



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

 ScienceDirect

Addictive Behaviors 32 (2007) 889–901

---

---

**ADDICTIVE  
BEHAVIORS**

---

---

## A campus-based motivational enhancement group intervention reduces problematic drinking in freshmen male college students <sup>☆</sup>

Joseph W. LaBrie <sup>a,\*</sup>, Eric R. Pedersen <sup>b,1</sup>, Toby F. Lamb <sup>b,2</sup>, Thomas Quinlan <sup>a,1</sup>

<sup>a</sup> Loyola Marymount University, Department of Psychology, 1 LMU Drive, Los Angeles, CA 90045, United States

<sup>b</sup> Loyola Marymount University, Heads UP!, 1 LMU Drive, Los Angeles, CA 90045, United States

---

### Abstract

The current study employs an adaptation to Motivational Interviewing (AMI) group intervention with freshmen male undergraduates. The program follows suggestions of the National Institute on Alcohol Abuse and Alcoholism for effective interventions with problematic college student drinking, and combines several empirically validated strategies to prevent drinking problems throughout college. All participants reduced drinking and alcohol-related problems; heavier drinkers and those experiencing the most alcohol-related problems reduced drinking most. Additionally, freshmen who completed the intervention were less likely than their non-intervention freshmen male peers to commit alcohol-related violations of campus policies. In addition to the reductions in problematic drinking, the group AMI has advantages over individual formats because larger numbers of students can benefit with comparable expenditures of time and effort.

© 2006 Elsevier Ltd. All rights reserved.

*Keywords:* Alcohol; Motivational Interviewing; Group intervention; College drinking; Freshmen college students

---

<sup>☆</sup> This research was funded by Grant Q184H030069 from the United States Department of Education Office of Safe and Drug Free Schools.

\* Corresponding author. Tel.: +1 310 338 5238; fax: +1 310 338 7726.

*E-mail addresses:* [jlabbrie@lmu.edu](mailto:jlabbrie@lmu.edu) (J.W. LaBrie), [epedersen@lmu.edu](mailto:epedersen@lmu.edu) (E.R. Pedersen), [tlamb@lmu.edu](mailto:tlamb@lmu.edu) (T.F. Lamb), [tquinlan@lmu.edu](mailto:tquinlan@lmu.edu) (T. Quinlan).

<sup>1</sup> Tel.: +1 310 338 7770.

<sup>2</sup> Tel.: +1 310 338 3753.

0306-4603/\$ - see front matter © 2006 Elsevier Ltd. All rights reserved.

doi:10.1016/j.addbeh.2006.06.030

Problematic student drinking concerns nearly every major university. Forty percent of college students report heavy drinking within the prior month (O'Malley & Johnston, 2002) and students who engage in heavy drinking have a greater likelihood of experiencing negative alcohol-related consequences (Wechsler & Nelson, 2001). Excessive drinking is associated with damaged property, poor class attendance, hangovers, trouble with authorities, injuries, and fatalities (Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler & Isaac, 1992; Wechsler, Lee, & Kuo, 2000). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) Task Force on College Student Drinking (2002) reported that first year resident students frequently misuse alcohol and experience negative consequences from use. Many freshmen students initiate heavy drinking during their first weeks on campus, and these patterns may continue throughout college interfering with academic success (Schulenberg et al., 2001; Wechsler et al., 1994). Moreover, students who drank heavily before college appear to significantly increase their drinking during the initial month at college (Baer, Kivlahan, & Marlatt, 1995). Finally, Turrisi, Padilla, and Wiersma (2000) found that freshmen consume larger amounts of alcohol than upperclassmen; suggesting that freshmen may require interventions to prevent them from developing problematic drinking. Fromme and Corbin (2004) suggest that interventions aimed towards younger college students, and particularly Caucasian men, may be helpful in preventing future problems and reduce the need for disciplinary actions.

Evidence supports the effectiveness of interventions that (1) use survey data to counter students' misconceptions about their fellow students' attitudes towards excessive drinking, (2) concurrently address alcohol-related attitudes and behaviors, and (3) increase students' motivation to change their drinking habits (Larimer & Cronce, 2002). Programs that combine these three empirically validated approaches are the most effective in reducing problem drinking. Interventions designed to build motivation for change follow the principles of Motivational Interviewing (MI; Miller & Rollnick, 2002). MI is a non-judgmental, client-centered style of counseling founded on the basic principles of expressing empathy, developing discrepancy, rolling with resistance, and supporting efficacy. Strategies focus on helping individuals build motivation to change problem behaviors. Interventions incorporating additional non-MI techniques or interventions specifically adapted for use by non-licensed MI therapists constitute adaptations of Motivational Interviewing (AMIs; Rollnick, Heather, & Bell, 1992).

Two intervention strategies that lend themselves to the therapeutic style of MI are social norms feedback and expectancy challenges. Students tend to have skewed perceptions of their peers' drinking behavior, perceiving other students as drinking more than they actually do (Baer, Stacy, & Larimer, 1991). Providing feedback to participants to correct misperceptions of peer drinking norms is an important piece of some motivational interventions to reduce drinking (Baer, 1994; Collins, Carey, & Sliwinski, 2002; Marlatt et al., 1998). Further, alcohol expectancies, beliefs and ideas about the positive effects of alcohol, are related to patterns of heavy drinking in college students (Hull & Bond, 1986; Marlatt & Rohsenow, 1980; Neighbors, Walker, & Larimer, 2003; Noar, LaForge, Maddock, & Wood, 2003). Expectancies that alcohol increases sociability, enhances sexual opportunity, and reduces stress and tension all predict heavier drinking. Interventions involving expectancy challenges have reduced drinking successfully (Darkes & Goldman, 1993, 1998). Researchers argue that providing students with information from studies that challenge alcohol expectancies helps them discover how their own expectancies influence their behavior while encouraging students to experiment with lesser quantities of alcohol to see that alcohol's perceived benefits are not caused solely by the physiological effects of the drug (Dimeff, Baer, Kivlahan, & Marlatt, 1999).

Several reviews of AMIs affirm the effectiveness of these interventions (Burke, Arkowitz, & Menchola, 2003; Dunn, DeRoo, & Rivara, 2001; Noonan & Moyers, 1997). Individual AMI interventions have reduced drinking in volunteer college student problem drinkers (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Borsari & Carey, 2000; Collins et al., 2002) as well as in heavy drinking mandated students (Barnett et al., 2004; White et al., 2006). Nevertheless, individual AMI interventions are time-consuming and do not provide immediate peer feedback and support. Few studies have examined how to adapt the principles of MI to a group setting. Foote and colleagues (1999) suggest that group sessions may encourage participants to strive for change due to the greater sense of autonomy and supportiveness experienced in the groups. Additionally, group interventions that foster increased autonomous motivation predict greater individual change (Ryan, Plant, & O'Malley, 1995). Finally, while many therapeutic techniques of MI are used in individual interventions, McNally and Palfai (2003) provide support for components of MI to be used in group interventions. If shown to be as successful as individual AMI interventions, group interventions can help reduce problematic drinking for many individuals at once.

The current study assesses a single-session group intervention targeting freshmen males during their initial weeks in college. The session was designed to encourage responsible drinking, promote mindfulness of one's alcohol consumption, and reduce problems resulting from alcohol use. The intervention employs the empathic, non-confrontational style of MI and combines three key components of motivating behavior change: (a) presenting participants with normative feedback to counter misperceptions of normative drinking behavior; (b) providing participants with information regarding alcohol expectancies and how they can influence behavior; and (c) building motivation to change through MI techniques—assessment of past drinking, construction of a decisional balance for changing drinking behavior, skill development to deal with high-risk drinking situations, and creation of behavioral goals.

The goal of the current campus-based intervention is to reduce problematic drinking within freshmen college males. Using the empathetic and non-confrontational style of MI, it is anticipated that motivation to reduce drinking will increase post-intervention, thereby impacting greater behavioral changes. The utility of a group AMI is that an intervention with large numbers of first year male students may prevent this high-risk group from becoming problematic drinkers as they progress throughout college. The current study utilizes both a within-person and between-group design. Specifically, all participants were hypothesized to reduce drinking from pre-intervention levels throughout 3 months of follow-up. Additionally, participants are anticipated to have fewer alcohol-related violations of campus policy compared to freshmen males not receiving the intervention.

## 1. Methods

### 1.1. Participants

During their initial month at a mid-sized private Western university, 120 freshmen males responded to flyers seeking participants for group discussions regarding drinking attitudes and habits. The participants, averaging 18.02 (SD=.50) years of age, received a nominal stipend for their participation (\$25 for initial intervention and \$10 each for one and three month follow-ups). Seventy-eight of the students (65%) were Caucasian, while the remaining 42 students (35%), who belonged to several different ethnic groups (13% Hispanic/Latino, 11% “mixed” ethnicity, 8% African American or Black, and 3% “other” ethnicities), were classified as “non-Caucasian.” Seventy-five percent ( $N=90$ ) completed the 3-month follow-up (92%,

$N=110$ , completed one-month follow-up). Those who failed to complete all follow-ups did not significantly differ from completers on age, race, or other demographic information, as well as on initial pre-study drinking behavior.

## 1.2. Design and procedure

The local IRB approved the project and, upon arrival at the group intervention, each participant gave informed consent and was assured confidentiality. They then completed a pre-intervention assessment questionnaire that included demographic information as well three self-report questions—how many times they drank alcohol within the past month, the average number of drinks they had each time they drank, and the maximum number of drinks they drank during a single occasion in the past month. In addition, they indicated their intended drinking behavior over the next month for the same drinking variables. Reliability analyses for these six alcohol questions revealed an alpha of .945. The questionnaire also contained the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989), which using an open-ended response option, assessed problems encountered during the prior month while drinking or as a result of alcohol use ( $\alpha=.852$ ). Finally, a Readiness to Change Drinking Ruler adapted from MI assessed how willing and ready one was to change drinking behavior. This measure asks participants to rate how ready they are to change problematic behavior on a 10-point ruler from 1 “I’ve never needed to change my drinking” to 10 “My drinking has changed. I now drink less than before.” This Change Ruler performs equivalently to standard multiple item questionnaires in assessing readiness to change drinking behavior (LaBrie, Quinlan, Schiffman, & Earleywine, 2005).

### 1.2.1. Group intervention

The group MI-based intervention consisted of a Timeline Followback (TLFB) assessment of drinking (Sobell & Sobell, 1992), normative feedback information, a decisional balance to weigh the Pros and Cons of drinking behavior, relapse prevention, expectancy challenge information, and the creation of behavioral goals. Groups consisted of 10–15 freshmen males, lasted between 60 and 90 min, and were led by one of two doctoral-level facilitators trained in MI. The groups were non-confrontational as facilitators validated students’ drinking experiences, rolled with resistance, and encouraged participants to make their own decisions about drinking mindfully (see detailed description of intervention by LaBrie, Pedersen, Lamb, & Bove, 2006).

First, participants completed a TLFB of drinking behavior over the 3 months prior to the intervention. Although directions were given in the group, participants were instructed to construct their TLFB individually. To increase memory for drinking events over the three-month period, each participant identified personal “marker” days, such as vacations, sporting events, visitors, parties, and birthdays. Using the marker days and drinking patterns to aid in recall, participants went back, day-by-day, through their calendar writing in the number of drinks consumed each day they drank. The TLFB allows participants to personally confront their drinking behavior over the past 3 months. This TLFB method is reliable and valid when used with college students (Sobell, Sobell, Klajner, Pavan, & Basian, 1986) and has been shown to reveal similar responses when performed in a group and when performed alone (LaBrie, Pedersen, & Earleywine, 2005; Pedersen & LaBrie, 2006).

Upon completion of the TLFB, the facilitator provided participants with normative drinking data for the local University (based on the CORE Alcohol and Drug Survey) to correct overestimations of drinking on campus. Participants also received feedback about the prevalence of alcohol-related incidents of violence, forced sex, vandalism, and other negative alcohol-related consequences. Next, as a group, the participants first generated reasons against (Cons) and then reasons for (Pros) drinking less. Each reason was highlighted and affirmed. If the group failed to generate Pros from a validated decisional balance

measure (Migneault, Pallonen, & Velicer, 1997), the facilitator mentioned them and listed them on the board with the other Pros. After group discussion, participants wrote the reasons for and against drinking less that resonated with them on a decisional balance sheet. They rated the personal importance of each Pro and Con as well as the overall personal importance of their total individual Pros and Cons.

The group discussed high-risk situations that might lead to excessive drinking. These discussions allowed students to explore their own potentially high-risk situations, identify skills for handling these situations, and gain input and support for dealing with these situations in the future. The group also discussed their expectancies for the effects of alcohol; particularly the social expectancy effects of use within the college context (i.e., “It helps me talk to new people,” “It facilitates a connection with members of the opposite sex”). Participants then received alternative evidence indicating that expectancies rather than the alcohol itself may lead to the social and sexual enhancement effects often related to drinking. The facilitator reviewed studies that revealed the role of expectancies in post-drinking behavior and emotion (Darkes & Goldman, 1993, 1998; Hull & Bond, 1986; Marlatt & Rohsenow, 1980). This was followed by a brief discussion where participants processed the presented information.

At the end of the group, participants wrote down a behavioral goal for how they would drink in the next 30 days. These goals were aimed at either maintaining safe levels or reducing harmful levels of drinking. Goals were then shared with the group. Two examples of behavioral goals include “I will continue to drink in a responsible manner; which is about 2 to 3 drinks per occasion” (maintenance) and “I want to limit my drinking to 5–6 drinks at parties. I want to drink in moderation and still enjoy social situations” (reduction).

Finally, participants completed monthly drinking logs each month for the 3 months following the intervention. They recorded how many standard drinks they consumed each day. In addition, the monthly diaries assessed intended drinking behavior over the next month, Readiness to Change using the Ruler, and 11 problematic behaviors.

## 2. Results

Four drinking variables were examined to assess change among the intervention participants—total drinks per month, drinking days per month, average drinks consumed per occasion in each month, and maximum drinks consumed at one time in each month. An overall MANOVA revealed significant changes among all participants for all four drinking variables from pre-intervention to one-month follow-up ( $F(1,107)=8.37, p<.001$ ) and from pre-intervention to three-month follow-up ( $F(1,86)=4.89, p<.01$ ). Repeated measures ANOVA analyses revealed significant within-subjects differences across time (pre-

Table 1  
Drinking variables for freshmen males from pre-intervention to one-month and three-month follow-up

Drinking variable	Self-report ( $N=120$ )	One-month follow-up ( $N=110$ )	Three-month follow-up ( $N=90$ )
	M (SD)	M (SD)	M (SD)
Drinking days	5.92 (5.66)	5.25 (5.82)	3.61 (4.40)*
Average drinks	5.23 (4.23)	4.23 (3.90)*	3.65 (4.06)**
Total drinks	47.23 (65.01)	33.24 (40.72)*	23.18 (37.00)*
Max drinks	9.85 (7.55)	6.75 (5.90)***	5.35 (5.79)***

Note: Values represent significant reductions in drinking variables from self-report to follow-up months: \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$ .

intervention, one-month and three-month follow-ups) for total drinks per month ( $F(2,174)=5.35, p<.05$ ), drinking days per month ( $F(2,178)=3.87, p<.05$ ), average drinks per month ( $F(2,174)=6.09, p<.01$ ), and maximum drinks ( $F(2,172)=16.35, p<.001$ ). Post hoc comparisons revealed significant reductions in drinking behavior from pre-intervention to one- and three-month follow-up (see Table 1 for means and standard deviations). Across all participants, drinks per month reduced 51% from 47.23 (SD=65.01) drinks to 23.18 (SD=37.00) drinks at three-month follow-up, while maximum drinks at any one time decreased 46% from 9.85 (SD=7.55) drinks to 5.35 (SD=5.79)drinks.

### 2.1. Drinker type analyses

Using TLFB data and previous research classifications (Wechsler & Nelson, 2001), participants were classified based on binge drinking (i.e., five or more drinks in one sitting for males) incidents in the previous 2 weeks. Non-Drinkers ( $N=19$ ) consumed no drinks at all over the three month TLFB assessment, Non-Binge Drinkers ( $N=40$ ) never consumed more than five drinks at one time in the two week period, Binge Drinkers ( $N=36$ ) drank more than five drinks on at least one occasion but less than

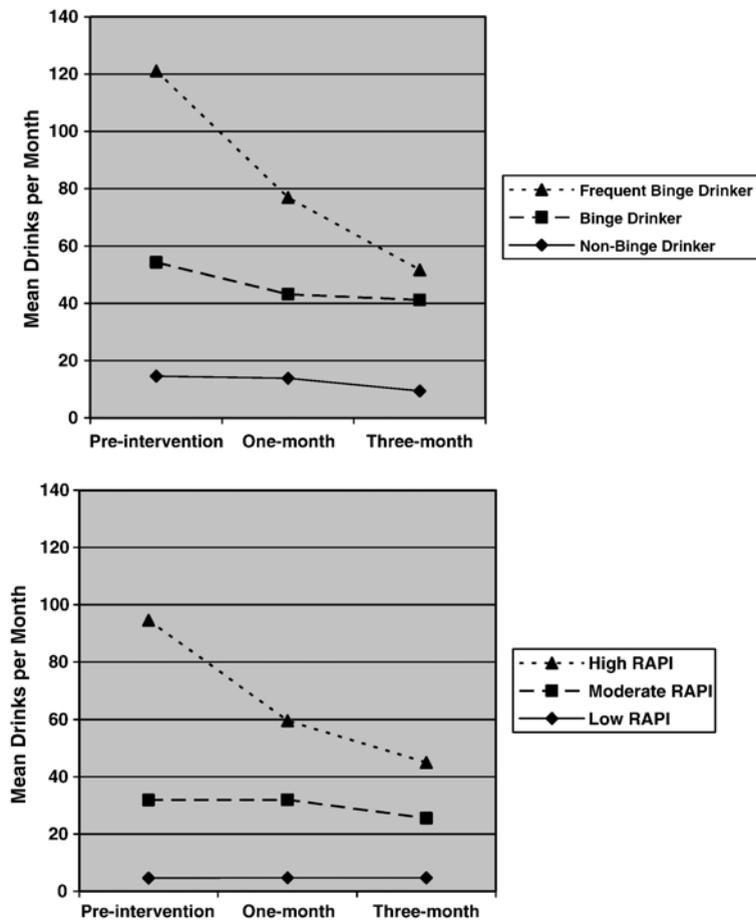


Fig. 1. Interactions in drinking across time by drinker type and RAPI group.

Table 2

Drinking variables and readiness to change (RTC) ruler by drinker type from pre-intervention to one-month and three-month follow-up

	Pre-intervention	One-month follow-up	Three-month follow-up
	M (SD)	M (SD)	M (SD)
<i>Non-Binge Drinkers (N=40)</i>			
Drinking days	2.77 (3.16)	2.66 (2.30)	2.00 (2.77)
Average drinks	3.68 (3.26)	3.23 (3.05)	2.54 (3.46)
Total drinks	14.56 (18.51)	13.82 (16.92)	9.43 (14.79)
Max drinks	7.21 (6.88)	4.57 (4.34)*	3.84 (5.09)*
RTC ruler	3.40 (3.88)	2.74 (3.22)	2.65 (3.76)
<i>Binge Drinkers (N=36)</i>			
Drinking days	6.88 (3.30)	6.91 (5.43)	6.40 (4.99)
Average drinks	7.59 (2.71)	6.02 (4.41)*	5.86 (3.66)
Total drinks	54.23 (35.67)	43.15 (32.86)	41.12 (35.94)
Max drinks	12.41 (4.12)	9.09 (5.43)*	9.12 (5.40)*
RTC ruler	2.50 (2.81)	2.77 (2.49)	2.14 (2.23)
<i>Frequent Binge Drinkers (N=25)</i>			
Drinking days	13.50 (5.04)	11.05 (6.39)	6.60 (4.17)*.a, b
Average drinks	8.27 (4.04)	6.61 (2.33)	6.84 (3.97)
Total drinks	121.14 (98.92)	76.91 (51.89) <sup>a</sup>	51.60 (58.43)*.a, b
Max drinks	16.73 (5.66)	11.86 (4.60)**	9.00 (5.14)**.a
RTC ruler	2.76 (2.74)	4.26 (3.48)*.a	4.93 (2.68)*.a, b

Values represent significant changes from self-report to follow-up month \* $p < .05$ , \*\* $p < .01$ .

<sup>a</sup> Indicates a significant ( $p < .05$ ) difference in reduction between Frequent Binge Drinkers and Non-Binge Drinkers.

<sup>b</sup> Indicates a significant ( $p < .01$ ) difference in reduction between Frequent Binge Drinkers and Binge Drinkers.

three occasions in the last two weeks, and Frequent Binge Drinkers ( $N=25$ ) drank more than five drinks three or more times in the previous two weeks. The following analyses exclude Non-Drinkers.

A mixed-model repeated measure ANOVA revealed significant time  $\times$  drinker type interactions for total drinks ( $F(4,136)=8.35$ ,  $p < .001$ ), drinking days ( $F(4,140)=6.82$ ,  $p < .001$ ), and maximum drinks ( $F(4,134)=2.74$ ,  $p < .05$ ). Subsequent post hoc analyses revealed significant differences in means among drinker types across time. Frequent Binge Drinkers experienced the largest reductions in drinking behavior; reducing total drinks per month by 57% at three-month follow-up and maximum drinks by 46% at three-month follow-up (see Fig. 1 and Table 2.)

To examine if motivation to change influenced reduction in drinking, increases on the Readiness to Change Rulers were examined. A repeated measures ANOVA revealed no main effect across time for the Change Rulers. However, there was a significant time  $\times$  group interaction ( $F(4,114)=3.38$ ,  $p < .05$ ) for Readiness to Change rulers. Post hoc analyses revealed that Frequent Binge Drinkers reported higher Readiness to Change at follow-up months than at pre-intervention, while the other drinker types did not (see Table 2).

Reports indicate that 21 drinks per week is considered the maximum safe consumption limit for males in terms of avoiding development of acute and chronic health problems (Bofetta & Garfinkel, 1990; Engs & Aldo-Benson, 1995). Prior to the intervention, 23 participants drank more than the weekly maximum safe consumption level (calculated by self-reported monthly drinking total drinks  $> 84$  drinks). Separate repeated measures ANOVAs across time revealed significant changes in these high-risk drinkers for total

drinks ( $F(2,22)=7.46$ ,  $p<.05$ ), drinking days ( $F(2,24)=7.47$ ,  $p<.01$ ), average drinks ( $F(2,22)=6.73$ ,  $p<.05$ ), and maximum drinks ( $F(2,22)=8.94$ ,  $p<.01$ ). From pre-intervention through three-month follow-up, these high-risk drinkers decreased total drinks by 50% (reduced by 95.33 drinks per month), drinking days by 42% (reduced by 6.15 days), average drinks by 32% (reduced by 4.16 drinks per occasion), and maximum drinks at one occasion by 43% (reduced by 6.40 drinks). Importantly, 78% of these high-risk drinkers drank below 21 drinks per week at the end of three-months.

## 2.2. RAPI group analyses

Participants were divided into three RAPI groups (Low, Moderate, and High) based on pre-intervention composite RAPI scores. The Low group had RAPI scores of 0 ( $N=36$ ), the Moderate group had RAPI scores between one and eight ( $N=40$ ), and the High group reported greater than eight alcohol-related problems ( $N=44$ , range=8–109, median=19). A mixed model ANOVA revealed a significant effect across time ( $F(2,170)=7.81$ ,  $p<.01$ ) for total drinks and a significant time  $\times$  RAPI group interaction ( $F(4,170)=5.78$ ,  $p<.01$ ). Subsequent post hoc analyses revealed that the High RAPI group significantly reduced total drinks over time; from 94.57 (SD=80.36) drinks per month at pre-intervention to 59.47 (SD=48.44) drinks at one-month follow-up and to 44.95 (SD=52.07) drinks at three-month follow-up. Additionally, the High RAPI group significantly reduced drinking days by 40% (by 3.65 days) and maximum drinks at one occasion by 47% (by 6.67 drinks) at three-month follow-up. No changes in drinking were found for the Low RAPI group. These analyses reveal that those with the greatest number of alcohol-related problems significantly reduced drinking post-intervention (see Fig. 1).

## 2.3. Alcohol-related violations

University records compared intervention freshmen with all non-intervention freshmen males at the school to determine if the intervention aided in preventing incidences of alcohol-related violations of campus policies. Such violations included underage drinking, damaging or stealing school or student property while under the influence of alcohol, hospital visits resulting from intoxication, and alcohol-involved physical altercations. Records were obtained from the Judicial Affairs office at the end of the freshmen year. Of the 120 freshmen participating in the intervention, 28 (23%) were sanctioned for violating campus alcohol policies on at-least one occasion. Of the remaining 365 freshmen males, 186 (51%) received a one-time sanction by Judicial Affairs for violating campus alcohol policies ( $\chi^2(1, N=485)=32.02$ ,  $p<.001$ ). Finally, 3% ( $N=4$ ) of the intervention freshmen received multiple alcohol-related sanctions, while 10% (36) of the non-intervention freshmen received multiple alcohol-related sanctions ( $\chi^2(1, N=485)=5.22$ ,  $p<.05$ ).

## 2.4. Preventative component

To provide evidence for the preventative effects of the intervention, drinker type in the last two weeks (Wechsler & Nelson, 2001) from the pre-intervention TLFB was compared with drinker type in the last two weeks of the participant's third month diary. As in the two-week label used for the last 2 weeks of the TLFB, participants were either classified as Non-Drinkers, Non-Binge Drinkers, Binge Drinkers, and Frequent Binge Drinkers. Thirty-seven of the 90 participants who finished 3 months of diaries (41%) stayed the same drinker type from pre-intervention to three-month follow-up and 33 (37%) decreased

their drinker type to a lower drinking label from pre-intervention to three-month follow-up. Examined more closely, all 18 Non-Drinkers who finished 3 months of follow-up continued to not drink at three-month follow-up. Seventeen Non-Binge Drinkers, four Binge Drinkers, and one Frequent Binge Drinker decreased to Non-Drinkers at follow-up; five Binge Drinkers and four Frequent Binge Drinkers decreased to Non-Binge Drinkers at follow-up; and two Frequent Binge Drinkers decreased to Binge Drinkers at follow-up. Twenty participants (22%) increased drinker type to a more risky classification. Even though these participants drank more heavily at post-intervention, they did not significantly increase drinking at one-month and three-month follow-up; increasing total drinks by 3.80 (SD=29.29;  $t(19)=.58, p=.57$ ) at one month and by 2.83 (SD=30.87;  $t(19)=.41, p=.69$ ) at 3 months.

### 3. Discussion

The current study investigated a group adapted Motivational Interviewing-based intervention (AMI) to reduce problematic drinking and alcohol-related consequences in freshmen male college students. While other studies have examined interventions with individual college students (Baer et al., 2001; Barnett et al., 2004; Borsari & Carey, 2000; Collins et al., 2002; White et al., 2006), the current study provides evidence for such interventions with groups. All participants drank less following the intervention and those most likely to experience potential problems appeared to benefit the most. Frequent Binge Drinkers, those with large numbers of alcohol-related problems (as determined by the RAPI), and those at risk for developing health problems due to dangerous levels of drinking (greater than 21 drinks/week) significantly reduced drinking behavior from pre-intervention through 3 months of follow-up on nearly all drinking variables assessed. The intervention also appeared to reduce the likelihood of alcohol-related violations of campus policies among participants. Freshmen males who did not receive the intervention were more than twice as likely to receive one alcohol citation and three times as likely to receive multiple alcohol citations as the freshmen who received the group intervention. Since early drinking patterns established during freshmen year may set the stage for drinking patterns throughout college (Wechsler et al., 1994), helping students establish lower risk drinking patterns early may reduce problematic drinking and prevent freshmen from experiencing negative consequences associated with heavy alcohol use.

The intervention appeared most effective with those who were drinking most prior to the group—Frequent Binge Drinkers. These drinkers showed marked improvement in their Readiness to Change after the intervention and reduced their total drinks per month by 37% at one-month and by 57% at three-month post-intervention. They also reduced the amount of their heaviest drinking episode by approximately five to eight drinks at one-month follow-up and approximately eight to nine drinks at three-month follow-up (29% and 46%, respectively). Similar reductions in total drinks and maximum drinks during any one drinking event were experienced by those most at-risk for alcohol-related health problems. A similar group AMI intervention reduced drinking, consequences and recidivism rates for adjudicated students who violated campus alcohol policies (LaBrie, Lamb, Pedersen, & Quinlan, 2006). Since the group AMI appears to work best with Frequent Binge Drinkers, perhaps intervening with only the heaviest drinkers on campuses is warranted. However, including non-heavy drinkers and non-drinkers in a group with Frequent Binge Drinkers may improve the intervention by making non-drinkers and non-heavy drinking peers more salient. This salience of peers who drink less is especially important during normative feedback. In addition, the intervention may prevent non-problematic drinkers from developing problems and from increasing drinking levels.

It is possible, however, that these significant within-person reductions in the highest risk drinkers are merely regression to the mean. Additionally, participants may have overestimated their pre-intervention drinking behavior and more accurately represented their behavior on the monthly diaries. Unfortunately, the current study lacks a true control group, which would best support the utility of the intervention with these heavy drinkers. Randomizing participants to either intervention group or a wait-list control group that received only the initial assessment as well as monthly diaries would provide further support for the effectiveness of this brief group intervention with heavy drinkers, as well as with all intervention participants.

The observed reductions in the heaviest drinkers are mitigated by several analytic issues which future studies employing more sophisticated designs may address. First there is overlap in the risk groups identified (i.e., Frequent Binge Drinkers, High RAPI group). Additionally, several of the drinking variables used to measure change were significantly and positively correlated, suggesting an overlap in results, particularly for total drinks with drinking days and average drinks. However, we felt it best to include all drinking variables to best exemplify the impact of the interventions on overall, as well as specific, drinking behavior. Further, the heaviest drinkers have greater capacity to change, which may contribute to the observed results. Nevertheless, each participant served as his own control for the within persons analysis and the reductions found among the heaviest drinking individuals are noteworthy and meaningful in terms of reducing potentially dangerous patterns.

Several other limitations mark the current study. The study relied heavily on the use of self-report data and measures of retrospective recall. Since no measures of actual consumption levels were used (i.e., BAC levels), it is unknown whether the participants accurately reported drinking behavior. However, self-reports of quantity and frequency consumed appear valid and reliable in other studies of college students (O'Hare, 1991). Likewise, the TLFB assesses alcohol use with high reliability and validity (Sobell & Sobell, 1992) and is comparable to the daily-reporting technique of diaries (Searles, Herlzer, Rose, & Badger, 2002). Finally, when no penalties are evident for being honest about drinking, alcohol use is not a sensitive subject that students lie about (Babor, Stephens, & Marlatt, 1987).

Since the goal of the current study was to reduce problematic drinking with one particular high-risk group (freshmen male students), women were excluded from the study. The NIAAA (2002) suggests that interventions targeting a particular high-risk campus group may have greater likelihood of success than those that throw a net over the whole campus treating all students as a monolithic group. Nonetheless, similar specific programs that deal with upperclass men and women, freshmen women, Greeks, athletes, and other campus groups are necessary.

Finally, although the group intervention appeared to impact alcohol use and related consequences, it is unclear which aspects of the intervention were effective. Analyzing the individual components of the intervention may reveal that one aspect is most important. For example, monitoring behavior alone (i.e., keeping a behavioral log) may effectively promote behavior change (Cronin, 1996; Miller, 1999). Utilizing an assessment only control group in the current student would have helped determine the role that monitoring behavior played in addition to the actual brief intervention, as well as if the initial TLFB assessment impacted behavioral change. Future studies focusing on specific elements of the intervention and with groups who receive different pieces would allow for more definitive statements about the intervention's effectiveness.

Nonetheless, the current intervention successfully reduced drinking in freshmen males, particularly those most at-risk for alcohol interfering with their health and collegiate success. The intervention also appeared to improve campus life. The freshmen who participated in the intervention were significantly

less likely to receive sanctions from the University Judicial System than their peers. More research appears warranted into the effectiveness of similar group adapted motivational interventions with college students including those that target other high-risk groups on college campuses. If this and other campus-based AMI interventions are successful in reducing drinking and negative events following drinking, they may reduce the likelihood of students developing problematic drinking habits, release pressure on strapped campus resources, and foster improved campus life. Universities might adopt similar group motivational enhancement interventions with freshmen to assist them in the transition to college and reduce the negative consequences of problematic alcohol use.

## References

- Babor, T. F., Stephens, R. S., & Marlatt, G. A. (1987). Verbal report methods in clinical research on alcoholism: Response bias and its minimization. *Journal of Studies on Alcohol*, *48*, 410–424.
- Baer, J. S. (1994). Effects of college residence on perceived norms of alcohol consumption: An examination of the first year in college. *Psychology of Addictive Behaviors*, *8*, 43–50.
- Baer, J. S., Kivlahan, D. R., Blume, A. W., McKnight, P., & Marlatt, G. A. (2001). Brief intervention for heavy-drinking college students: 4 year follow-up and natural history. *American Journal of Public Health*, *91*, 1310–1316.
- Baer, J. S., Kivlahan, D. R., & Marlatt, G. A. (1995). High-risk drinking across the transition from high school to college. *Alcoholism, Clinical and Experimental Research*, *19*(1), 54–61.
- Baer, J. S., Stacy, A., & Larimer, M. (1991). Biases in the perception of drinking norms among college students. *Journal of Studies on Alcohol*, *52*, 580–586.
- Barnett, N. P., Tevyaw, T., Fromme, K., Borsari, B., Carey, K. B., Corbin, W. R., et al. (2004). Brief alcohol interventions with mandated or adjudicated college students. *Alcoholism, Clinical and Experimental Research*, *28*(6), 966–975.
- Bofetta, P., & Garfinkel, L. (1990). Alcohol drinking and mortality among men enrolled in an American Cancer Society prospective study. *Epidemiology*, *1*, 342–348.
- Borsari, B., & Carey, K. B. (2000). Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology*, *68*(4), 728–733.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, *71*(5), 843–861.
- Collins, S. E., Carey, K. B., & Sliwinski, M. J. (2002). Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. *Journal of Studies on Alcohol*, *63*(5), 559–567.
- Cronin, C. (1996). Harm reduction for alcohol-use related problems among college students. *Substance Use and Misuse*, *31*, 2029–2037.
- Darkes, J., & Goldman, M. S. (1993). Expectancy challenge and drinking reduction: Experimental evidence for a mediational process. *Journal of Consulting and Clinical Psychology*, *61*(2), 344–353.
- Darkes, J., & Goldman, M. S. (1998). Expectancy challenge and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology*, *6*, 64–76.
- Dimeff, L. A., Baer, J. S., Kivlahan, D. R., & Marlatt, G. A. (1999). *Brief Alcohol Screening and Intervention for College Students (BASICS): A harm reduction approach*. New York, NY: The Guilford Press.
- Dunn, C., DeRoo, L., & Rivara, F. P. (2001). The use of brief interventions adapted from motivational interviewing across behavioral domains: A systematic review. *Addiction*, *96*, 1725–1742.
- Engs, R. C., & Aldo-Benson, M. (1995). The associated of alcohol consumption with self-reported illness in university students. *Psychological Reports*, *74*, 12–14.
- Foote, J., DeLuca, A., Magura, S., Warner, A., Grand, A., Rosenblum, A., et al. (1999). A group motivational treatment for chemical dependency. *Journal of Substance Abuse Treatment*, *17*(3), 181–192.
- Fromme, K., & Corbin, W. (2004). Prevention of heavy drinking and associated negative consequences among mandated and voluntary college students. *Journal of Consulting and Clinical Psychology*, *72*, 1038–1049.
- Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Annual Review of Public Health*, *26*, 259–279.

- Hull, J. G., & Bond, C. F. (1986). Social and behavioral consequences of alcohol consumption and expectancy: A meta-analysis. *Psychological Bulletin*, 99, 347–360.
- LaBrie, J. W., Lamb, T. F., Pedersen, E. R., & Quinlan, T. (2006). A group motivational interviewing intervention reduces drinking and alcohol-related consequences in adjudicated college students. *Journal of College Student Development*, 47(3), 267–280.
- LaBrie, J. W., Pedersen, E. R., & Earleywine, M. (2005). A group-administered timeline followback assessment of alcohol use. *Journal of Studies on Alcohol*, 66, 693–697.
- LaBrie, J., Pedersen, E., Lamb, T., & Bove, E. (2006). Heads UP! A nested intervention with freshmen male college students to promote responsible drinking. *Journal of American College Health*, 54, 301–304.
- LaBrie, J. W., Quinlan, T., Schiffman, J., & Earleywine, M. (2005). Performance of alcohol and safer sex rulers compared to readiness to change questionnaires. *Psychology of Addictive Behaviors*, 19(1), 112–115.
- Larimer, M. E., & Crouce, J. M. (2002). Identification, prevention, and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol. Supplement*, 14, 148–163.
- Marlatt, G. A., Baer, J. S., Kivlahan, D. R., Dimeff, L. A., Larimer, M. E., Quigley, L. A., et al. (1998). Screening and brief intervention for high-risk college student drinkers: Results from a 2-year follow up assessment. *Journal of Consulting and Clinical Psychology*, 66(4), 604–615.
- Marlatt, G. A., & Rohsenow, D. R. (1980). Cognitive processes in alcohol use: Expectancy and the balanced placebo design. In N. K. Mello (Ed.), *Advances in substance abuse* (pp. 159–199). Greenwich, CT: JAI Press.
- McNally, A. M., & Palfai, T. P. (2003). Brief group alcohol interventions with college students: Examining motivational components. *Journal of Drug Education*, 33, 159–176.
- Miller, E.T. (1999). Preventing alcohol abuse and alcohol-related negative consequences among freshmen college students: Using emerging computer technology to deliver and evaluate the effectiveness of brief intervention efforts. Unpublished Doctoral Dissertation, University of Washington, Seattle.
- Miller, W. R., & Rollnick, S. (2002). *Motivational Interviewing: Preparing people for change*, 2nd ed. New York: Guilford Press.
- Migneault, J., Pallonen, U., & Velicer, W. (1997). Decisional balance and stage of change for adolescent drinking. *Psychology of Addictive Behaviors*, 22, 339–351.
- National Institute on Alcohol Abuse and Alcoholism (2002). A call to action: Changing the culture of drinking at U.S. colleges. *NIH Publication No. 02-5010*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.
- Neighbors, C., Walker, D. D., & Larimer, M. E. (2003). Expectancies and evaluations of alcohol effects among college students: Self-determination as a moderator. *Journal of Studies on Alcohol*, 64(2), 292–299.
- Noar, S. M., LaForge, R. G., Maddock, J. E., & Wood, M. D. (2003). Rethinking positive and negative aspects of alcohol use: Suggestions from a comparison of alcohol expectancies and decisional balance. *Journal of Studies on Alcohol*, 64(1), 60–69.
- Noonan, W. C., & Moyers, T. B. (1997). Motivational interviewing: A review. *Journal of Substance Abuse*, 2, 8–16.
- O'Hare, T. (1991). Measuring alcohol consumption: A comparison of the retrospective diary and the quantity frequency methods in a college drinking survey. *Journal of Studies on Alcohol*, 52, 500–502.
- O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol*, 63, 23–39.
- Pedersen, E. R., & LaBrie, J. W. (2006). A within-subjects validation of a group administered timeline followback for alcohol use. *Journal of Studies on Alcohol*, 67, 332–335.
- Rollnick, S., Heather, N., & Bell, A. (1992). Negotiating behaviour change in medical settings: The development of brief motivational interviewing. *Journal of Mental Health (UK)*, 1(1), 25–37.
- Ryan, R., Plant, R., & O'Malley, S. (1995). Initial motivations for alcohol treatment: Relations with patient characteristics, treatment involvement, and dropout. *Psychology of Addictive Behaviors*, 20, 279–297.
- Schulenberg, J., Maggs, J. L., Long, S. W., Sher, K. J., Gotham, H. J., Baer, J. S., et al. (2001). The problem of college drinking: Insights from a developmental perspective. *Alcoholism, Clinical and Experimental Research*, 25, 473–477.
- Searles, J. S., Helzer, J. E., Rose, G. L., & Badger, G. J. (2002). Concurrent and retrospective reports of alcohol consumption across 30, 90, and 366 days: Interactive voice response compared with the timeline follow back. *Journal of Studies on Alcohol*, 63, 352–362.
- Sobell, L. C., & Sobell, M. B. (1992). Timeline followback: A technique for assessing self-reported alcohol consumption. In R. Z. Litten, & J. P. Allen (Eds.), *Measuring alcohol consumption: Psychosocial and biological methods*. Totowa, NJ. (pp. 41–72).

- Sobell, M. B., Sobell, L. C., Klajner, F., Pavan, D., & Basian, E. (1986). The reliability of a timeline method for assessing normal drinker college students' recent drinking history: Utility for alcohol research. *Addictive Behaviors*, *11*, 149–162.
- Turrisi, R., Padilla, K. K., & Wiersma, K. A. (2000). College student drinking: An examination of theoretical models of drinking tendencies in freshmen and upperclassmen. *Journal of Studies on Alcohol*, *61*(4), 598–602.
- Wechsler, H., Davenport, A., Dowdall, G. W., Moeykens, B., & Castillo, S. (1994). Health and behavioral consequences of binge drinking in college. *Journal of the American Medical Association*, *272*, 1672–1677.
- Wechsler, H., & Isaac, N. (1992). 'Binge' drinkers at Massachusetts colleges. Prevalence, drinking style, time trends, and associated problems. *Journal of the American Medical Association*, *267*, 2929–2931.
- Wechsler, H., Lee, J. E., & Kuo, M. (2000). College binge drinking in the 1990s: A continuing problem: Results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*, *48*(5), 199–210.
- Wechsler, H., & Nelson, T. F. (2001). Binge drinking and the American college students: What's five drinks? *Psychology of Addictive Behaviors*, *15*(4), 287–291.
- White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*, *50*(1), 30–37.
- White, H. R., Morgan, T. J., Pugh, L. A., Celinska, K., Labouvie, E. W., Pandina, R. J., et al. (2006). Evaluating two brief substance-use interventions for mandated college students. *Journal of Studies on Alcohol*, *67*(2), 309–317.