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Evaluating Personal Alcohol Feedback as a Selective Prevention for College Students with Depressed Mood

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Abstract

Objective—This research evaluated a brief mailed intervention for alcohol use as an adjunct to a brief depression treatment for college students with depression symptoms. The intervention aimed to correct normative misperceptions and reduce students' drinking and related consequences.

Method—One hundred seventy seven college students (70% Female) with elevated scores on the Beck Depression Inventory were randomly assigned to intervention or control group. Participants in the intervention were mailed feedback and information detailing their reported alcohol use, moderation strategies, and accurate normative information regarding student drinking.

Results—Results indicated no main effects of the intervention on drinking or related problems but students receiving feedback showed significant reductions in their perception of drinking norms compared to the control group. Furthermore, students whose normative perceptions reduced showed significant reductions in total drinks per week and total alcohol related problems compared to those whose norms did not reduce.

Conclusions—Results support the importance of correcting normative perceptions and provide direction for selective prevention of alcohol use and related problems among college students with depressed mood.

Keywords

Alcohol; Norms; Selective Prevention; College Students

1. Introduction: Evaluating Personal Alcohol Feedback as a Selective Prevention for College Students with Depressed Mood

The college years are a high-risk period for a variety of mental health concerns. These young adults often initiate alcohol use or increase their rates from high school (Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996). Drinking for college students is both a widespread and problematic phenomenon with high prevalence rates of alcohol misuse (Johnston, O'Malley, Bachman, & Schulenberg, 2005; O'Malley & Johnston, 2002; Presley, Meilman, & Leichliter, 2002). The consequences of heavy drinking include educational, health, psychological, interpersonal, and behavioral consequences (Hingson, Heeren,

Zakocs, Kopstein, & Wechsler, 2002; Wechsler, Lee, Kuo, & Lee, 2000) and underscore the need for continued prevention efforts on college campuses.

Prevention strategies to address college student drinking have been conceptualized at three levels: universal (i.e., strategies target entire populations without respect to current use or level of risk), indicated (i.e., strategies target individuals who are at risk and/or who have already begun to experience problems), and selective prevention (i.e., strategies target members of groups considered to be at-risk, regardless of an individual's personal risk) (IOM, 1994). On college campuses, many of the prevention strategies focusing on alcohol use are universal (e.g., social marketing campaigns targeting the entire campus, Borsari & Carey, 2003; Lewis & Neighbors, 2004; Perkins & Berkowitz, 1986) or indicated (i.e., programs for students already experiencing problems or elevated drinking levels, e.g., Borsari & Carey, 2000; Larimer, Kilmer, & Lee, 2005; Neighbors, Lewis, & Larimer, 2004). Selective strategies are currently being developed and tested with high-risk groups on college campuses such as athletes (Martens, Dams-O'Connor, Duffy-Paiement, & Gibson, 2006) and fraternity and sorority members (Larimer et al., 2001; Larimer, Turner, Mallett, & Geisner, 2004) but have seldom targeted students who may be at risk based on other criteria.

1.1. Personalized Feedback

A number of studies have found interventions which provide students with personalized feedback regarding their alcohol use to be efficacious as an "indicated prevention", or interventions aimed at those already at risk for drinking problems and/or those who are experiencing problems (for review see Larimer & Cronce, 2002; Walters & Neighbors, 2005). Personalized feedback is used to develop discrepancies between students' beliefs about drinking norms and their own consumption relative to actual campus norms in order to create reductions in problematic alcohol use. Feedback components typically include information summarizing one's own drinking and alcohol related consequences, personalized descriptive norms feedback (e.g., comparing one's beliefs about others' use to actual prevalence of peer use), risk factors such as family history, feedback regarding alcohol expectancies (beliefs about effects of alcohol), and moderation strategies (e.g., Dimeff, Baer, Kivlahan, & Marlatt, 1999). The self-regulation model posits that when provided normative standards that indicate our own behaviors are deviant from the norm, there is a correction of action towards the now perceived norm. Therefore just providing feedback has been hypothesized to be enough to achieve behavior change (Agostinelli, Brown, & Miller, 1995). The effectiveness of providing normative information to students about their drinking can also be explained through social comparison theory (Festinger, 1954). The theory suggests that people compare themselves to others as a way of determining and evaluating the appropriateness of their behavior. Thus providing accurate norms about the drinking of others on campus can motivate a student to reduce their drinking (Neighbors, Larimer, & Lewis, 2004). Students may be resistant to attend even one or two sessions with a therapist, and thus a way to provide them with information in the privacy of their own home can have tremendous economic and harm reduction benefits.

1.2. Personalized Feedback for Selective Prevention: At-Risk Groups

Selective prevention efforts utilizing personalized feedback have been relatively rare, but promising. Larimer and colleagues (2001) found personalized feedback targeting fraternity members to be effective at reducing alcohol use and typical peak blood alcohol levels for this high risk group. Others have shown feedback to be promising when provided to students sanctioned for violating campus substance use policies (Fromme & Corbin, 2004; White et al., 2006). Finally, brief mailed feedback was shown to be successful in reducing depressed mood in college students (Geisner, Neighbors, & Larimer, 2006). These results suggest that personalized feedback may be effective in targeting other at-risk groups.

1.3. Depressed Mood as an At-Risk Factor for Alcohol Use

College students often experience depressed mood (symptoms of depression, such as feelings of sadness, unhappiness, hopelessness, which fail to meet diagnostic criteria for a major depressive episode), and students with depressed mood represent another group at particular risk for higher alcohol use and negative consequences. Research has shown that up to 22% of college students may experience depressed mood at any given time (Pace & Trapp, 1995). Depressed mood is associated with increased risk of problematic alcohol use (as well as other drug use) and related problems (Gilvarry, 2000; Weitzman, 2004). While there is some controversy around the cause and effect relationship between alcohol use and depressed mood, for college students, those with depressed mood have been shown to be more likely than non-depressed peers to use alcohol and other drugs and have more related consequences (Geisner, Larimer, & Neighbors, 2004; Ross, 2004; Weitzman, 2004). In fact, the odds of meeting criteria for alcohol abuse or dependence among those with depression, relative to those without, are approximately 4 times greater (Kessler et al., 1997). Grant and Harford (1995) found that of people with major depression, 21% also had an alcohol use disorder, while only 7% of those not depressed reported a drinking problem. Likewise the risk of having a major depression (9.6%) is higher for those with an alcohol use disorder than without (3.3%) (Grant & Harford, 1995). The link between depressed mood and alcohol (Berger & Adesso, 1991; Camatta & Nagoshi, 1995; Flynn, 2000; Geisner et al., 2004) suggests that students who are identified on the basis of depressed mood are an at-risk group for alcohol misuse and related problems. In addition, there is debate as to whether treatment for depression should occur prior to, after, or concurrently with alcohol treatment (Teeson & Proudfoot, 2003). Thus, a selective prevention approach which would target students at risk for alcohol use and related problems may be warranted for students with depressed mood, but to date, does not yet exist. By providing students who are feeling depressed with information about alcohol, both current and future substance use problems may be diminished and prevented.

1.4. Personalized Normative Feedback and Selective Prevention

Studies providing brief mailed alcohol feedback which included norms, student's own use, and reported consequences, in addition to moderation tips, have shown reductions in alcohol consumption and related problems (Agostinelli et al., 1995; Collins, Carey, & Sliwinski, 2002; Walters, Bennett, & Miller, 2000), and often achieved with a single mailing (Agostinelli et al., 1995; Collins, et al., 2002). However, these studies only focused on heavy drinking college students. Evaluation of this approach as a broader prevention strategy with the inclusion of non-and light drinking students seems potentially promising. Recently Larimer and colleagues (in press) showed brief mailed feedback used as a Universal prevention successfully kept abstaining students from initiating drinking, as well as finding that drinking status did not moderate intervention efficacy.

Up until now, brief mailed feedback has not been evaluated as a *selective* prevention strategy for those with depressed mood. Thus, the first purpose of this study was to evaluate whether this approach would reduce normative misperception, alcohol use, and alcohol related negative consequences among students with depressed mood (regardless of students' drinking status). Furthermore, personalized normative feedback as a stand alone intervention has been shown to reduce consumption among heavy drinking students (Neighbors, Larimer, & Lewis, 2004; Neighbors, Lewis, Bergstrom, & Larimer, 2006), and reductions in normative misperceptions have been shown to mediate intervention efficacy (Borsari & Carey, 2000). Because one's perceptions of their peers' drinking (i.e., norms) have been consistently linked to one's behavior (e.g., Social Comparison Theory), and because of the pervasive culture of alcohol use in college, the second purpose of this study was to evaluate whether changing depressed students' normative perceptions of others alcohol use would be

related to their alcohol use and related problems. We thus hypothesized that providing students mailed feedback and moderation strategies would reduce their normative misperceptions, alcohol use and related consequences. Our second hypothesis was a reduction in normative misperceptions would be related to a decrease in alcohol use and related problems.

2. Method

2.1. Participants

Participants were screened and recruited from the Psychology Department's Undergraduate Mass Testing Subject Pool. This pool is representative of the student population at the UW and consists of all students taking introductory psychology which fulfills general requirements and contains students from various majors. Participants are mostly first and second year students. Students are given credit for participating in research. All students in the pool who were 18 years of age filled out an informed consent form, as well as the Beck Depression Inventory-II (BDI; Beck et al., 1996) and a demographics measure during the screening session. One week later, students who scored 14 or above on the BDI (i.e., were at least mildly depressed; Beck, Steer, & Brown, 1996) were invited to participate in a larger study, again signed an informed consent form, and filled out a confidential 30-minute baseline assessment of depressed mood, alcohol use, and coping. The University's Institutional Review Board approved all procedures. All data was kept confidential by using a randomly assigned identification number on all the assessment measures.

Complete screening sample demographics are described elsewhere (Geisner et al., 2006). Of the 1166 people screened, 202 (17%) met the cut-off criteria and agreed to participate by signing informed consent during the screening process. The BDI scores ranged from 0 to 41 at baseline (possible maximum on scale is 63), with a mean of 18.55 and a standard deviation of 7.5. An additional 31 people (3%) met the cut-off criteria but did not provide contact information (and thus chose not to participate). Of the 202 students who consented and met criteria, 177 (83%) completed the baseline assessment, and 168 (95%) of these participants completed the follow-up. There were no differences in screening variables assessed between those who did and did not complete baseline. Of the 177 in the final sample, 70% were women. Ethnicity was 49% Caucasian, 48% Asian, and 3% Other (African American, Hispanic, Native American, and multi-racial). The average age of participants was 19.28 years ($SD = 1.97$; range: 18 to 33).

2.2. Procedures

Students were randomly assigned to either the intervention or control condition after completion of the baseline. Those in the intervention condition ($N = 89$) received mailed personalized feedback on their depressed mood and alcohol use, and two brochures, one for coping strategies with depressed mood, the other with drinking moderation tips one week after completing the baseline measures. Students in the control condition ($N = 88$) received a thank you letter for their participation, and a list of several resources in the community. Students completed the follow-up questionnaires approximately one month after receiving the mailing.

Personalized Alcohol Feedback was modeled after feedback developed by Marlatt and colleagues (Dimeff et al., 1999; Marlatt et al., 1998). Information about the role of alcohol in the cause and/or maintenance of depression was first presented, followed by the student's drinking rates and experienced alcohol-related problems or consequences, including how these rates compared with other college students on campus. The student's drinking percentile was calculated based on comparing the student's reported drinks per week to

drinking rates from a survey of approximately 6000 students. Perceptions of the normative drinking rates on campus were juxtaposed with actual drinking rates on the campus. Finally, a general list of moderation tips was provided (e.g., spacing drinks and limit setting). Personalized feedback about depression symptoms and a depression tips brochure were also provided. Details of the depressed mood intervention and its efficacy are presented elsewhere (see Geisner et al., 2006).

2.3 Measures

2.3.1. Perceived Norms—The Drinking Norms Rating Form (DNRF; Baer, Stacy, & Larimer, 1991) asks students their perceptions of the drinking habits of a typical student on their campus, and was used to assess changes in perceived descriptive norms. Students were asked to report the number of standard drinks they believe a typical student consumes on each day of a typical week, averaged over the past month. The DNRF has been used in numerous studies of college student drinking and has demonstrated good concurrent validity and test-retest reliability (Marlatt et al., 1998; Neighbors et al., 2006). Reliability in this study was $\alpha = .77$ and $\alpha = .86$ at baseline and follow-up respectively.

2.3.2. Alcohol Consumption—Paralleling the DNRF, the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) asks students to report their own drinking on each day of a typical week, averaged over the past month. This procedure minimizes weekly fluctuations and provides a more stable drinking estimate in college samples (Dimeff et al., 1999). A total weekly drinking summary score based on quantity and frequency reported was calculated. Like the DNRF, the DDQ has been widely used in this population and has demonstrated good psychometric properties (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990). Reliability for the DDQ in this study was $\alpha = .76$ and $\alpha = .79$ at baseline and follow-up, respectively. In addition, items assessing the typical weekend drinking quantity and the drinks consumed on peak occasion in prior month from the Quantity/Frequency Questionnaire (QF; Dimeff et al., 1999) were included.

2.3.3. Alcohol Problems—The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) is a questionnaire used to assess drinking consequences in college populations. The RAPI asks the student to rate the occurrence of 23 items reflecting alcohol's impact on social and health functioning over the past month. Sample items include "how many times have you not been able to do your homework or study for a test because of your alcohol use" and "how many times have you had a fight or argument or bad feelings with a friend because of your alcohol use". Two additional items were added regarding drinking and driving. Response options ranged from 1 to 5 (1 = Never, 2 = 1 to 2 times, 3 = 3 to 5 times, 4 = 6 to 10 times, 5 = more than 10 times). The RAPI has internal consistency of .92 and moderately strong correlations with alcohol use (White & Labouvie, 1989). Reliability for the RAPI in this study was $\alpha = .89$ and $\alpha = .91$ at baseline and follow-up respectively.

2.3.4. Adherence—An adherence measure was designed for this study asking students to indicate whether they received the intervention in the mail, read the materials, and the degree to which they found it useful on a 1 to 7 scale with higher scores indicating better perceptions. This measure was administered only at follow-up.

3. Results

SPSS 11.5 was used to conduct all analyses. Almost half the sample drank less than 2 drinks per week, with 37% of the entire sample reporting zero drinks per week. The relatively large number of abstainers resulted in positive skew for drinking variables. To determine whether

this was problematic in results reported below, analyses were run with and without non-drinkers. Results were essentially unchanged, thus, consistent with the selective prevention focus all participants were included in analyses reported below. In addition, the t-tests revealed that Caucasian students drank significantly more than non-Caucasian students at both baseline and follow-up (baseline: 8.4 versus 3.4; follow-up: 7.9 versus 2.7), but were not different on alcohol related problems (baseline: 6.3 versus 5.2; follow-up: 6.2 versus 4.1). However, ethnicity did not moderate the relationship between the intervention and the variables examined below. Likewise, while men drank more than women at baseline (8.6 versus 4.7), gender did not moderate the results presented below.

Students reported drinking an average of 5.86 ($SD = 8.14$) drinks per week (range 0 to 36 drinks per week, median of 2 drinks per week). Approximately half the sample (50.8%) indicated they exceeded the “heavy drinking” criteria of 5 drinks per occasion for men and 4 drinks for women based on number of drinks on peak occasion reported during the past month (Wechsler et al., 2000), with no significant difference in the percentage of men and women who met these criteria (men 57%; women 48%). Twenty per cent of the sample drank 10 or more drinks per week, and less than 2% drank more than 30 drinks per week. Both the rate of heavy drinking episodes and the rate of abstinence were higher than in the general population (heavy drinking 40–44%, abstinence 25%; Johnston et al., 2005).

Of those in the intervention group who completed the follow-up, most (86%) indicated that they received the alcohol materials, read it carefully (57%), and about a third found it helpful (35%). Furthermore, 26% said the materials helped them change their thinking, and 18% said it changed their behavior.

3.1. Changes in Alcohol, Problems, and Norms as a Function of Group

Independent sample t-tests indicated no baseline differences on any of the drinking variables between the intervention and control groups (see Table 1). Two repeated measures ANOVAs examining 1) changes in drinking and 2) changes in alcohol problems as a function of intervention condition indicated no significant Time $\times$ Group interactions. Thus neither drinking nor problems varied as function of intervention condition. In contrast, for perceived norms, there was a significant Time $\times$ Group interaction, $F(1, 155) = 13.79, p < .001, d = .60$, revealing that the intervention was effective in reducing perceived norms. Figure 1 presents marginal means of perceived norms at baseline and follow-up by intervention condition. These results suggested that providing alcohol-related normative feedback to students with depressed mood was efficacious in reducing their perceptions of typical student drinking norms but did not have a significant effect on alcohol consumption or alcohol related problems. Results were also evaluated with respect to severity of depression at baseline; depressed mood did not moderate any of the results.

3.2. Changes in Drinking as a Function of Changes in Norms

Next, in the absence of a main effect of feedback on drinking outcomes, we were interested in determining whether changes in perceived norms were associated with reductions in drinking and related consequences. We created a norms change variable by saving the values of unstandardized residuals from a regression equation predicting follow-up norms from baseline norms. This variable was then used as a predictor variable in subsequent analyses. Positive values on the norms change variable represented increases in perception of typical student drinking, whereas negative values represented decreases in perceptions of typical student drinking. Consistent with the results reported above, there was a significant difference between the intervention and control group on the norms change variable ($t = 3.60, p < .001, d = .29$), with the intervention group more accurately reporting norms compared to the control group.

A series of repeated measures ANOVAs was conducted examining follow-up alcohol use and related problems as a function of the baseline alcohol variable, group, and norms change. Results revealed a main effect of norms change on all variables: total drinks per week, $F(1, 153) = 26.88, p < .001, d = .84$, total negative consequences, $F(1, 151) = 4.66, p = .03, d = .35$, and peak drinks on a typical weekend, $F(1, 154) = 24.59, p < .001, d = .80$. For all variables, a reduction in drinking norms was related to a reduction in self-reported drinking quantity, frequency, and related problems.

4. Discussion

The present study is unique in that it evaluated the efficacy of mailed personalized normative feedback for alcohol as a selective prevention approach for college students with depressed mood. While prior research has found that providing personalized normative feedback reduces both misperceptions of others' use and actual alcohol consumption in *indicated* samples, this research has not been conducted with students who may be at-risk for heavier drinking based on elevated depressed mood (i.e., *selective* sample). The feedback intervention was associated with reduced drinking norms, thus was successful in reducing the overestimates of typical students' use, but was not associated with reductions in alcohol consumption or alcohol-related problems in comparison to a control group. Congruent with our second hypothesis, students who showed reductions in normative misperceptions also reported reductions in alcohol use and negative consequences. In the absence of a main effect for the intervention in this study, this finding nevertheless represents an important implication in that social influences on drinking are potentially relevant for college students with depressed mood despite the likely reason for drinking in this population being related to coping and affect regulation. More accurate appraisals of others' drinking have been consistently associated with less drinking generally (Borsari & Carey, 2003; Neighbors et al., 2006) but with some exceptions (e.g., Fraternity/Sorority students; Larimer et al., 2004 and athletes; Martens et al., 2006) has not been widely evaluated in sub-populations, and this is the first study we are aware of to evaluate this issue among students suffering from depressed mood. Alcohol-related social misperceptions appear to be ingrained, self-fulfilling, self-perpetuating, and ubiquitous in the college culture (Borsari & Carey 2001, 2003; Perkins, 2002; Prentice & Miller, 1993) and their consistent associations with drinking in this population make them an important intervention target in their own right.

The results from this study are somewhat inconsistent with prior research, but there may be several explanations for these findings. First, while others have indicated brief mailed interventions have impacted or reduced students' own drinking (Agostinelli, Brown & Miller, 1995; Collins, Carey, & Sliwinski, 2002; Walters, 2000; Walters, Bennett, & Miller, 2000), this study failed to replicate the reductions in drinking. Previous studies have typically been conducted with indicated samples, college students already engaging in heavy drinking (Walters & Neighbors, 2005). In contrast, the current sample was based on the students' at-risk status based on depressed mood, which was unlike similar studies in that drinking status was not used as screening criteria. It may take longer for the effects of the intervention on drinking to be noticeable with a selective prevention approach in comparison to interventions geared specifically for drinkers. In addition, there may have been a floor effect since many students were already abstaining or drinking moderately, so there may have not been as much room to impact their drinking. Finally, low power may have contributed to results with not enough heavy-drinking students to be able to detect the effects of the intervention on drinking. Moreover, larger effect sizes in changes in norms may be required to impact changes in drinking in selective prevention trials.

Second, research utilizing normative feedback suggests that drinking motives may play a significant role in individual responses to feedback. For example, while college students

have been found to drink for a variety of reasons, research has found these types of interventions are more effective with students who drink for social reasons (Neighbors et al., 2004). In the present sample, students were experiencing depressed mood and were perhaps more apt to drink for emotion regulation (i.e., self-medication/tension reduction) rather than for social reasons (Mohr et al., 2001; Mohr et al., 2005). While the present study did not examine drinking motives, future research should examine the influence of drinking motives on intervention efficacy.

Finally, in addition to the study design limitations discussed above, the alcohol measures used were self-report. The assurance of confidentiality and use of well-validated and reliable measures reduce the risk of biased data (Babor, Steinberg, Anton, & Del Boca, 2000; Chermack, Singer, & Beresford, 1998; Darke, 1998). Furthermore, research on the use of collateral respondents suggests self-report is accurate regarding quantity, frequency, and problems related to alcohol use and that adding external corroboration does not improve reporting (Laforge, Borsari, & Baer, 2005; Marlatt et al., 1998; Smith, McCarthy, & Goldman, 1995). Nevertheless, we can not rule out potential response biases in this study, nor can we rule out the possibility that students who reported reductions in perceived norms may have underreported their drinking in efforts to normalize their behavior. Additional research directly evaluating the potential influence of social desirability in this context would be worthwhile.

5. Future Directions

The present study, to our knowledge, is the first of its kind to evaluate a personalized feedback intervention for alcohol use with students with depressed mood. Although the feedback did not directly reduce drinking in this sample, reductions in students' perception of the drinking norms were related to self-reported reductions in both drinking and related problems. This research has important implications for the use of a brief personalized mailed feedback alcohol intervention in a selective prevention context with college students.

Future studies could be designed to address the above limitations. For example, depressed students who are also heavy drinkers could be recruited to test intervention efficacy for those who report both depressed mood and alcohol use problems. Another direction would attempt to disentangle the components of the intervention, sending only feedback, only brochure, both, or neither for those depressed, and similarly for the depressed heavy drinkers, sending some people all components of the intervention, while others receive information solely on depression or drinking. Though a brief, mailed feedback approach may not be sufficient to change norms and use for every student, identifying active components of brief interventions and determining what works best and for whom is an important avenue for future investigation.

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Figure 1.
Changes in Perceived Drinking Norms between Intervention and Control Group from Baseline to Follow-up.

Table 1

Means by Group on Alcohol Measures, Baseline and Follow-Up

Alcohol	Control Mean (SD)	Intervention Mean (SD)
Total drinks per week baseline	5.48 (8.42)	6.22 (7.89)
Total drinks per week follow-up	5.28 (8.6)	5.35 (7.97)
Most drinks peak occasion baseline	4.38 (5.66)	5.65 (5.07)
Most drinks peak occasion follow-up	4.09 (4.94)	4.85 (5.4)
Weekend typical baseline	2.66 (3.64)	3.55 (4.05)
Weekend typical follow-up	2.72 (4.1)	3.35 (4.8)
Days drink per week baseline	2.63 (1.59)	2.94 (1.48)
Days drink per week follow-up	2.43 (1.49)	2.68 (1.46)
Total RAPI baseline	5.53 (7.36)	5.98 (7.55)
Total RAPI follow-up	5.24 (7.89)	5.03 (8.53)
Total drinks per week norms baseline	11.53 (8.8)	13.24 (10.98)
Total drinks per week norms follow-up *	12.40 (9.58)	9.1 (6.05)

Note. *N*'s range between 76 and 89,

* $p < .05$.