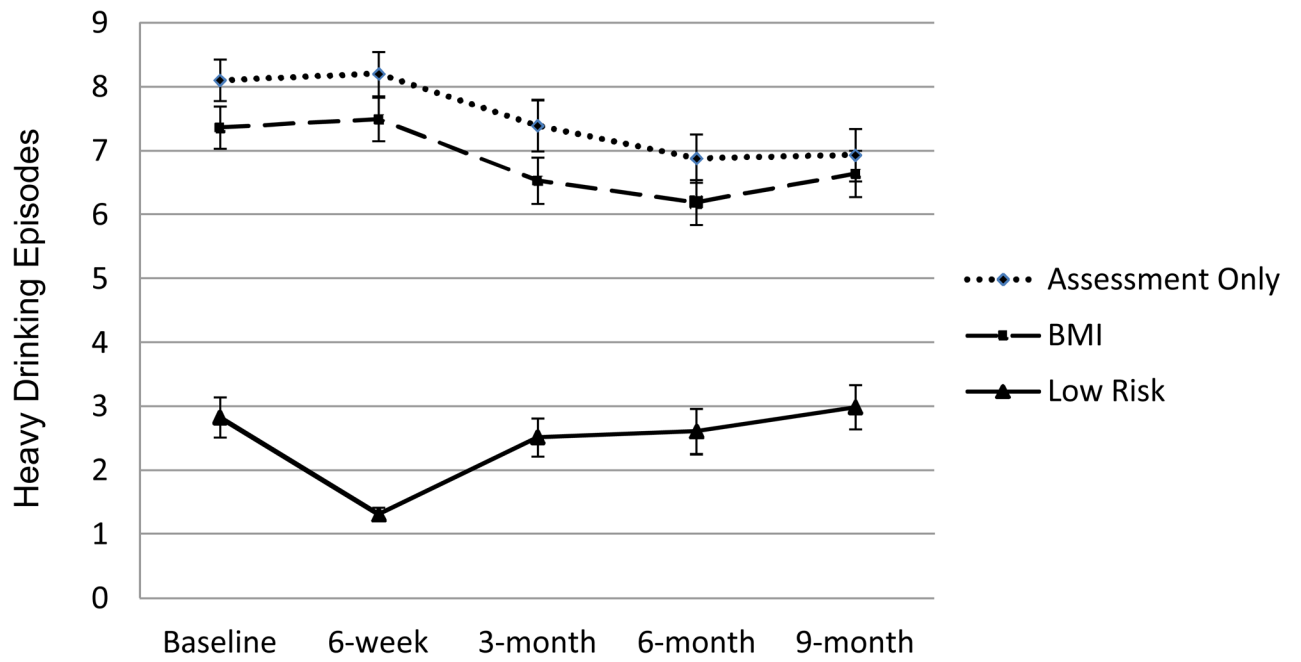
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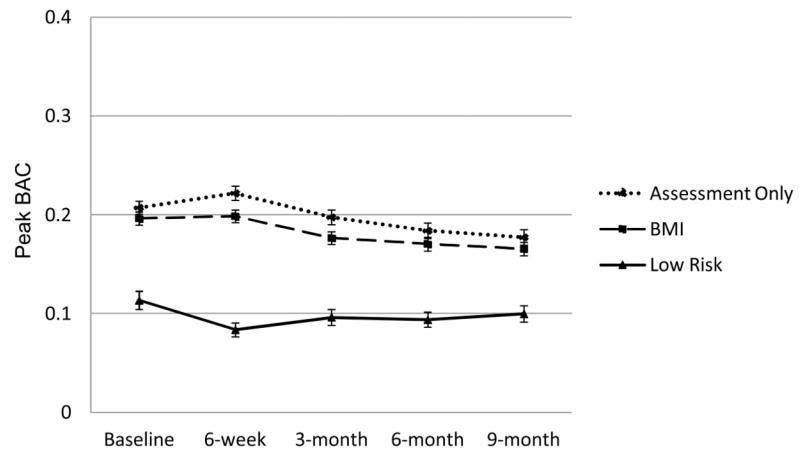
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**Figure 1.**  
Participant flow



**Figure 2.**  
Number of heavy drinking days over time

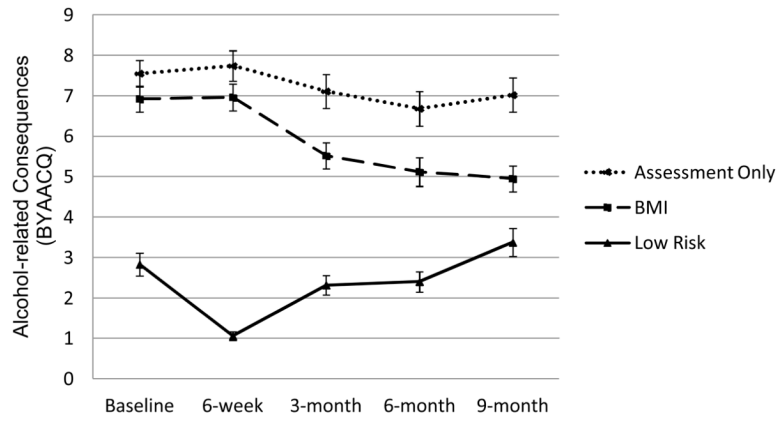


**Figure 3.**  
Estimated peak blood alcohol concentration over time

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**Figure 4.**  
Number of alcohol-related consequences over time

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Table 1

## Descriptive Statistics at 6-week Assessment

Variable	Sample Summary N (% or SD)	Low Risk (n=102) Mean (SD)	BMI (n=211) Mean (SD)	AO (n=194) Mean (SD)	Test statistic $F/\chi^2$
<u>Demographics</u>					
Age in years	18.68 (0.79)	18.75 (0.75)	18.68 (0.82)	18.64 (0.77)	0.48
<u>Gender</u>					
Male	349 (68.0)	65 (63.7)	142 (67.3)	138 (71.1)	1.79
Female	164 (32.0)	37 (36.3)	69 (32.7)	56 (28.9)	
<u>Race</u>					
White	493 (96.1)	101 (99.0) <sup>b</sup>	208 (98.6) <sup>c</sup>	179 (92.3) <sup>d</sup>	15.99 <sup>**</sup>
Non-white	20 (3.9)	1 (1.0)	3 (1.4)	15 (7.7)	
<u>Year in school</u>					
Freshman	347 (68.0)	66 (64.7)	136 (64.8)	141 (73.4)	5.13
Sophomore	123 (24.1)	28 (27.5)	56 (26.7)	37 (19.3)	
Upperclassmen	40 (7.8)	8 (7.8)	18 (8.6)	14 (7.3)	
GPA	2.99 (0.47)	3.08 (0.42)	2.96 (0.52)	2.98 (0.42)	2.34
<u>Alcohol Use Variables</u>					
Age at first drink	15.67 (1.54)	16.12 (1.71) <sup>b</sup>	15.63 (1.42) <sup>c</sup>	15.49 (1.51) <sup>c</sup>	3.97 <sup>**</sup>
<u>Type of offense</u>					
Alc. presence or possess.	463 (90.4)	90 (89.1)	191 (90.5)	176 (90.7)	3.32
Behavioral infraction	46 (9.0)	11 (10.9)	19 (9.0)	16 (8.2)	
Medical infraction	2 (0.4)	0 (0.00)	1 (0.5)	1 (0.5)	
No. drinking episodes <sup>a</sup>	9.82 (11.49)	3.77 (3.26) <sup>b</sup>	11.36 (13.57) <sup>c</sup>	11.44 (10.86) <sup>c</sup>	18.55 <sup>***</sup>
Average no. drinks: typical episode <sup>a</sup>	7.19 (4.21)	3.90 (2.32) <sup>b</sup>	8.06 (4.95) <sup>c</sup>	7.99 (3.15) <sup>c</sup>	45.11 <sup>***</sup>
No. HED episodes <sup>a</sup>	6.50 (5.09)	1.31 (1.07) <sup>b</sup>	7.49 (4.87) <sup>c</sup>	8.20 (4.82) <sup>c</sup>	92.57 <sup>***</sup>
No. peak drinks <sup>a</sup>	10.75 (5.66)	5.54 (3.35) <sup>b</sup>	11.39 (5.27) <sup>c</sup>	12.81 (5.35) <sup>c</sup>	74.22 <sup>***</sup>
B-YAACQ score	5.63 (5.15)	1.04 (1.07) <sup>b</sup>	6.96 (4.76) <sup>c</sup>	7.74 (1.07) <sup>c</sup>	86.90 <sup>***</sup>

Note: HED=heavy episodic drinking, Behavioral infraction = Drunk in public, fighting, and fake ID, AUDIT= Alcohol Use Identification Test, YAACQ= Young Adult Alcohol Consequences Questionnaire, ADCQ= Alcohol and Drug Consequences Questionnaire, RFLD= Reasons for Limiting Drinking questionnaire

<sup>a</sup>Past month



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*b, c, d* Group differences notated by these three superscripts; *b, c, d*

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$

**Table 2**

Recidivism rates following assignment to stepped care

Group	6-Week to 3-Month Follow up	3-Month to 6-Month Follow up	6-Month to 9-Month Follow-up	Total Infractions
Low Risk	4 (3.8%)	4 (4.1%)	0 (0%)	9 (3%)
High Risk	20 (10.2%)	11 (5.9%)	6 (3.1%) <sup>a</sup>	37 (6.4%) <sup>a</sup>
AO	23 (12.2%)	19 (10.4%)	17 (9.1%)	60 (10.2%)

Note: BMI = Brief Motivational Intervention; AO = Assessment Only Percentages derived from total number of participants who *completed* the survey

<sup>a</sup>Significant difference between BMI and AO groups ( $\chi^2$ ),  $p < .05$