

Approaches to Brief Intervention for Hazardous Drinking in Young People

John B. Saunders, Kypros Kypri, Scott T. Walters, Robert G. Laforge, and Mary E. Larimer

This article represents the proceedings of a symposium at the 2002 joint conference of the Research Society on Alcoholism and the International Society for Biomedical Research on Alcoholism in San Francisco. The chair was John B. Saunders. The focus of the symposium was on brief intervention approaches for hazardous drinking among young people. The presentations were (1) Evidence for the effectiveness of brief intervention as an approach to reducing hazardous alcohol use, by John B. Saunders; (2) College student hazardous drinking in New Zealand, the USA, UK, and Australia: implications for research, policy, and intervention, by Kypros Kypri; (3) Applications of motivational feedback on the college campus, by Scott T. Walters; (4) A population based individualized alcohol harm reduction feedback intervention: preliminary results from the college-based alcohol risk reduction (CBARR) trial, by Robert G. Laforge; and (5) Brief interventions: conclusions and future directions, by Mary E. Larimer.

HAZARDOUS DRINKING IS a continuing and, in many countries, a growing problem among young people. This is occurring despite legislation, policies, and prevention programs that are designed to limit alcohol consumption among youth. Brief interventions comprising advice, goal setting, and simple strategies to reduce hazardous drinking are known to be effective in the general adult population, but there is limited evidence for the benefits of this approach in young people. Brief interventions may be provided by a health professional, but there is growing interest in their presentation through electronic media (such as Web sites) and via correspondence-based programs. This symposium reviewed innovative approaches to brief alcohol intervention among young people.

EVIDENCE FOR THE EFFECTIVENESS OF BRIEF INTERVENTION AS AN APPROACH TO REDUCING HAZARDOUS ALCOHOL USE

John B. Saunders

Evidence for the efficacy of brief interventions for hazardous drinking has been mounting for more than a decade. This review will summarize the evidence for this approach and examine some key questions. How brief may these interventions be? How long does the effect last? Is the response to brief intervention influenced by the severity of the drinking problem, by age or gender, or by the ethnic background of the individual? How are brief alcohol interventions best presented to at-risk populations, and can developments in health technology extend the scope of these interventions?

To date, 36 randomized, controlled trials of brief alcohol interventions have been reported. Six meta-analyses have been undertaken, the most recent being one by Moyer et al. (2002). These trials have been based in a variety of settings, including physicians' rooms, primary health-care clinics, hospital outpatient clinics and wards, health screening programs, and community settings. In 34 of the 36 trials, participants were not specifically seeking treatment for hazardous drinking. They were identified opportunistically, for example, through systematic screening in a health-care facility. Most trials have emanated from Europe, North America, and Australasia, but a World Health Organization collaborative study included countries from Africa, Latin America, and Eastern Europe.

The meta-analysis by Moyer et al. (2002) concluded that among non-treatment-seeking populations, brief interventions had a statistically significant medium effect size that was evident up to 12 months from the time of intervention

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Table 1. Aggregate Effect Sizes (Composite Outcome Index) for Brief Intervention Versus Control in Non-Treatment-Seeking Populations Moyer et al. (2002)

Follow-up period	No. Studies	Effect size	Heterogeneity (Q)
<3 months	4	0.30*	4.5
3–6 months	11	0.14*	10.6
6–12 months	23	0.24*	30.6
>12 months	5	0.13**	7.4

* $p < 0.01$; ** $p = 0.05$.**Table 2.** Aggregate Effect Sizes (Alcohol Consumption) for Brief Intervention Versus Control in Non-Treatment-Seeking Populations Moyer et al. (2002)

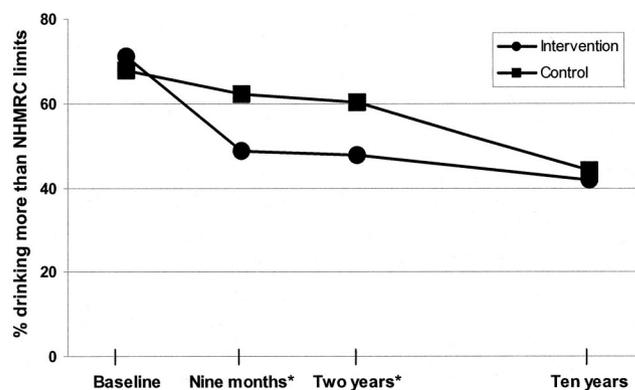
Follow-up period	No. Studies	Effect size	Heterogeneity (Q)
<3 months	3	0.67*	3.6
3–6 months	11	0.16*	18.5**
6–12 months	23	0.26*	50.8
>12 months	2	0.20**	0.8

* $p < 0.01$; ** $p = 0.05$.

(Tables 1 and 2). The effect size was smaller after 12 months, suggesting a decay in the intervention effect from this point.

There was no difference in effect size between men and women or when participants were subdivided into age groups. It is important to note that when trials that included alcohol-dependent participants were omitted, the effect size was significantly larger. This supports the contention that brief interventions are best directed to those who are in the hazardous drinking/alcohol abuse category and not those who have alcohol dependence, for whom more extended interventions are, presumably, needed. In the two remaining studies, which comprised treatment-seeking populations, brief intervention resulted in better outcomes than a control condition over 12 months, with a small to moderate effect size.

To gauge the applicability of brief interventions in health-care practice, two other considerations are important. They are the brevity of the intervention, the duration of the effect, and whether these interventions result in reduced morbidity, health-care utilization, and mortality. The comparative effect of interventions of different length was examined in the WHO collaborative study (Babor et al., 1987; Saunders et al., 1998; WHO Brief Intervention Study Group, 1996). In the Australian arm of this study, 554 participants were randomly assigned into 4 treatment conditions: (1) 5 min of simple advice, (2) 20 min of advice and brief counseling in strategies to deal with high-risk situations, (3) an extended intervention of up to 40 min over 3 sessions, and (4) a no-treatment control condition. Average weekly alcohol intake declined by 28% in those who received the 5-min intervention compared with the control group. Extended treatment resulted in a 38% reduction in intake, but participants reported some reluctance to attend. Thus, the 5-min intervention was considered the appropriate one to promote. Further follow-up showed that intervention effects were apparent at 2 years but not at 10 years (Fig. 1; Wutzke et al., 2002).

* $p < 0.01$ **Fig. 1.** Reduction in the percentage of hazardous drinkers (NHMRC criteria) in those receiving brief interventions compared with controls.

Two trials have examined intervention effects over 4 years and 10 to 16 years. In a US-based trial of physician-delivered intervention, Fleming et al. (2002) found that weekly alcohol intake was significantly lower in the intervention group than in control participants up to 3 years after therapy. Hospitalizations were significantly less frequent over the first 4 years in the intervention group. In the Malmo medical intervention study, Kristenson et al. (1983) showed that survival was longer in those who had received an alcohol intervention over a 16-year follow-up. This result, which might suggest an intervention of extraordinary potency, needs to be considered in the context that participants who were assigned to the active intervention group could receive booster advice every 2 weeks in the first 2 years. Nonetheless, it demonstrated the scope of opportunistic interventions in reducing morbidity and mortality at the population level.

The evidence for the efficacy of brief interventions in reducing hazardous alcohol use is compelling. The subsequent reductions in morbidity and health-care utilization are highly encouraging. Subsequent work by our group has been directed to assessing their effectiveness in everyday primary care practice and investigating the training and support strategies needed to incorporate them into regular practice. Valid screening and brief assessment instruments such as the Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993) and the FLAGS (Feedback, Listen, Advise, Goals, Strategies) intervention, designed for primary health care (Saunders et al., 2001), are examples of the techniques that have been developed to translate potential into reality.

The question as to whether brief interventions are effective and appropriate for young populations has been little addressed. Most studies have recruited participants aged 17 to 18 years and 55 to 70 years. Although no differential effect of intervention in relation to age has been identified, the sample size of young people in individual studies has been comparatively small. A conclusion of this review is that more information is urgently needed on the efficacy of

brief interventions, specifically in young people in the age range of 16 to 25 years. Whether the type of brief intervention assessed in the studies examined previously, namely, one provided by a health professional, is appropriate to younger populations is a question that demands an empirical response.

COLLEGE STUDENT HAZARDOUS DRINKING IN NEW ZEALAND, THE USA, UK, AND AUSTRALIA: IMPLICATIONS FOR RESEARCH, POLICY, AND INTERVENTION

Kypros Kypri

Studies in the US (Wechsler et al., 1994), the UK (Webb et al., 1996), and Australia (Roche and Watt, 1999) raise serious concerns about college student hazardous drinking, a regular activity of a large proportion of students in each of these countries. Students are found to drink more than their nonstudent peers and to experience significant alcohol-related problems. Recent research suggests that college hazardous drinking is also a problem in New Zealand (Kypri et al., 2002a). In view of the empirical basis for brief intervention with older drinkers (Moyer et al., 2002), it is opportune to consider the potential for its widespread use for college students, as a component of campus harm prevention policies. Accordingly, the aims of this study were to characterize the drinking of New Zealand college students; to compare hazardous drinking levels across New Zealand, the US, the UK, and Australia; to review options for preventing hazardous drinking; and to report preliminary results of a brief intervention trial on a New Zealand college campus.

Details of the methods are described elsewhere (Kypri et al., 2002a). Students from 12 residential halls in Dunedin, New Zealand, were surveyed in the first semester (time 1; $n = 1480$) and second semester (time 2; $n = 967$). Indicators of college student hazardous drinking were obtained from studies in the US, the UK, and Australia, and drink measures were converted to grams of ethanol for comparison.

Alcohol Consumption and Related Problems. The students' mean age was 18.3 years (SD, 1.6 years), and most were in their first year. The mean drinking frequency was 2.4 (SD, 1.5) and 2.0 (SD, 1.3) occasions per week for men and women, respectively. The mean typical episodic consumption was 85 g (SD, 52 g) and 55 g (SD, 35 g) for men and women, respectively. Sixty percent of male drinkers and 58% of female drinkers typically exceeded recommended limits (40 and 60 g, respectively) when they drank. Sixty-two percent of men and 48% of women scored 8 or higher on the AUDIT (Conigrave et al., 1995). Twenty-three percent of men and 14% of women reported an alcohol-related injury in the last year (AUDIT item 9), although it should be noted that when a minimum injury threshold was specified (i.e., "required medical attention"), these percentages halved (Kypri et al., 2002b). Problems

commonly reported by men were blackouts (37%) and difficulty concentrating (18%). For women, blackouts (33%) and emotional outbursts (32%) were common. Drinking patterns were persistent, with a 0.83 correlation for the AUDIT consumption subscale across the year. Of students who met criteria for hazardous drinking at time 1, 90% were still drinking hazardously at time 2. Variables found in other studies to be associated with hazardous drinking (Wechsler et al., 1995) were found to predict time 2 hazardous drinking in the New Zealand study (Kypri et al., 2002a). Of particular interest is a variable that is rarely objectively operationalized: the drinking norm of the student's social group. For each residential hall, the mean episodic consumption by residents served as a proxy for the drinking norm in that hall, with adjustment for baseline drinking and demographics. A potentiating effect of the social environment was observed. Students in the wettest hall had AUDIT scores 2.3 points higher at time 2 than those in the driest hall after adjustment for time 1 drinking and demographic differences.

Cross-National Comparison. Review of the most recent and comprehensive studies of college drinking available for New Zealand (Kypri et al., 2002a), the US (Wechsler et al., 2002), the UK (Webb et al., 1996), and Australia (Roche and Watt, 1999) revealed differences in the heavy episode quantity thresholds (in grams of ethanol for men/women: New Zealand, $\geq 70/\geq 50$; US, $\geq 60/\geq 48$; UK, $\geq 88/\geq 64$; and Australia, $\geq 70/\geq 50$). Reference periods were per typical drinking occasion for New Zealand and Australia and once or more in the past 2 weeks in the US. No reference period was given in the UK article. The high threshold for heavy drinking used in that study precludes meaningful comparison with other studies. For New Zealand, the US, and Australia, heavy episodic drinking levels were similar, ranging from 44 to 52% for men and 41 to 47% for women.

Prevention Options. In 1999, New Zealand reduced the minimum purchase age for alcohol from 20 to 18 years. The real price of alcohol is lower than it has been in decades (Zhang and Casswell, 1999), and New Zealand has an unprecedented number of licensed premises, with a high density of outlets surrounding college campuses. Given such free access and promotion of alcohol, the public health community is compelled to consider demand-reduction approaches such as brief intervention.

Brief Intervention. Can brief intervention be applied to young people and to college students in particular? In focus group studies, the acceptability of brief intervention to students was examined (Kypri, 2002). Hazardous drinkers expressed reluctance to discuss their drinking with a doctor or another health professional but expressed interest in electronic assessment and feedback about their drinking. In a survey of a random sample of university students ($n = 1564$), electronic screening and brief intervention was found to be the most popular of several intervention strategies (Kypri et al., 2003). A randomized, controlled trial of

Table 3. Published Studies Incorporating Motivational Feedback for College Student Heavy Drinking (HD)

Study	Population	Format	Follow-up	Results
Baer et al. (1992)	HD college students	In person	24 months	Decreased drinking
Agostinelli et al. (1995)	HD college students	Mailed	6 weeks	Decreased drinking
Marlatt et al. (1998)	HD college freshmen	In person	24 months	Decreased drinking, decreased consequences
Walters et al. (2000)	HD college students	Mailed	6 weeks	Decreased drinking, n/s consequences
Walters (2000)	HD college students	Mailed	6 weeks	n/s drinking, n/s consequences
Borsari and Carey (2000)	HD college students	In person	6 weeks	Decreased drinking
Larimer et al. (2001)	Fraternity/sorority pledges	In person	12 months	Decreased drinking for males

electronic screening and brief intervention was conducted at the university's student health service. Of a random sample of students approached, 94% consented to participate. Hazardous drinkers were randomly assigned to a leaflet-only control condition ($n = 52$) or to computerized assessment and detailed personalized motivational feedback ($n = 52$). At 6 weeks and 6 months after the intervention, Web-based follow-up assessments were conducted with 80 and 90% of the sample, respectively. Analysis of data by using random effects models with adjustment for baseline AUDIT scores revealed reductions in alcohol consumption and alcohol-related problems of 20 to 30% in the intervention group relative to controls (Kypri et al., 2002). Qualitative studies showed high levels of acceptance of the intervention among students (Kypri, 2002).

Summary and Conclusion. As in the US, UK, and Australia, the prevalence of hazardous drinking among college students in New Zealand is high. It is a persistent behavior, and many students experience significant alcohol-related problems. Given the evidence base for brief intervention for older drinkers, its efficacy in reducing hazardous drinking among young people, and college students in particular, deserves further study.

APPLICATIONS OF MOTIVATIONAL FEEDBACK ON THE COLLEGE CAMPUS

Scott T. Walters

Recent media coverage of the string of alcohol-related deaths on college campuses has brought mainstream attention to the perennial problem of college drinking. In response, colleges have begun to look seriously at the prevention and intervention programs they offer to students. Although it is among the briefest of interventions, motivational feedback has shown efficacy whether it is presented by an empathic therapist or simply mailed to the student (Larimer and Crouce, 2002; Walters and Bennett, 2000). Such feedback draws from stages of change (Prochaska et al., 1992) and motivational interviewing (Miller and Rollnick, 2002) theories and attempts to motivate students via discrepant information about personal drinking patterns and associated risks. Feedback generally reports information about the quantity/frequency of consumption, peak blood alcohol levels, comparison with general or local norms, money spent on alcohol, risk factors (e.g., tolerance, dependence, and genetic risk), and associated risk behaviors (e.g., drinking and driving; smoking). Information is

customized to responses that students provide on an initial assessment and is accompanied by nonjudgmental advice, explanation, and local referral information. When it is mailed, the critical variables that separate it from other informational approaches are that the feedback is customized to the individual by using information derived from a self-report and that the feedback, rather than knowledge correction, is thought to play the major role in motivating recipients.

Table 3 shows published studies that have incorporated feedback as a major component with heavy-drinking college students and pledges to fraternities and sororities. Six of seven studies reported significant reductions in consumption as compared with controls; Baer et al. (1992) reported reductions equivalent to those with longer-term treatment. The one exception to this trend (Walters, 2000) nonetheless showed a mean reduction over controls, although these decreases did not reach significance.

When feedback is presented in person in a one- to two-session motivational interview, it has demonstrated robust effects at up to 24 months. Indeed, many schools have chosen to intervene in this way by using a more or less straightforward application of the "drinker's check-up" intervention (Miller et al., 1993). Depending on student responses, some campuses vary the number of sessions that students attend or use a combination of individual, telephone, and mailed feedback. However, despite its growing use, more campuses still lack the financial and personnel resources to implement such an intervention on a large scale.

Mailed feedback has been particularly attractive to institutions that lack the resources to provide one-on-one counseling but would like to offer more than generic prevention messages to students. Colleges currently use mailed feedback in a variety of contexts: (1) students who violate campus alcohol policies, as an adjunct to a mandatory class or individual session; (2) as a stand-alone intervention for students identified via a student health center screening, where students are assessed over the phone, and either mailed feedback, or seen for an in-person feedback session; (3) inserted by fraternities and sororities into an initial assessment for pledges, where the feedback is scored and mailed separately to maintain confidentiality; and (4) other high-risk and/or "coerced" groups, such as athletes, Greek houses, and freshman orientation classes.

Three published studies (Table 3) offer evidence that mailed feedback can be effective on its own, at least in the

short term. Feedback seems to work best when it is kept separate and private. In one unpublished study (Martin, unpublished data), mailed feedback did not have an effect when it was distributed to intact groups of fraternity and sorority members. Two unpublished program evaluations (Schroeder, unpublished data) showed that feedback did have an effect when it was mailed to sorority pledges who did not yet reside in the house and when it was distributed to an intact freshman orientation class, where students were not given the opportunity to compare results.

Younger college students are almost universally computer and Internet literate. Thus, future applications of motivational feedback on the college campus will likely include electronic means. Already, there are several health interventions online, from the smoking- and drug-prevention messages of Cyberisle (<http://cyberisle.org>) and Consider This (<http://considerthisusa.org>), aimed at younger students, to the more comprehensive Drinker's Check-Up (<http://www.drinkerscheckup.com>), designed for adults. The most widely disseminated program for college students, the Alcohol 101 CD-ROM (<http://alcohol101.com>), is mostly educational in nature, although it does incorporate some feedback material. Two other programs, the College Alcohol & Life Skills Survey (<http://iea.fau.edu/colalc/colalc.asp>) and the Check-Up to Go (<http://sdsu.edu/chuginfo>) are based more strictly on motivational feedback theory. However, the relative slowness with which inroads are being made into this area is partially accounted for by the numerous questions that remain, including the reliability and validity of data collected online, the efficacy of messages presented in this venue, and confidentiality/privacy issues. Nonetheless, electronic applications show great promise at increasing the number of students who can be effectively served by these interventions.

A POPULATION BASED INDIVIDUALIZED ALCOHOL
HARM REDUCTION FEEDBACK INTERVENTION:
PRELIMINARY RESULTS FROM THE COLLEGE-BASED
ALCOHOL RISK REDUCTION (CBARR) TRIAL

Robert G. Laforge

This paper presents the initial results from the NIAAA-funded CBARR study. CBARR is a randomized trial of a brief alcohol harm-reduction intervention that involves a series of three individualized risk and motivationally matched feedback reports delivered by mail during the 2000 to 2001 academic year. A representative sample of 1638 college freshmen and sophomores was proactively recruited by telephone from a random list of matriculating students during the fall semester. Of these students, 82% completed the screener survey, and 77% of eligible students agreed to participate in the longitudinal trial study. To be eligible, students had to report drinking two or more drinks at any time in the previous year and must not have exhibited clear signs of alcohol dependence. Participants

were randomly assigned to one of three experimental conditions: (1) feedback report intervention, (2) assessment only, and (3) posttest only, minimal assessment. This paper reports on data from 1067 study participants assigned to the first two experimental conditions. Outcome analyses report on the results from the first four survey assessments: baseline, 3 months, 6 months, and 12 months. More than 80% of these participants participated in the 3- and 6-month intervention-related follow-up assessments, whereas 77% provided data at the 12-month assessment. Evaluation of self-report bias, comparing a sample of 408 subject and collateral reports of 12-month data, found no evidence that subjects underreported either drinking or problems and found no differences in the pattern of subject/collateral reporting across treatment groups (Guarna et al., 2002).

Feedback reports were four to nine pages long and offered either primary or secondary prevention messages, depending on the individual's alcohol risk status. The intervention group received mailed feedback reports after the baseline, 3-month, and 6-month assessments. Reports were generated by using data provided by the participant after the baseline, 3-month, and 6-month assessments. Reports were created with expert system software by compiling selected messages—from more than 500 prewritten intervention messages—to produce a participant's printed feedback report. Feedback reports matched individual responses based on scores on 17 different constructs, including the frequency of high-risk alcohol use; motivational readiness; decisional balance measures of alcohol expectancies; situational temptations; cognitive barriers to change; and behavioral, experiential, and cognitive processes that have been found to be related to behavioral change. The feedback reports provided information on a participant's comparative risk and behavioral and cognitive practices, as well as self-help information. In addition, the 3- and 6-month reports also gave feedback about the participant's progress toward change compared with earlier assessments.

Baseline results indicated that all groups were equivalent with respect to values on the study's main outcome and predictor variables (Laforge et al., 2001). Process-to-outcome analyses showed that the intervention was successfully delivered and was found to be generally acceptable to the vast majority of intervention participants; 92% reported that they received two or more of the intervention reports. Participants indicated that the reports were interesting (85%), accurately reflected their alcohol behavior and risks (88%), and were of appropriate length (90%).

Outcome analyses are presented for the results of mixed model regression with a random intercept on two primary outcome composite measures assessed on four occasions: high-risk alcohol behavior and alcohol-related problems. The behavior measure was a unit-weighted composite of past-month binge frequency (gender-specific measure), intensity (drinks per drinking day), and past month maximum number of drinks. The problems measure was a unit-

Table 4. Mixed-Effects Random Intercept Model Predicting Alcohol Behaviors: 1-Year Results From the CBARR Study

Effect	Time (months)	Group	Gender	Estimate	SE	df	t	p
Intercept				0.803	0.173	1063	4.64	<0.0001
Time	3			-0.181	0.118	2594	-1.54	0.124
Time	6			-0.016	0.122	2594	-0.13	0.896
Time	12			0.454	0.124	2594	3.66	0.000
Group		TX		0.363	0.244	1063	1.49	0.136
Time × group	3	TX		0.146	0.166	2594	0.88	0.382
Time × group	6	TX		0.164	0.171	2594	0.96	0.338
Time × group	12	TX		-0.245	0.176	2594	-1.39	0.165
Gender			Female	-1.581	0.231	1063	-6.85	<0.0001
Group × gender		TX	Female	-0.351	0.326	1063	-1.08	0.282
Time × gender	3		Female	0.320	0.158	2594	2.03	0.043
Time × gender	6		Female	0.103	0.162	2594	0.63	0.527
Time × gender	12		Female	-0.222	0.165	2594	-1.35	0.178
Time × group × gender	3	TX	Female	-0.449	0.223	2594	-2.01	0.044
Time × group × gender	6	TX	Female	-0.310	0.229	2594	-1.36	0.175
Time × group × gender	12	TX	Female	0.083	0.235	2594	0.35	0.723

TX, treatment group.

Table 5. Mixed-Effects Random Intercept Model Predicting Alcohol Problems: 1-Year Results From the CBARR Study

Effect	Time (months)	Group	Gender	Estimate	SE	df	t	p
Intercept				0.268	0.123	1062	2.18	0.030
Time	3			0.232	0.087	2539	2.66	0.008
Time	6			0.135	0.090	2539	1.49	0.136
Time	12			0.290	0.091	2539	3.17	0.002
Group		TX		-0.018	0.173	1062	-0.10	0.919
Time × group	3	TX		0.014	0.124	2539	0.11	0.913
Time × group	6	TX		0.065	0.126	2539	0.51	0.608
Time × group	12	TX		-0.179	0.130	2539	-1.38	0.168
Gender			Female	-0.524	0.164	1062	-3.20	0.001
Group × gender		TX	Female	0.124	0.231	1062	0.54	0.593
Time × gender	3		Female	0.150	0.117	2539	1.29	0.198
Time × gender	6		Female	0.312	0.120	2539	2.61	0.009
Time × gender	12		Female	0.116	0.121	2539	0.96	0.339
Time × group × gender	3	TX	Female	-0.293	0.166	2539	-1.77	0.077
Time × group × gender	6	TX	Female	-0.356	0.169	2539	-2.11	0.035
Time × group × gender	12	TX	Female	-0.356	0.173	2539	-2.06	0.040

TX, treatment group.

weighted composite of two college student alcohol problem instruments: the YAAPST (Young Alcohol Adult Problems Screening Test; Hurlbut and Sher, 1992) and CAPS (College Alcohol Problems Scale; Maddock et al., 2000).

As shown in Tables 4 and 5, treatment effectiveness was moderated by gender. Significant treatment effects on both outcome measures were found to be earlier and greater for women than for men. For women, the intervention significantly decreased high-risk alcohol behaviors compared with the control group at the 3-month assessment, and this difference was sustained up to, and included, the 12-month assessment period (Table 4). Further, among women, the brief harm-reduction intervention significantly decreased alcohol-related problems compared with controls at the 3-, 6-, and 12-month follow-up periods, and the size of the intervention effect on alcohol problems increased significantly over the three follow-up periods (Table 5). No significant treatment effects were observed for men. Sensitivity and multiple imputation analyses indicated that the results of the outcome results were not biased by missing data (Laforge and Sun, 2002).

In conclusion, this study demonstrated successful recruit-

ment, retention, and intervention delivery with a large proactively recruited sample of college students. It also provided evidence that low-cost very brief individualized mailed feedback reports alone can produce important and sustained reductions in alcohol risk taking and problems over a 1-year period. Future research to identify factors that influence differential treatment effects by gender may be especially fruitful for improving the efficacy of this intervention method.

BRIEF INTERVENTIONS: CONCLUSIONS AND FUTURE DIRECTIONS

Mary E. Larimer

The papers presented in this symposium provide encouraging information about the efficacy of brief interventions. As summarized by Dr. Saunders, a growing body of research literature suggests that brief, individualized interventions provided by health-care professionals in opportunistic encounters with hazardous drinkers can lead to reductions in alcohol use and related harm. Further, research suggests these effects persist months and even years

after encounters that consist of as little as 5 min of advice to reduce consumption. This is consistent with published research reviewed by Dr. Walters that suggested that brief, in-person interventions incorporating motivational feedback are effective for reducing drinking and negative consequences in college-aged populations, a group at particular risk for hazardous drinking. Drs. Kypri, Walters, and Laforge extended these promising findings through investigating alternative implementation strategies for reaching large numbers of students in a cost-effective manner by using computer-generated and/or mailed feedback protocols that eliminate the need for one-to-one professionally delivered feedback interviews. Given the rapidly expanding access to and familiarity with computers and Internet resources, this work clearly represents a very promising and innovative path toward large-scale implementation of effective interventions that target hazardous drinking practices on college campuses and elsewhere in the community. Dr. Kypri presented data indicating that electronic assessment and motivational feedback were effective with heavy-drinking college students in New Zealand who were screened during a health-care visit. His data also indicated that this intervention was well received by students in this setting and that it was preferred by students compared with in-person intervention by a health-care provider. Dr. Walters' research provides support for mailed feedback interventions and also provides an overview of the expansion of computer-based intervention options, several of which overlap with brief motivational interventions based on the work of Miller and Rollnick (2002). Similarly, Dr. Laforge presented preliminary results of his mailed feedback intervention, which is individually tailored to the students' level of risk. His results provide additional support (with longer-term follow-up) for the efficacy of this approach, primarily for high-risk women.

Although results of recent research are promising and the outlook for prevention and intervention with high-risk drinkers is considerably more optimistic now than it was a decade ago, there is still a lot we do not know about brief interventions. For example, there is no standard definition of the term *brief*, and interventions range from four sessions to 5 min to receipt of a feedback sheet (or three feedback sheets) in the mail, all collapsed under this general rubric. How brief is brief? How much is enough? Is more better? Although some research (as reviewed by Dr. Saunders) has addressed these issues, it is often difficult to obtain a clear comparison of intervention length because the content of such interventions also tends to vary across studies. Such content variation is particularly difficult to account for in making sense of research findings, because the actual intervention is often only cursorily described in journal articles. Content variation raises a host of additional research questions. For example, very few researchers have investigated independent components of feedback-based brief interventions but, rather, have tended to incorporate a

broad range of feedback content in an effort to target hypothesized mechanisms of intervention efficacy. Few studies are sufficiently large to evaluate these mediating mechanisms in addition to outcome, and those that have often find little support for the hypothesized mediators despite finding significant effects on behavior. Recent research suggests that normative feedback is one active ingredient (Borsari and Carey, 2000; Neighbors et al., 2004; Nye et al., 1999), but insufficient research has examined this component or others systematically in the context of feedback-based interventions. Thus, the questions remain: What are the active and necessary ingredients in brief interventions? Why do they work? Does adding more components have an additive or synergistic effect to improve outcome, or do some components undermine the efficacy of other components? How important is the presentation mode (mailed, computerized, telephone, or in-person) or style (nonjudgmental, directive, and so on) to the efficacy of feedback-based brief interventions? Do visual appeal and the entertainment value of the feedback improve the effect, or do such things detract from the processing of the message? Do they matter at all?

Finally, for whom do these interventions work best, and why? Research is emerging to suggest that these interventions may be more effective with at-risk than dependent drinkers, and some research (including Dr. Laforge's work presented here) suggests that women may be more responsive than men to brief interventions (Moyer et al., 2002), although other research has found effects for men but not women (O'Leary et al., 2002). Little research has been conducted regarding ethnic or cultural differences in response to these interventions, and even less has investigated whether or to what extent sexual orientation might moderate intervention effects or whether interventions need to be tailored to address the needs of different populations.

It might seem from this concluding summary that there are more questions than answers. It is important to remember that we are able to progress to thinking about mediating mechanisms, moderators of efficacy, and subtleties of content and presentation mode and style because we are now in the fortunate position of having sufficient empirical support for the overall class of brief, feedback-based interventions to begin to look more closely at the *why's* and *how's*. This is a tremendously encouraging place to be, and the potential for additional progress over the next decade is enormous.

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