

Evaluation of Web-Based and Counselor-Delivered Feedback Interventions for Mandated College Students

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This study evaluated the efficacy of 2 brief personalized feedback interventions aimed at reducing drinking among mandated college students. Results indicated significant reductions in drinking for students in both conditions. Findings provide support for web-based interventions for mandated college students.

Heavy drinking represents a significant problem on college campuses in the United States, with over 30% of students meeting criteria for a diagnosis of alcohol abuse (Knight et al., 2002). National survey data indicate that 80% to 85% of U.S. college students reported drinking (O'Malley & Johnston, 2002), and 40% to 45% reported a heavy drinking episode at least once in the 2 weeks prior to the survey (Wechsler et al., 2002). Heavy drinking is also associated with multiple social and interpersonal problems such as arguing with friends, engaging in unplanned sexual activity, drinking and driving, getting into trouble with the law, and having academic difficulties (Abbey, 2002; Cooper, 2002; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Juhnke, Schroat, Cashwell, & Gmutza, 2003; Perkins, 2002; Vik, Carrello, Tate, & Field, 2000; Wechsler, Lee, Kuo, & Lee, 2000). In addition, heavy episodic drinking is associated with severe consequences such as unintended injuries, assault, and death (Hingson, Heeren, Winter, & Wechsler, 2005).

Over the past decade, alcohol prevention programs have been implemented on college campuses in an effort to reduce heavy drinking. Despite these efforts, research examining national drinking trends indicates an increase in binge drinking, driving under the influence of alcohol, and alcohol-related unintentional injury deaths among college students (Hingson, Zha, & Weitzman, 2009). Although heavy drinking is a problem for college students in general, reviews of the literature have identified mandated students (i.e., students who receive sanctions for violating campus alcohol policies) as a high-risk group for heavy drinking relative to the general

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college population (Larimer & Cronce, 2002, 2007). Studies examining drinking patterns on college campuses also indicate that mandated students drink more heavily and report more alcohol-related problems than other college students (see Barnett & Read, 2005). Barnett and Read (2005) also indicated there has been an increase in the number of alcohol-related arrests, the number of students receiving alcohol citations, and the proportion of students mandated to participate in a postcitation intervention on college campuses. These statistics point to the importance of developing effective interventions for mandated college students.

Reviews of the literature support the efficacy of brief interventions for reducing heavy drinking among the general college student population (Burke, Arkowitz, & Menchola, 2003; Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Larimer & Cronce, 2007; Moyer, Finney, Swearingen, & Vergun, 2002). Brief motivational interventions typically include personalized normative feedback, such as information about personal drinking patterns and drinking risk status in relation to peer drinking normative data (Larimer et al., 2001; Marlatt et al., 1998). Over the past few years, innovative approaches to implementing brief motivational interventions have been developed, with a growing number of controlled studies indicating that web-based personalized feedback programs are effective in reducing drinking and alcohol-related consequences among college students (see Carey, Scott-Sheldon, Elliot, Bolles, & Carey, 2009). Although research indicates feedback, whether delivered in person, by mail, or electronically, can be effective in reducing heavy drinking among college students (Larimer & Cronce, 2007; Walters & Neighbors, 2005), there are many advantages to using online programs to provide normative feedback to students (Walters, Miller, & Chiauzzi, 2005). In particular, web-based interventions are easily disseminated, provide an engaging medium for college students who enjoy "surfing the net," and are low in cost compared with in-person interventions.

Several randomized controlled studies have been conducted examining the efficacy of brief motivational interventions with mandated students (Barnett, Murphy, Colby, & Monti, 2007; Barnett et al., 2004; Borsari & Carey, 2005; Carey, Henson, Carey, & Maisto, 2009; Doumas, McKinley, & Book, 2009; White et al., 2006; White, Mun, Pugh, & Morgan, 2007). In a study of high-risk mandated students, Borsari and Carey (2005) compared the efficacy of two brief in-person interventions (motivational interviewing vs. education) for reducing drinking and alcohol-related problems among mandated students. Results at a 6-month follow-up indicated both groups decreased their binge drinking, and the motivational intervention group showed a significantly higher reduction in alcohol-related problems than the education group. Similarly, Doumas et al. (2009) compared the efficacy of two web-based interventions (personalized normative feedback vs. education) for reducing drinking and alcohol-related problems among mandated students. Results of a 30-day follow-up indicated mandated

students in the personalized normative feedback condition reported significantly greater reductions in all drinking measures than students in the education condition. Although not significant, a similar trend was found for alcohol-related consequences.

In a larger study with a longer follow-up period, Barnett and colleagues (see Barnett et al., 2007; Barnett et al., 2004) examined the efficacy of two interventions for mandated students referred to either a one-session brief motivational interview (BMI group) or a 45-minute session reviewing an educational CD (Alcohol 101 group). At the 3-month follow-up, both groups decreased their drinking, although there were no changes in alcohol-related problems. Results of a 12-month follow-up, however, indicated mandated students in the Alcohol 101 group increased the number of drinks per drinking occasion compared with the BMI group, whereas the students in the BMI group reported an increase in drinking frequency compared with those in the Alcohol 101 group. In a similar study, Carey et al. (2009) compared students referred to a one-session BMI (BMI group) with those referred to a session reviewing an educational CD (Alcohol 101 Plus group). Initial findings indicated female students in the BMI group reduced their drinking more than those in the Alcohol 101 Plus group. Results of a long-term follow-up, however, indicated that at 12 months all drinking measures had returned to baseline levels, with no differences between the groups.

In another large-scale study with a long-term follow-up, White and colleagues (see White et al., 2006; White et al., 2007) examined the efficacy of a two-session brief personalized feedback program comparing the Brief Alcohol Screening and Intervention for College Students (Dimeff, Baer, Kivlahan, & Marlatt, 1999) delivered either in an in-person motivational feedback session or in a written feedback condition. At 3-month follow-up, both groups decreased the total number of drinks per week, the frequency of binge drinking, and alcohol-related problems. However, no significant differences were identified between the in-person feedback and written feedback conditions. Results of a 15-month follow-up assessment, however, indicated that mandated students reduced their drinking and alcohol-related problems from the baseline assessment, and this reduction was primarily accounted for by the students in the in-person motivational feedback session (White et al., 2007).

The growing body of research examining interventions with mandated students generally supports the short-term efficacy of personalized normative feedback interventions for mandated students whether delivered in person (Barnett et al., 2004; Borsari & Carey, 2005; White et al., 2006), by mail (White et al., 2006), or online (Doumas et al., 2009). Results of studies with longer follow-up periods, however, are inconsistent, with some studies showing mixed effects (Barnett et al., 2007), no effects (Carey et al., 2009), or positive effects (White et al., 2007) for BMIs in the long term. The most promising approach for follow-up periods longer than 6

months appears to be personalized feedback delivered in-person through a motivational interview. To date, however, no studies have examined the efficacy of using web-based personalized normative feedback (WPF) relative to using counselor-delivered personalized normative feedback (CPF) with mandated students.

The aim of the present study is to extend the literature by examining the efficacy of a web-based feedback program in reducing heavy drinking and alcohol-related problems in mandated college students. This study is unique in that we use the same web-based feedback program for both intervention conditions, with one group of college students reviewing the feedback on their own (WPF group) and the other group reviewing the feedback with a counselor (CPF group). To achieve these aims, we randomly assigned mandated college students to either the WPF or the CPF condition. We hypothesized that mandated students in the CPF condition will report greater reductions in drinking and alcohol-related problems compared with those in the WPF condition.

Method

Participants

The participants in this study were students who were referred to University Counseling Services for violating the university policy for alcohol and other drugs. Referrals were made by staff in residence life (85.7%) and the athletic department (14.3%). Mandated students were given an opportunity to participate in the study and were not offered compensation for their participation. All participants were treated according to established American Psychological Association ethical standards, and the university institutional review board approved all research procedures.

Of 61 mandated students referred to University Counseling Services, 60 were referred for an alcohol-related citation. Of these, four declined to participate in the study. Of the remaining 56 students, 61% were male and 39% were female. Ages of the students ranged from 18 to 24 years ($M = 19.22$, $SD = 1.30$). The majority of students were European American (88%), with 6% African American, 4% Asian American, and 2% Native American. Students were primarily freshmen (72%), with 14% sophomores, 10% juniors, and 4% seniors. Participants were randomly assigned to either the WPF or the CPF condition using a computer-generated random numbers table. Thirty-two (57%) students were assigned to the WPF condition and 24 (43%) students were assigned to the CPF condition. Chi-square analyses and t tests confirmed there were no significant differences in any of the demographic variables between the groups. A series of independent sample t tests, however, indicated that students in the CPF group reported higher levels than those in the WPF group on all of the drinking variables. Therefore, we include baseline levels of drinking and alcohol-related consequences in the statistical analyses using a repeated measures design.

Measures

Recommendations by the National Institute on Alcohol Abuse and Alcoholism (2003) task force include assessing patterns of alcohol consumption in addition to the average number of drinks consumed and including at least three measures of consumption covering quantity, frequency, and heavy consumption. We included three measures of alcohol consumption: weekly drinking quantity, peak alcohol consumption, and frequency of drinking to intoxication. We also included a measure of alcohol-related consequences.

Alcohol consumption. We assessed typical quantity of weekly drinking by using a modified version of the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). This item asks participants to indicate how much they typically drink: "Given that it is a typical week, please write the number of drinks you probably would have each day." A response scale is provided for each day of the week (Monday, Tuesday, etc.). Weekly drinking was calculated by combining reports for the 7 days of the week. Peak alcohol consumption was assessed by an item asking participants to indicate the number of drinks consumed on the occasion on which they drank the most the previous month. Frequency of drinking to intoxication was assessed by the question, "During the past 30 days (about 1 month), how many times have you gotten drunk, or very high from alcohol?" This item was rated on a scale with the anchors 0, 1 to 2, 3 to 4, 5 to 6, 7 to 8, or > 9 times.

Alcohol-related consequences. We assessed alcohol-related consequences by using the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The RAPI is a 23-item self-administered screening tool used to measure adolescent problem drinking. Participants were asked the number of times in the past 30 days they experienced each of 23 negative consequences as a result of drinking. Responses were measured on a 5-point scale ranging from 1 (*never*) to 5 (*more than 10 times*). A total consequence score was obtained by summing the 23 items. The RAPI assesses both traditional physical consequences (e.g., tolerance, withdrawal symptoms, physical dependency) and consequences presumed to occur at higher rates in a college student population (e.g., missing school, not doing homework, going to school drunk). The RAPI has good internal consistency (Neal & Carey, 2004) and test-retest reliability (Miller et al., 2002).

Intervention

Mandated students were randomly assigned to one of two interventions: a WPF condition or a CPF condition. All participants completed the baseline questionnaires and the computerized assessment. Those in the WPF condition reviewed the web-based feedback on their own, and those in the CPF condition reviewed the web-based feedback with an advanced master's in counseling graduate student trained in motivational interviewing techniques.

WPF condition. Participants in the WPF condition were directed to take e-CHUG, an evidenced-based, online alcohol intervention and personalized

feedback tool recognized by the National Association of Student Personnel Administrators and developed by counselors and psychologists at San Diego State University (SDSU). This brief web-based program is designed to reduce high-risk drinking by providing personalized feedback and normative data regarding drinking and the risks associated with drinking. The program is commercially available and is managed by the SDSU Research Foundation. Further details about the program, procedures and costs for subscribing to the program, and supporting research are provided on the program's website (<http://www.e-chug.com/>). The program is customized for the participating university, including providing normative data for the specific university population, providing referrals for the local community, and designing the website using university colors and logos.

The personalized feedback program takes approximately 30 minutes to complete. Students first complete an online assessment. This assessment consists of basic demographic information (e.g., sex, age, weight, living situation, class standing) and information on alcohol consumption, drinking behavior, and alcohol-related consequences. Immediately following the assessment, individualized graphed feedback is provided in the following domains: summary of quantity and frequency of drinking including graphic feedback such as the number of cheeseburgers that are equivalent to alcohol calories consumed, graphic comparison of one's own drinking to U.S. adult and college drinking norms, estimated risk status for negative consequences associated with drinking and risk status for problematic drinking based on the participant's Alcohol Use Disorder Identification Test (AUDIT) score, genetic risk, tolerance, approximate financial cost of drinking in the past year, normative feedback comparing one's perception of peer drinking with actual university drinking normative data, and referral information for local agencies.

CPF condition. Participants in the CPF group completed the same web-based program (e-CHUG) as those in the WPF group. In addition, participants in the CPF group reviewed their feedback with an advanced master's in counseling graduate student trained in motivational interviewing techniques. Immediately after completing the web-based program, participants reviewed their feedback with the student counselor. The in-person session focused on reviewing the feedback with the participant and discussing the participant's alcohol use and alcohol-related risk in relation to the peer-based normative data.

Procedure

Participants completed all procedures at University Counseling Services with an advanced master's in counseling graduate student trained in motivational interviewing techniques. Mandated students received instructions for scheduling an appointment from the source of referral and were scheduled within 2 weeks of the policy violation. During the appointment, participants were informed of the nature of the study, risks and benefits

of participation, and the voluntary nature of participation. Questionnaires at baseline were completed in written format. During the baseline data collection, students were assigned a personal code. This code was used to identify pre- and postintervention responses from each student, as well as to calculate response rates from baseline to follow-up assessments. Participants completed baseline questionnaires and either the WPF or the CPF program. Once the intervention was completed, students set up an appointment for a 30-day follow-up session. The average appointment length ranged from 35 to 45 minutes ($M = 40.88, SD = 3.05$) for the WPF condition and 35 to 45 minutes ($M = 42.33, SD = 2.2$) for the CPF condition. During the 30-minute follow-up session, participants completed follow-up questionnaires and then participated in a brief session in which the master's in counseling student reviewed the student's current drinking and any concerns related to drinking. Students were provided a referral to University Counseling Services either for ongoing alcohol-related problems or for future issues or concerns.

Results

Attrition

Of the 56 participants, 37 (66%) completed the 30-day follow-up assessment. There was no difference in the rate of attrition across the two intervention groups, $\chi^2 = 1.80, p = .15$. In addition, a series of chi-square analyses and independent sample *t* tests revealed no differences in demographic variables or in any of the drinking variables between the participants who completed the study and those who did not.

Statistical Analyses

We first examined the data for extreme cases that might affect the results of the analyses. Outliers were defined as those that were more than 3.3 standard deviations from the mean on any of the drinking measures at baseline. Rather than eliminating outliers from the analyses, we adjusted outliers for all drinking items at each time point to 3.3 standard deviations above the mean (Tabachnick & Fidell, 2001).

Intervention Effects

To examine whether students in the CPF group would report significantly greater reductions in drinking and alcohol-related consequences than those in the WPF group, we conducted a repeated measures multivariate analysis of variance (MANOVA). The two independent variables in the analysis were time (baseline vs. follow-up) and group (WPF vs. CPF). The four drinking measures included as dependent variables were quantity of weekly drinking, peak alcohol consumption, frequency of drinking to intoxication, and alcohol-related consequences.

Means for alcohol consumption and consequences at baseline and the 30-day follow-up assessment are shown in Table 1. Results of the repeated measures MANOVA indicated a significant main effect for time, Wilks's $\lambda = .58$, $F(4, 32) = 5.84$, $p = .001$, $\eta^2 = .42$. Follow-up univariate analyses of variance revealed a significant main effect for time for weekly drinking, $F(1, 35) = 7.34$, $p < .01$, $\eta^2 = .17$; peak alcohol consumption, $F(1, 35) = 5.82$, $p < .02$, $\eta^2 = .14$; frequency of drinking to intoxication, $F(1, 35) = 10.79$, $p < .002$, $\eta^2 = .24$; and alcohol-related consequences, $F(1, 35) = 9.28$, $p < .004$, $\eta^2 = .21$. Results indicate that mandated students in both groups reported significant reductions in drinking. Examination of the means in Table 1 indicates that mandated students reduced their weekly drinking quantity by an average of three drinks per week at the 3-day follow-up (approximately 33% reduction in quantity), reduced their peak alcohol consumption by one and a half drinks (approximately 17% reduction in the quantity), reduced their frequency of drinking to intoxication by 19%, and reported a 42% reduction in their alcohol-related consequences.

Discussion

The primary aim of this study was to evaluate the efficacy of a WPF program relative to a CPF program in reducing heavy drinking and alcohol-related problems among mandated college students. Although research indicates that brief interventions delivered in person (Barnett et al., 2007; Barnett et

TABLE 1

Means and Standard Deviations for Drinking Variables and Alcohol-Related Problems

Variable	Baseline		Follow-Up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Weekly drinking				
Web-based personalized normative feedback	5.55	4.21	4.15	3.76
Counselor-delivered personalized normative feedback	13.31	8.58	8.58	7.91
Total	9.11	8.60	6.18	6.34
Peak drinking				
Web-based personalized normative feedback	8.00	5.25	6.80	4.95
Counselor-delivered personalized normative feedback	9.94	5.30	8.41	5.19
Total	8.89	5.30	7.54	5.05
Intoxication				
Web-based personalized normative feedback	2.40	1.14	2.00	1.21
Counselor-delivered personalized normative feedback	2.94	1.35	2.29	1.16
Total	2.65	1.25	2.14	1.18
Consequences				
Web-based personalized normative feedback	2.60	2.89	1.15	1.56
Counselor-delivered personalized normative feedback	4.77	4.89	3.37	4.40
Total	3.60	4.03	2.17	3.34

al., 2004; Borsari & Carey, 2005; White et al., 2006; White et al., 2007), by mail (White et al., 2006), or online (Doumas et al., 2009) are effective in reducing heavy drinking and alcohol-related consequences in mandated students, this is the first study to compare the efficacy of a web-based program providing personalized normative feedback reviewed alone with the efficacy of the same feedback reviewed with a counselor. Thus, this study adds to the growing body of literature evaluating the use of web-based personalized feedback programs.

Results of this study, however, did not confirm the hypothesis that the reductions in weekly drinking, peak alcohol consumption, frequency of drinking to intoxication, and alcohol-related consequences in the CPF condition would be significantly greater than reductions in the WPF condition. Rather, significant reductions in all drinking variables were found in both groups. Mandated students reported a 33% reduction in weekly drinking quantity, a 17% reduction in peak alcohol consumption, a 19% reduction in frequency of drinking to intoxication, and a 42% reduction in reported alcohol-related consequences. These findings are consistent with research indicating brief interventions providing in-person normative feedback (Barnett et al., 2004; Borsari & Carey, 2005; White et al., 2007) and web-based normative feedback (Doumas et al., 2009) are effective for mandated students.

Clinical Implications

Results of this study have important implications for intervention efforts aimed at reducing drinking and alcohol-related consequences among mandated college students. Despite intervention efforts, mandated students remain a high-risk population for drinking and drinking-related problems on college campuses. In addition, although personalized normative feedback programs are more effective than educational programs in decreasing alcohol use in the college student population (Larimer & Cronce, 2002, 2007), group lecture-based alcohol education is still a common practice used in intervention programming. This common practice may be the result of the limited amount of outcome studies examining individual brief motivational interventions in the literature. Alternatively, cost may be a factor in selecting both group formats and educational formats for early intervention programs. Results of this study suggest that providing web-based normative feedback as an intervention program is a promising strategy for the reduction of high-risk drinking in the mandated student population. Because of the low cost, ease of dissemination, and efficacy associated with web-based personalized feedback, this type of program is ideal for large colleges and universities that do not have many resources for intervention programming.

The brief intervention used in this study may be used as an intervention for mandated college students as described in this study. In addition, treatment providers may use WPF programs such as e-CHUG with their

individual clients in other mandated settings. Although mandated clients may be hesitant to report alcohol-related issues to therapists or other treatment providers, they may be more willing to complete an online program between counseling sessions. Clients may then bring their feedback into the counseling session to discuss with their therapist, who may then use motivational interviewing strategies to help mandated clients make better choices about drinking.

Limitations and Directions for Future Research

Although this study adds to the literature by demonstrating the efficacy of web-based personalized feedback for decreasing drinking among mandated college students, there are several limitations. First, the small sample size and attrition rate in this study limit the generalizability of the results. Whereas 93% of students cited with an alcohol policy violation participated in this study, only 66% of them completed the 30-day follow-up assessment. Although attrition and selection are important issues to consider in interpreting the findings, a high percentage of mandated students did participate in this study, the completion rate was adequate in relation to similar studies, and there were no differences in any demographic or drinking variables between those who completed the study and those who did not. Furthermore, attrition rates were similar across study conditions, suggesting that attrition was not related to the particular study condition. In addition, because of the primarily European American composition of the sample, generalizability of the results may be limited to this population. Therefore, future research with larger sample sizes and a more diverse sample is recommended to replicate this study's findings.

Second, information in this study was obtained through self-report. Self-reported alcohol use is, however, common practice in studies evaluating interventions for mandated students. Although self-report potentially leads to biased or distorted reporting, college students may not be motivated to misrepresent their alcohol use because heavy drinking is perceived as normal in the college setting (Borsari & Muellerleile, 2009). Furthermore, results of a meta-analysis support this usage, indicating that the reliability of self-reported drinking in college students is good, with little bias reported between participant and collateral reports (Borsari & Muellerleile, 2009).

Next, although this study followed a randomized controlled design with two intervention groups, we did not have a true no-treatment control group because of ethical considerations. Without a no-treatment control group, it is unclear if the reductions in drinking found in this study were due to the intervention. It is possible that the action resulting in the sanction or the sanction itself contributed to the drinking reductions. Prior research, however, has demonstrated the efficacy of web-based feedback relative to web-based education (Doumas et al., 2009), suggesting that the intervention contributed to drinking reductions beyond the effect of receiving a sanction. Future research with a wait-list control group would be beneficial,

although ethical concerns make this difficult to achieve, particularly in studies examining long-term effects.

Finally, the duration of the 30-day follow-up was fairly short. Although effects of web-based feedback programs have been shown by Neighbors, Larimer, and Lewis (2004) to last for up to 6 months in university students, a more recent study by Walters, Vader, Harris, Field, and Jouriles (2009) indicated that at a 6-month follow-up, motivational interviewing with personalized normative feedback was more effective in reducing university student drinking than web-based feedback alone, and there were no differences between the web-based feedback alone and assessment-only conditions. In addition, although research on the long-term efficacy of brief interventions for mandated students is mixed (Barnett et al., 2007; Carey et al., 2009; White et al., 2007), overall, the literature suggests in-person feedback may be the most promising strategy for this population. Therefore, future research should include examining the efficacy of WPF programs implemented for mandated students across a longer period of time.

Conclusions

Despite prevention efforts, mandated students remain a high-risk population for heavy drinking and alcohol-related consequences on college campuses. Results of this study add to the growing body of literature suggesting that providing web-based personalized feedback interventions to mandated students is a promising strategy for decreasing heavy drinking and alcohol-related consequences in this high-risk population. Because of the low cost, ease of dissemination, and growing empirical evidence associated with web-based feedback, this type of program is ideal for colleges and universities without many resources, needing to target large numbers of students, or wanting to provide students unlimited program access. Directions for future research include examining the impact of web-based feedback programs over longer follow-up periods, with larger and more diverse samples, and with a wait-list control group. Furthermore, additional measures of alcohol-related consequences (e.g., campus alcohol policy violations) and academic success (e.g., retention rate or grade point average) could be included as more objective measures of program effectiveness.

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