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# A Group Motivational Interviewing Intervention Reduces Drinking and Alcohol-Related Negative Consequences in Adjudicated College Women

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## A Group Motivational Interviewing Intervention Reduces Drinking and Alcohol-Related Negative Consequences in Adjudicated College Women

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### Abstract

College students who violate campus alcohol policies (adjudicated students) are at high risk for experiencing negative alcohol-related consequences and for undermining campus life. Further, college women may be especially at risk due to differential intoxication effects and sexual consequences experienced mainly by female students. Research on interventions for adjudicated students, especially adjudicated females, has been limited. One hundred and fifteen college women who received a sanction for violating campus alcohol policies participated in the study. The two hour group intervention focused on female-specific reasons for drinking and included decisional balance, goal setting and other exercises. Participants completed follow-up surveys for 12 weeks following the intervention and answered questions regarding alcohol consumption and alcohol-related negative consequences. Findings support the use of an MI-based intervention to reduce both alcohol consumption and consequences among adjudicated females. Specifically, alcohol use was reduced by 29.9% and negative consequences were reduced by 35.87% from pre-intervention to 3-month follow up. Further, the intervention appeared to successfully initiate change in the heaviest drinkers, as women who drank at risky levels reduced alcohol consumption to a greater extent than women who drank at moderate levels.

### Keywords

adjudicated college students; motivational interviewing; female; college drinking

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Excessive drinking among college students remains a national issue. The negative consequences that accompany heavy drinking result in problems for both drinkers themselves, and the larger community. For example, drinking may increase the likelihood of experiencing personal problems such as poor academic performance, vandalism, sexual assault, and even death (Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler et al., 2002). Likewise, excessive drinking strains campus resources aimed at providing a safe and nurturing environment (Anderson & Gadaletto, 2001; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; National Institute on Alcohol Abuse and Alcoholism, NIAAA, 2002; U.S. Department of Health and Human Services, 2000). Specifically, students sanctioned by the university for violating campus alcohol policies (i.e., adjudicated students) are disproportionately heavy drinkers and are at increased risk for adverse alcohol-related consequences (Larimer & Cronce, 2002; Caldwell, 2002). This group of students is growing with the number of sanctioned or mandated students nearly doubling between 1993 and 2001 (Wechsler, Lee, Nelson, & Kuo, 2002). Further, alcohol misuse and resulting behavioral consequences are the largest number of disciplinary violations on college campuses (Dannells, 1991; Freeman, 2001). Despite this, most heavy drinkers involved in the judicial system do not view their behavior as problematic and rarely seek assistance voluntarily (NIAAA, 2002). Heavy drinkers, who happen to be at-risk for harm, are not likely to self-identify or seek treatment (Barnett & Read, 2005), and as such the responsibility to safeguard vulnerable students, especially mandated students, falls on the shoulders of college administrators. Consequently, there is a pressing need to implement low-cost, effective sanctions to reduce both heavy drinking and its concomitant deleterious consequences.

Traditional responses to under-age drinking by college administrators stem from the theory that a lack of knowledge leads to problem drinking. Thus, most conventional prevention programs were educational and didactic in nature (Darkes & Goldman, 1993; Flynn & Brown, 1991; Garvin et al., 1990). Didactic interventions, however, fail to consider the complexity of motives for drinking, and are heavily criticized for producing little measurable change (Maddock, 1999). Likewise, conventional alcohol education programs which provide information about the risks of alcohol use have not reduced drinking among students (Hingson, Berson, & Dowley, 1997).

The NIAAA Task Force on College Drinking examined prevention efforts aimed at reducing excessive alcohol use on college campuses (NIAAA, 2002) and found support for the use of brief motivational enhancement (e.g., Dimeff, Baer, Kivlahan, & Marlatt, 1999; Marlatt et al., 1998) and cognitive-behavioral interventions (e.g., Baer et al., 1992; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990) that counter misperceptions of others' drinking behaviors and increase motivation to change personal drinking habits. Brief interventions using principles of Motivational Interviewing (MI; Miller & Rollnick, 2002), such as non-confrontation, developing discrepancy, expressing empathy, and non-judgmental listening, have reduced alcohol use among college students more than traditional educational programs (Larimer & Cronce, 2002). MI, a client-centered technique designed to help students confront their ambivalence about changing behaviors, has been successful in reducing binge drinking rates and negative problems associated with alcohol (Marlatt et al., 1998) and has significantly reduced drinking for heavy drinkers (Murphy et al., 2001; Larimer & Cronce, 2002).

Among mandated students, few studies have examined the effectiveness of MI interventions on alcohol use and related problems (Borsari & Carey, 2005; Fromme & Corbin, 2004; LaBrie, Lamb, Pedersen, & Quinlan, 2006). Specifically, Borsari and Carey (2005) found that mandated students who received a brief MI intervention reduced alcohol-related problems to a greater extent than mandated students who received an alcohol-education

intervention. While both types of interventions reduced alcohol consumption, alcohol-related problems reduced more among the MI group and were maintained six months post-intervention. While limited, these results provide preliminary support for the use of MI interventions among mandated students. Fromme and Corbin (2004) compared male and female volunteer and mandated students, as well as the efficacy of peer-led or professionally-led interventions. As one of the few, if not only, randomized studies involving both mandated and volunteer students, and a control group, results support the use of brief MI interventions for mandated students in reducing heavy alcohol use and negative alcohol-related consequences. Their intervention, the Lifestyle Management Class (LMC), incorporated elements of MI and cognitive-behavioral skills training. Participants in the LMC condition had larger reductions in negative consequences, with volunteers reducing heavy drinking more than mandated students, and male mandated students reducing heavy drinking more than female mandated students. Overall, the LMC appeared effective for both mandated and volunteer participants, suggesting the value in using MI to reduce defensiveness among a mandated group of students. Moreover, this study compared facilitation by either a trained professional or a peer. Results indicated that while a professionally-led intervention was rated higher in adherence to the program and overall quality, there were no significant differences to suggest a clear advantage of a trained professional compared to a peer-led intervention. In fact, Fromme and Corbin (2004) recommend considering co-facilitation by both a trained professional and a peer to optimize the effects of the intervention. Finally, LaBrie and colleagues (2006) found success implementing a single session, motivational enhancement group intervention in reducing levels of drinking, negative alcohol-related consequences, and judicial recidivism in a mandated co-ed sample referred for violating campus alcohol policies. The heaviest drinkers in the sample, males and frequent binge drinkers, experienced the greatest reductions in consumption patterns. Thus, while few studies have specifically examined mandated students, the literature suggests that brief interventions grounded in MI may provide college administrators with a cost-effective way to reduce alcohol consumption among the heaviest and most at-risk students.

While mandated students share similarities and typically engage in heavy consumption, experience alcohol-related consequences, and are referred through campus judicial systems, these students are still diverse in their needs, motives, and consequence levels. Previous interventions have failed to consider gender-specific issues (Borsari & Carey, 2005; Dimeff, Baer, Kivlahan, & Marlatt, 1999; Fromme & Corbin, 2004), and have simply lumped adjudicated students together in large co-ed groups. According to Social Comparison Theory (Festinger, 1954) and Social Impact Theory (Latané, 1981), gender-specific group interventions facilitate greater transparency and deeper disclosure in comparison to mixed-gender forums where there is less commonality, and thus less trust and emotional freedom in the group dynamic (Borsari & Carey, 2003; Lewis & Neighbors, 2004). Given the primacy of relationships for women (Gleason, 1994), the collective sharing that occurs within a female-specific model produces “connected knowing,” provides an ambiance of trust and relatedness, and engenders self-disclosure (Belenky et al., 1986).

The group format is an effective medium to discuss gender-specific issues and bolsters participation that generates collective energy towards change-talk and actual behavior change. Targeted interventions offer the potential to locate and diffuse hazardous issues germane to college women and alcohol (Hingson et al., 2005) and respond to the need to incorporate gender-specific issues (Spigner, Hawkins, & Loren, 1993). A same-sex group may provide women with an opportunity to investigate similar reasons for drinking. As rates of drinking and binge drinking among women are on the rise (Wechsler et al., 2000; Wechsler & Nelson, 2001; Hingson et al., 2002; Wechsler & Wuethrich, 2002), and with

one third of women qualifying as heavy drinkers (O'Malley & Johnston, 2002), a same-sex group may reduce heavy consumption as well as alcohol-related problems.

While problem drinking does not discriminate based on gender, the realities of those problems evidence themselves differently for women than men. Due to physiological differences, women reach higher Blood Alcohol Concentration (BAC) levels at lower levels of alcohol consumption than men (Carey, Carey, Maisto, Henson, 2006; Perkins, 2000; Jones & Jones, 1976). With size held constant, women still have less body water, less alcohol-dehydrogenase enzyme, and fluctuating hormones which contribute to women experiencing the intoxicating effects at lower quantities of alcohol than men (Perkins, 2000; Jones & Jones, 1976; Frezza et al, 1990; NIAAA, 2002) and placing them at greater risk for negative alcohol-related consequences. The NIAAA (2002) estimates that each year 70,000 cases of sexual assault or date rape occur and 400,000 unprotected sex events that involve drinking occur on American college campuses. These events predominantly involve alcohol use. In fact, among college women who reported being raped, 72% reported that the rape occurred while they were intoxicated (Mohler-Kuo, Dowdall, Koss, & Wechsler, 2004). Given that adjudicated students tend to be "heavy drinkers" as compared to non-adjudicated students (Caldwell, 2002; Larimer & Cronce, 2002) and in addition to the fact that women are more vulnerable to more serious problems related to drinking, sanctioned women qualify as a high-risk subgroup within the college population, and thus are in need of protective measures to reduce alcohol-related problems.

There is a paucity of research that examines cost-effective, gender-specific policies that can be implemented at institutions. This paper offers new, valuable alcohol-related data on adjudicated female students, and proposes a gender-specific group-based intervention that effectively responds to this rising crisis on college campuses. Utilizing techniques from MI, this intervention addresses female-specific reasons for drinking. We predict that women will reduce alcohol consumption and alcohol-related negative consequences after attending the group session. Further, we predict the intervention will have the greatest impact on heavy drinkers compared to moderate and light drinkers, demonstrated by the greatest decrease in alcohol consumption after the intervention.

## Method

### Participants

During the 2005-2006 academic year at a mid-sized, private university, 115 female students were referred by Judicial Affairs to participate in an alcohol-intervention program. Participants were first-time offenders of campus alcohol policies, mandated to either attend the intervention program in its entirety or pay a fine and be placed on disciplinary probation. The infractions ranged from underage presence in a room where alcohol was in the sight of resident advisors to intoxication requiring medical attention. Of the 115 referred students, 110 females (96 %) completed the program in its entirety.

Participants had a mean age of 18.94 ( $SD = 1.02$ ) years and consisted of 63 Caucasians (57.3%), 13 Hispanics (11.8%), 12 "Mixed ethnicity" (10.9%), 7 Asian Americans/Pacific Islanders (6.4%), 4 Black/African Americans (3.6%), and 11 identified as "Other" or "Declined to State" (10.0%). Freshmen made up 48.2% of the sample, with 30.9% sophomores, 11.8% juniors, 7.3% seniors and 1.8% declined to state.

### Design and Procedure

The study consisted of an initial online questionnaire taken one week before the group session, a two-hour group session, and 12 weeks of online follow-up assessment. After reading and electronically signing an online informed consent form, participants completed

an initial online questionnaire. Participants then attended the group session where facilitators reminded students of the informed consent highlighting that all information they reported on forms, in the follow-up diaries, or shared in the group was confidential and would be used solely for the research purpose of data analysis. The participants received further assurances that no one from the intervention/research team would communicate any information about them or their responses to any member of Judicial Affairs except whether or not they completed the intervention and follow-up in its entirety.

**Initial Questionnaire**—The initial questionnaire included demographic questions including age, ethnicity, and family income, as well as the following measures and questions:

**Alcohol use behavior and attitudes:** Participants reported alcohol use over the past 28 days/4 weeks using three single-item self-report questions (drinking days, average number of drinks per occasion, and maximum amount of drinks consumed at one time). Motivations for drinking alcohol were assessed using the 20-item Drinking Motives Questionnaire (DMQ; Cooper, 1994), and its four subscales of conformity ( $\alpha = .86$ ), coping ( $\alpha = .87$ ), enhancement ( $\alpha = .89$ ), and social motives ( $\alpha = .91$ ).

**Alcohol-related negative consequences:** The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) assessed consequences encountered during the prior month while consuming alcohol ( $\alpha = .91$  for the 23 RAPI items). Items include, for example, “Not able to do your homework or study for a test”; “Neglected your responsibilities”; “Noticed a change in your personality”; “Passed out or fainted suddenly”; and “Had a bad time.” All statements were anchored by 0 (*Never*) and 4 (*more than 10 times*), and the summed score was used for the RAPI total scale ( $\alpha = .91$ ). The RAPI breadth scale ( $\alpha = .90$ ), reflecting the absence or presence of consequences, was derived by summing the number of items that respondents indicated 1 or higher on the 4-point scale, for a possible score ranging from 0 to 23.

**Intervention**—Intervention groups consisted of 2-11 mandated female students and were held semi-monthly during the academic year. Sixteen total groups were held throughout the academic year. All 110 participants completed each of the 12 weekly follow-up diaries.

Students were assigned to groups after being referred to the program by Judicial Affairs. The groups were supervised and led by a doctoral-level clinician and co-facilitated by a bachelor-level research assistant. Both facilitators were women and received extensive training in Motivational Interviewing (MI; Miller & Rollnick, 2002). The group intervention lasted two hours and consisted of an individual Timeline Followback (TLFB, Sobell & Sobell, 1992) assessment and self-confrontation with personal drinking over the previous three months, an introductory discussion of alcohol expectancies and the “good things” and “not-so-good things” about drinking, normative feedback, information on blood alcohol content and alcohol effects specific to women, a discussion of reasons for drinking, a decisional balance exercise, and the setting of personal behavioral goals.

**Timeline Followback:** Groups began with the completion of a TLFB self-assessment of drinking behavior over the three months prior to the intervention. Participants were instructed to complete their TLFB individually, although the directions were given in the group. This group TLFB assessment has been shown to be as reliable and valid as single item self-reports of behavior and as reliable and valid as the previously validated individual TLFB (LaBrie, Pedersen, & Earleywine, 2005; Pedersen & LaBrie, 2006). Once the TLFB was completed, the facilitators led a brief discussion asking participants if they noticed anything about their drinking patterns.



**“Good things vs. not-so-good things” and alcohol expectancies:** After the TLFB, facilitators led participants in generating a list of the good things about alcohol (e.g., “It’s fun,” “It makes social settings easier”); followed by a list of the not-so-good things about alcohol (e.g., “You could get sick,” “You might fall behind in your grades”). The not-so-good things were affirmed and highlighted. This led to a follow-up discussion about alcohol expectancies and research supporting the concept (Hull & Bond, 1986; Marlatt & Rohsenow, 1981; Rohsenow & Marlatt, 1981). Specifically addressed was the role of social expectancies in college drinking.

**Normative feedback:** Next, participants were interactively provided with normative drinking data for women at their university to correct overestimations of drinking on campus. For example, participants were presented with statistics such as, “94% of females drink two or less days per week,” and “The average number of drinks consumed per week by female students is 2.91 drinks.”

**Information presentation:** Participants next engaged in a discussion about the inherent differences between males and females as they relate to drinking, as well as how alcohol differentially affects the body. Participants received personalized blood alcohol concentration (BAC) cards, and a discussion about BAC ensued in which several BAC levels were highlighted and alcohol poisoning was discussed. For example, when discussing BAC information, facilitators highlighted that at a BAC of .02 many people begin to feel relaxed, while at a BAC from .25-.35, people may pass out, lose consciousness and there is a risk of death. BAC information was followed by a discussion on the biphasic effects of alcohol (Dimeff, Baer, Kivlahan, & Marlatt, 1999).

**Reasons for drinking discussion:** Facilitators next opened a discussion on the specific reasons for drinking of the women in the group, as well as perceptions of why women drink in general. This discussion focused on social and relational reasons for drinking and whether or not alcohol use, particularly excessive alcohol use, helped young women meet their social and relational needs. Facilitators, in MI style, reflected back participants’ statements, amplifying the ways alcohol failed to enhance or actually interfered with social and relational needs. Facilitators highlighted and affirmed any “change talk”—statements about cutting back on alcohol use in order to better meet needs.

### Follow-up Assessment

All participants completed weekly online drinking diaries for the 12 weeks following the group session, recording the number of drinks they consumed each day in the past week. These weekly diaries were used to calculate the behavioral outcome measures at 1-month and 3-month time points post intervention. Specifically, four drinking outcome measures – drinks per month, drinking days, average drinks, and maximum drinks – were calculated using the drinking diaries. For example, the total number of drinks reported over the first four weeks of follow-up diaries, were summed to create the drinks per month variable at the 1-month follow-up. Drinking days was calculated by summing the number of days over the first four weeks of diaries that participants indicated drinking. Maximum drinks was calculated by taking the highest number of drinks reported over the four weeks of diaries, while average drinks was calculated by taking the total drinks per month variable and dividing by drinking days reported. These calculations were kept consistent using data from the last month of diaries, to create the same drinking measures at the 3-month follow-up.

Another behavioral outcome measure assessed was alcohol-related negative consequences. At the end of the fourth week of diary collection, participants were given the RAPI to assess consequences in the past month. The last drinking diary at week 12 contained a final

assessment survey, repeating measures from the initial questionnaire to determine changes in attitudes and alcohol-related negative consequences at the 3-month follow-up.

### Drinker Status

Using data from the TLFB on the number of binge drinking episodes in the two weeks prior to the intervention, participants were divided into three mutually exclusive and exhaustive groups: Non-Binge Drinkers, Binge Drinkers, and Frequent Binge Drinkers (Wechsler & Nelson, 2001). Each binge drinking session was defined as the consumption of four or more drinks within a two hour period. Non-Binge Drinkers comprised 23.6% ( $n = 26$ ) of the sample and did not engage in binge drinking. Binge Drinkers (39.1%;  $n = 45$ ) binge drank one or two times. Participants (33.9%;  $n = 39$ ) reporting three or more binge drinking occasions were labeled Frequent Binge Drinkers.

## Results

### Drinker Status $\times$ Time

To examine systematic changes in drinking behaviors, separate repeated measures ANOVA were undertaken for each of the outcome measures, in which the within-subjects factor was time (pre-intervention, 1-month follow-up, and 3-month follow-up) and the between-subjects factor was drinker status assessed at pre-intervention (Non-Binge Drinker, Binge Drinker, and Frequent Binge Drinker). Interaction effects between time and drinker status emerged for drinks per month,  $F(4, 200) = 2.71, p < .05$ ; average drinks,  $F(4, 200) = 5.34, p < .001$ ; and maximum drinks,  $F(4, 200) = 2.52, p < .05$ . Main effects across time were revealed for all outcomes: drinks per month,  $F(2, 200) = 5.71, p < .01$ ; drinking days,  $F(2, 200) = 3.05, p < .05$ ; average drinks,  $F(2, 200) = 21.28, p < .001$ , maximum drinks,  $F(2, 200) = 7.01, p < .01$ ; RAPI total,  $F(2, 200) = 5.71, p < .01$ , and RAPI breadth,  $F(2, 200) = 8.07, p < .001$ . Further, across the three drinker status categories (Non-Binge Drinker, Binge Drinker, and Frequent Binge Drinker), all outcome measures evidenced statistical significance: drinks per month,  $F(2, 100) = 38.83, p < .001$ ; drinking days,  $F(2, 100) = 48.71, p < .001$ ; average drinks,  $F(2, 100) = 31.83, p < .001$ ; maximum drinks,  $F(2, 100) = 39.96, p < .001$ ; RAPI total,  $F(2, 100) = 6.63, p < .01$ ; RAPI breadth,  $F(2, 100) = 6.66, p < .01$ . Figure 1 contains changes across time in drinking variables by drinker status for drinks per month, maximum drinks during any one drinking event, and RAPI total and breadth.

### Decomposition of Effects

Aside from the time and drinker status main effects, the above tests revealed that drinker status statistically moderated the association between time and behavioral outcomes. Although such omnibus results are informative, it would yield important insights into the effectiveness of the intervention to decompose these effects in order to determine the differential reductions in drinking behaviors among each of the three drinker status groups. Displayed in Table 1 are the means and standard deviations for each status group, along with comparisons across all time points, between pre-intervention and 1-month follow-up, and between pre-intervention and 3-month follow-up. Results support that the intervention was most efficacious in reducing alcohol consumption and its related problems for individuals classified as Binge Drinkers or Frequent Binge Drinkers. Specifically, after the intervention, Binge Drinkers exhibited significant reductions in all behaviors except drinking days. For Frequent Binge Drinkers, the intervention mitigated all other behavioral outcomes except drinking days and RAPI total.



## Additional Outcome Analyses

Next, we offer evidence for the intervention effects by examining individuals classified as Binge Drinkers and Frequent Binge Drinkers at pre-intervention who later reduced their alcohol consumption habits. Of those categorized as Binge Drinkers at pre-intervention, 44.4% remained in the same status, and almost one-third (31.1%) became Non-Binge Drinkers at the 1-month follow-up. With respect to the Frequent Binge Drinkers during the same period, 43.6% became Binge Drinkers and 7.7% become Non-Binge Drinkers.

Results were persistent and even more pronounced between baseline and 3-month follow-up: Of Binge Drinkers, 40% remained in this classification, while another 40% became Non-Binge Drinkers. Concerning Frequent Binge Drinkers at pre-intervention, 35.9% and 23.1% were re-classified as Binge Drinkers and Non-Binge Drinkers, respectively, at the 3-month follow-up. Overall, across all three drinker types, only 12.7% increased to a more heavy drinking status, while 37.3% went down to a less risky drinker status, and exactly half (50.0%) remained within the same classification at the 3-month follow-up. These results highlight that, after the intervention, the odds of achieving a less risky drinker status is 2.93 times that of falling into a more risky drinker status,  $Z = 3.64$ ,  $p < .001$ .

## Discussion

The present study is an MI based, gender-specific intervention that aims to create motivation to decrease risk associated with drinking in adjudicated college women. The intervention implemented techniques such as rolling with resistance, expressing empathy, developing discrepancy, and supporting self-efficacy in an effort to create motivation to change alcohol-related behaviors (Miller & Rollnick, 2002). Further, the intervention addressed female-specific reasons for drinking in a focus-group style allowing women to collectively share in an environment of trust. No previous research to date has examined female-specific interventions with adjudicated college women. While previous research on non-sex specific interventions reveal significant reductions in drinking behavior for both male and female mandated students, males tend to evidence the largest reductions in drinking (LaBrie et al., 2006). The current findings suggest that an MI-based intervention designed for a female sample significantly reduces drinking and alcohol-related negative consequences across three months of follow-up.

Further analyses revealed that reductions in drinking were most pronounced among those with the greatest risk: heavy drinking women. Women classified as Frequent Binge Drinkers prior to the intervention reduced alcohol consumption by 17.9% at 1-month follow up and then by 28.7% at 3 month follow up. Women classified as Binge Drinkers reduced by 10.6% over the 1-month follow up period and by 30.1% over the 3-month follow up period. Further, all drinker types reported a reduction in alcohol-related negative consequences. Frequent Binge Drinkers reduced alcohol-related negative consequences by 15.0% at 1-month follow up and by 22.5% at 3-month follow up; Binge Drinkers reduced by 26.8% at 1-month follow up and by 41.9% at 3-month follow up; Non-Binge Drinkers reduced by 30.1% at 1-month follow up and by 28.8% at 3-month follow up. Thus, the intervention appears to have had beneficial effects with respect to alcohol-related negative consequences, such that after participating in the intervention, participants experienced less negative consequences than they had at baseline. Further, 59% of Frequent Binge Drinkers decreased alcohol consumption enough to be classified as Binge Drinkers (35.9%) or as Non-Binge Drinkers (23.1%). Binge Drinkers also showed a decrease in drinking levels as 40% of Binge Drinkers at pre-intervention were categorized as Non-Binge Drinkers at 3-month follow-up.

While it is possible that the very act of sanctioning itself may lead to reductions in drinking (Barnett et al., 2004), it is less likely to have occurred in this sample. The findings herein account for any effect that the initial experience of being sanctioned might have had on alcohol use. Every woman in the study attended the group at least 30 days following their alcohol citation. Baseline drinking variables assessed in this study (drinking in the month prior to attending the intervention and a Timeline Followback of drinking behavior), measured drinking patterns after the initial sanction, and thereby incorporated any reduction that may have been associated with being written-up. While some women may have already begun to reduce drinking patterns due to being written-up, reductions in drinking found after the intervention indicate additional effects, such that the experience of an MI intervention appears to have impacted further changes and reductions in drinking behaviors.

While the results offer valuable insight on adjudicated women, the findings are limited by the lack of a control group. Without a control group, we cannot determine the cause of the observed reductions in alcohol-related risk. It is possible that findings reflect assessment reactivity, such that participants reduced drinking simply due to the awareness of being asked about drinking patterns (Carey et al., 2006; Marlatt et al., 1998). Further, the fact that the intervention was most successful in reducing drinking and consequences in the heaviest drinking females might be due to regression to the mean or to some cohort effect. As such, inferences made regarding the effectiveness of the intervention on specific aspects of drinking behavior are tentative. Nonetheless, in our within-subjects design, each subject served as her own control. The fact that groups ran throughout the year also reduces the likelihood that reductions in drinking resulted from a cohort time effect (such as reductions around finals or increases over Spring Break). While the reductions in drinking among the heaviest drinkers might be accounted for by regression to the mean, the fact that data collection for both baseline and follow-up variables occurred at least 30 days post sanction helps ensure that students were not simply reporting socially desirable answers nor effects solely from being cited. Future research with random assignment to group intervention and alternative control could better determine if the intervention accounted for change.

The multi-component nature of the intervention makes it impossible to ascertain which aspects of the intervention were effective in changing behavior. Nonetheless, the intervention did reveal significant within-person reductions in problematic drinking and consequences. Thus, while it is impossible to determine without adequate control what accounted for these reductions, these changes are clinically significant to campus communities who can use similar brief and easy to administer interventions with their own adjudicated students. Finally, the use of retrospective self-report data from adjudicated college students raises the issue of built-in demand characteristics to report lower levels of alcohol consumption. However, the study took several steps to address this issue. First, MI principles were employed to defuse resistance, encourage personal responsibility, and foster an atmosphere of acceptance and non-judgment. Second, participants received verbal and written assurances of the confidentiality of their responses. They received assurances that no further penalties would ensue from their responses. Babor, Aguirre, Marlatt, and Clayton (1999) found that participants accurately report alcohol use when no penalties are evident for being honest about drinking. In addition, TLFB assessments are a valid and reliable measure of drinking behavior among college students (Searles, Helzer, & Walter, 2000; Searles, Helzer, Rose, & Badger, 2002).

These results are especially important for college personnel. The physiological effects on women from alcohol put women at greater risk for problems (Carey, K., Carey, M., Maisto, Henson, 2006; Perkins, 2000; Jones & Jones, 1976), thus making this issue an urgent one demanding greater attention and commitment on the part of college administrators. Overall, a MI based intervention directed at female-specific reasons for drinking seems to have a

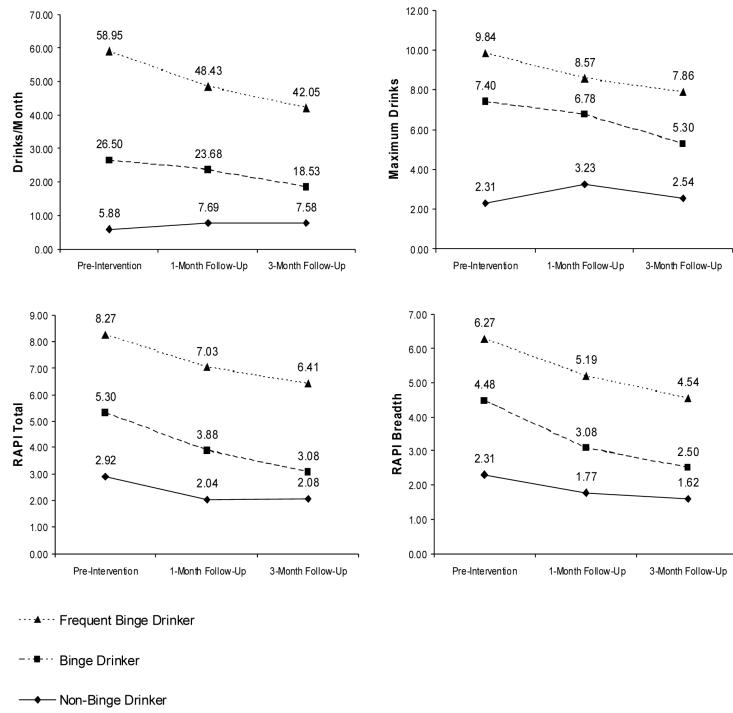
positive impact on adjudicated college women, resulting in a decrease in alcohol consumption and alcohol-related negative consequences. Moreover, the brief nature of the intervention provides college personnel with an efficient way to address college drinking among mandated students. Future interventions for adjudicated students implemented on college campuses might be most effective with college women if they attended to female-specific concerns and use MI-styled approaches.

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**Figure 1.**  
Changes across time in drinking variables by drinker status.



Table 1

Mean Differences Across Time in Drinking Variables by Drinker Type

	Pre-Intervention		1-Month Follow-Up		3-Month Follow-Up		Repeated Measures		
	Mean	(SD)	Mean <sup>a</sup>	(SD)	d <sup>b</sup>	Mean <sup>a</sup>	(SD)	d <sup>b</sup>	F
<b>Non-Binge Drinker (n = 26)</b>									
Drinks/Month	5.88	(6.73)	7.69	(8.63)	-0.23	7.58	(11.68)	-0.18	0.53
Drinking Days	2.19	(2.43)	2.85	(3.21)	-0.23	2.96	(3.54)	-0.25	0.74
Average Drinks	1.61	(1.56)	1.85	(1.93)	-0.14	1.48	(1.64)	0.08	0.56
Maximum Drinks	2.31	(2.28)	3.23	(3.63)	-0.30	2.54	(2.75)	-0.09	1.37
RAPI Total	2.92	(3.95)	2.04	(3.32)	0.24	2.08	(5.50)	0.18	0.61
RAPI Breadth	2.31	(3.22)	1.77	(2.85)	0.18	1.62	(4.13)	0.19	0.52
<b>Binge Drinker (n = 45)</b>									
Drinks/Month	26.50	(16.98)	23.68	(16.34)	0.17	18.53 <sup>**</sup>	(14.96)	0.50	4.17 <sup>*</sup>
Drinking Days	5.88	(2.54)	6.70	(3.82)	-0.25	5.30	(3.76)	0.18	2.54
Average Drinks	4.61	(1.74)	3.71 <sup>**</sup>	(1.75)	0.52	2.91 <sup>***</sup>	(1.72)	0.99	14.01 <sup>***</sup>
Maximum Drinks	7.40	(2.80)	6.78	(3.50)	0.20	5.30 <sup>***</sup>	(3.29)	0.69	8.48 <sup>***</sup>
RAPI Total	5.30	(6.09)	3.88	(5.28)	0.25	3.08 <sup>**</sup>	(3.46)	0.45	5.41 <sup>**</sup>
RAPI Breadth	4.48	(4.66)	3.08 <sup>*</sup>	(3.80)	0.33	2.50 <sup>**</sup>	(2.82)	0.52	6.46 <sup>**</sup>
<b>Frequent Binge Drinker (n = 39)</b>									
Drinks/Month	58.95	(30.70)	48.43 <sup>*</sup>	(33.40)	0.33	42.05 <sup>**</sup>	(39.82)	0.48	5.21 <sup>**</sup>
Drinking Days	9.97	(3.34)	11.22	(5.36)	-0.28	9.41	(6.03)	0.12	1.97
Average Drinks	5.85	(1.94)	4.14 <sup>***</sup>	(2.13)	0.84	3.91 <sup>***</sup>	(2.11)	0.96	22.08 <sup>***</sup>
Maximum Drinks	9.84	(4.11)	8.57 <sup>*</sup>	(4.60)	0.29	7.86 <sup>**</sup>	(4.34)	0.47	4.36 <sup>*</sup>
RAPI Total	8.27	(7.89)	7.03	(8.38)	0.15	6.41	(7.96)	0.24	1.93
RAPI Breadth	6.27	(4.71)	5.19	(5.80)	0.21	4.54 <sup>*</sup>	(5.28)	0.35	3.64 <sup>*</sup>

<sup>a</sup> Asterisk denotes statistically significant post-hoc contrast from pre-intervention.

<sup>b</sup> Cohen's *d* comparing pre-intervention with this follow-up assessment.

\*  $p < .05$ .  
\*\*  $p < .01$ .  
\*\*\*  $p < .001$ .