

BRIEF REPORTS

An Experimental Test of Three Methods of Alcohol Risk Reduction With Young Adults

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This study tested 3 forms of alcohol risk reduction programming for young adults. Volunteers were randomly assigned to receive a 6-week class and discussion group, a 6-unit self-help manual, or a single 1-hr feedback and advice session with professional staff. Results reveal significant reductions in self-reported drinking at the end of the intervention phase and maintenance of drinking changes throughout a 2-year follow-up period. Comparable drinking reductions were rated across treatments; however, noncompliance with the self-help reading program suggested limited utility. Treatment response was related to subject age, as subjects showed increased drinking during the year they reached legal drinking status. The efficacy of brief motivational interventions and client matching in prevention programs is discussed.

In this study, we first attempt to replicate the efficacy of a skills-based approach to reducing alcohol use for young adults with 2-year follow-up. The use of cognitive-behavioral self-management principles and challenging assumptions about alcohol effects have shown considerable promise as a method of secondary prevention of heavy alcohol use in young people (Baer, Kivlahan, Fromme, & Marlatt, 1991; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990). Second, we test methods of program administration by randomly assigning subjects to a cognitive-behavioral 6-week group treatment, a cognitive-behavioral six-unit self-help manual, or a single session of individualized feedback and professional advice. Self-help manuals have shown cost-effectiveness in previous studies of alcohol problems (Heather, 1986). Brief motivational interviewing has also shown significant promise for early intervention for problem drinking (Miller & Rollnick, 1991). Third, individual differences were examined as possible moderators of program impact, with potential implications for future client-treatment matching. We assess demographic characteristics, family history of alcohol problems, measures of psychiatric symptomatology, and stress.

Method

Subject Recruitment and Screening

Student volunteers were recruited, using fliers and newspaper ads, to participate in a 6-week skills-training program for those who wanted

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to learn more about or to change their drinking patterns. Notices containing information about monetary compensation for research participation (i.e., \$75 in six installments over 2 years) produced the best results. Through an informed-consent interview procedure, subjects agreed to complete assessments at preprogram, at postprogram, and on four occasions over a 2-year follow-up period and to monitor their daily drinking during the 6-week program. Subjects also agreed to be randomly assigned to one of three program formats described later.

Subjects needed to report at least one alcohol-related problem on the Michigan Alcoholism Screening Test (MAST; Selzer, 1971) and at least 2 days of drinking per average week with blood alcohol levels (BALs) approaching intoxication (.10%). Of 155 screening interviews, 134 subjects chose to participate and met study criteria. Two subjects were ruled out on the basis of alcohol dependence, and they were referred to abstinence-oriented treatment.

Sample Description

The sample was 52% female and averaged 21.2 years of age ($SD = 3.58$; range = 17-40, mode = 19). The sample was 91% White, 4.5% Asian, and less than 1% Black, Latin American, and Native American. Twenty-three percent reported parental history of alcohol problems. MAST scores averaged 6.08 ($SD = 4.68$). From their screening interview using the Brief Drinker Profile, subjects reported consuming an average of 19.75 drinks ($SD = 10.5$) on 3.7 drinking occasions ($SD = 1.3$) in a typical week. Peak BALs estimated from self-reports of the speed and quantity of typical weekly drinking were calculated at an average of .14% ($SD = .09$).

Randomization

Subjects were randomly assigned, separately by sex, to one of three treatment formats described later. The study was completed in three separate cohorts over time; approximately 45 individuals participated at each of three baseline periods. Because of poor program completion and high dropout in the self-help manual condition, individuals in the

third cohort were randomly assigned to classroom or individualized feedback only.

Program Content

For all formats, we organized program content around two key themes: (a) Alcohol consumed at moderate levels (BAL < .05%) minimizes health and social risks (e.g., accidents, illness, embarrassment, and hangovers), and (b) alcohol effects at moderate doses are largely dependent on set and setting, including expectancies or beliefs about these effects, and less influenced by the chemical properties of alcohol. In all conditions, students self-monitored their drinking and learned to estimate their own BALs. We questioned myths and cultural expectations about alcohol effects and explored coping strategies for typical high-risk situations (see, Baer, Kivlahan, Fromme, & Marlatt, 1991; Kivlahan et al., 1990, for more program details).

A student workbook paralleled program content. In the classroom, the workbook was used to supplement presentations and discussions; the workbook constituted the intervention for those assigned to read self-help materials.

Classroom format. Each classroom group consisted of approximately 8 members. An effort was made to evenly distribute men and women, as well as under- and upper-class students. Subjects attended six 90-min weekly meetings led by male and female coleaders who were advanced graduate students in clinical psychology or who were doctoral psychologists.

The second classroom meeting was held in a simulated bar, and placebo drinks were provided to subjects who were led to believe they were drinking alcohol. After 30 min of drinking and discussion, we told subjects that their drinks contained no alcohol. Subsequent discussion emphasized the power of beliefs about alcohol effects.

Self-help correspondence format. Subjects assigned to the self-help format were asked to complete six reading units during the same 6-week period as the classroom meetings. Each reading unit averaged 17 pages, which included some exercises to elaborate program points (e.g., an expectancy questionnaire and assertive drink refusals) and a homework assignment for the next week.

Individualized feedback and advice format. Subjects assigned to receive individual feedback and advice completed a 1-hr individual motivational interview (Miller & Rollnick, 1991) with one of the same staff members who led the classroom program. Interviewers attempted to emphasize the central points of the Alcohol Skills Training Program (ASTP) but varied advice on the basis of individual subject motivation. Students were given a personalized BAL-monitoring card and a brief two-page written summary of the program's main points.

Screening Interview

The Brief Drinker Profile (BDP; Miller & Marlatt, 1984) was used to assess subjects' typical drinking patterns, history of drinking problems (using MAST), family history of alcohol problems, and symptoms of a physical dependency.

Pretreatment Questionnaires

The pretreatment questionnaires included questions concerning age, sex, and school history, as well as Cahalan's drinking habits questionnaire (DHQ; Cahalan & Room, 1974). Retrospective drinks consumed per month (DRKMN) was computed from this questionnaire. In addition, subjects completed measures of alcohol expectancies, psychiatric symptomatology (Symptom Distress Checklist; SCL-90; Derogatis, Lipman, & Covi, 1973), and daily hassles (Folkman & Lazarus, 1985).

Self-Monitoring of Drinking

Subjects were instructed on how to keep a daily record of their alcohol consumption on wallet-size cards, noting beverage type and amount, time, and place of each drink. Using a scoring program developed by Matthews and Miller (1979), we scored subjects' drinking records to reflect the number of standard ethanol consumption units per week (SECs) and the peak blood alcohol level reached per week (PBAL).

End-of-Treatment Questionnaires

In addition to measures of drinking, daily hassles, and psychiatric symptomatology, subjects completed a four-item program evaluation questionnaire. This questionnaire asked subjects to rate, on a Likert-type scale, how understandable the program was, how helpful it was in changing drinking, how helpful it was in changing general life-style, and how likely they would be to recommend the program to others.

Follow-Up Assessment

At 3, 6, 12, and 24 months after the end of the program, students monitored their drinking for 1 week and completed questionnaires, including the DHQ. In addition, the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) was administered as a reliability check of drinking patterns at the 6-, 12-, and 24-month follow-up assessments.

Results

Treatment Compliance and Follow-Up Attrition

Treatment exposure was defined as attending at least five of six meetings in the classroom condition, completing at least five of six reading units of the self-help manual condition, or completing the individual feedback session in the individual advice condition. Among the first 84 subjects (first 2 treated cohorts) randomized into three conditions, treatment exposure varied significantly across treatment conditions, $\chi^2(2, N = 84) = 24.52, p < .001$. All but 1 (28 of 29, 97%) subject in the individual advice condition completed the personal feedback session, and 18 of 25 (72%) subjects in the classroom condition attended five sessions; however, only 11 of 30 (37%) subjects completed five of six units of the self-help manual. This significant relation between exposure and program type contributed to decisions to abort randomization to the self-help manual condition. In the third cohort, 15 of 23 (65%) subjects in the classroom condition attended five sessions, and all individual advice subjects received feedback.

Compliance with treatment requirements was unrelated to gender, age, family history of alcohol problems, MAST scores, and retrospective drinking rates. However, poor program compliance was associated with higher baseline self-monitored drinking: $M = 18.75$ versus 12.87 for SECs, $F(1, 124) = 9.61, p < .002$, and $M = 0.19$ versus 0.15 for PBAL, $F(1, 124) = 3.61, p < .06$, for noncompliant and compliant subjects, respectively.

Attrition was limited during the 2-year follow-up period. Of 107 subjects who provided data at the end of treatment, 100 (93.5%) provided data at the 2-year follow-up. Four subjects who did not complete questionnaires at the end of treatment did so at the final follow-up. Of the 104 total 2-year follow-up assess-

ments completed, 75 subjects (72%) provided complete data at all follow-up intervals.

Analytic Strategy for the Assessment of Changes in Drinking

1. Due to the general lack of acceptance by subjects, no random assignment was made to the self-help manual in the final treatment cohort. Descriptive information about drinking outcomes for self-help subjects is described but not included in comparative analyses of treatment effects or follow-up.

2. Missing data were replaced for subjects who completed the 2-year follow-up assessment and had only one missing previous assessment (end of treatment, 3-, 6-, or 12-month follow-up; $n = 20$). Regression analyses were performed for the three dependent measures of drinking (SECs, PBAL, and DRKMN) at each assessment point, including all other measures of drinking at other time points as predictors. The resulting regression equation was then used for each subject to compute an estimated value for the missing data point. Subjects who did not complete the 24-month follow-up or who had more than one missing assessment are not included in analyses of drinking over time.¹

3. To minimize within-subjects variation, follow-up assessments were averaged at two different points in time. Data from the 3- and 6-month assessments were averaged to reflect short-term maintenance, and data from the 12- and 24-month assessments were averaged to reflect long-term maintenance. Significant results were reanalyzed using all four follow-up assessment points and yielded consistent results.

A two-phase multivariate analysis of variance (MANOVA) method for assessment of repeated measures was used to assess drinking changes over time and differential patterns between treatment groups (O'Brien & Kaiser, 1985). For the MANOVA method, difference scores for each of three drinking measures (SECs, PBAL, and DRKMN) were calculated between pretreatment and end of treatment, between end of treatment and short-term follow-up, and between short-term follow-up and long-term follow-up, respectively. A two-group (classroom vs. individual advice) MANOVA for this set of nine difference scores was then completed, followed by examination of univariate contrasts. Analysis of the DDQ, which was not collected at each follow-up, was completed separately.

Program Evaluations

Data from the program evaluation questionnaire revealed both individual advice and classroom formats of the ASTP to be perceived as understandable and helpful to students. The classroom condition was preferred, rated higher for assistance in changing drinking ($M = 5.16$ vs. 3.86 , on a 7-point scale), $F(1, 39) = 8.87$, $p < .005$,² and more likely to be recommended to others ($M = 6.00$ vs. 4.68 , on a 7-point scale), $F(1, 39) = 8.15$, $p < .007$. There were no differences in rated helpfulness for changing general lifestyle. The self-help manual was rated lowest in all evaluation categories.

Drinking Over Time

Figure 1 shows mean DRKMN, SEC, and PBAL for the two treatment groups for preprogram, postprogram, short-term

maintenance, and long-term maintenance. A MANOVA revealed a significant overall reduction in self-monitored drinking and retrospective drinks per month across treatment and follow-up points, Wilks's $\lambda = .37$, approximated $F(9, 60) = 11.46$, $p < .0001$.

The greatest changes were noted during the course of the 6-week program; self-monitored SECs reduced from 13.2 ($SD = 8.0$) at pretreatment to 8.7 ($SD = 6.3$) at end of treatment, univariate $F(1, 68) = 25.2$, $p < .0001$; PBAL declined from .15% ($SD = 0.08$) at pretreatment to .10% ($SD = 0.08$) at end of treatment, univariate $F(1, 68) = 15.58$, $p < .0001$; and DRKMN declined from 49.9 ($SD = 23.3$) at pretreatment to 41.1 ($SD = 30.1$) at end of treatment, univariate $F(1, 68) = 7.71$, $p < .007$. Although subjects in the classroom condition reported lower drinking at the end of treatment for all three measures, comparisons with subjects who received individual advice were not statistically significant.

Self-reported drinking rates noted at the end of treatment assessment were generally maintained through the follow-up periods. Short-term follow-up reflected some continued significant decline in DRKMN, $M = 3.64$, $SD = 26.2$, $F(1, 68) = 4.88$, $p < .03$, and nonsignificant increases in SECs, $M = 10.4$, $SD = 7.2$, $F(1, 68) = 3.62$, *ns*, and PBAL, $M = 0.11\%$, $SD = 0.06$, $F(1, 68) = 0.12$, *ns*.

Long-term follow-up periods revealed continued declines in DRKMN, $M = 29.5$, $SD = 25.8$, $F(1, 68) = 5.42$, $p < .023$, and maintenance of positive changes in self-monitored measures of drinking: SECs, $M = 9.4$, $SD = 8.5$, $F(1, 68) = 1.59$, *ns*; PBAL, $M = .09\%$, $SD = 0.06$, $F(1, 68) = 2.64$, *ns*.

Self-Help Manual

Although not included in comparative analyses, those who completed reading the self-help manual reported similar patterns of drinking throughout the study. For example, self-monitored SECs among the 11 self-help subjects with complete follow-up data averaged 14.2, 11.8, 11.2, and 11.3 at pretreatment, end of treatment, and short-term and long-term follow-up points, respectively. Other drinking measures were quite similar to those in the classroom and individual advice treatment groups.

Reliability of Follow-Up Drinking

Correlations between self-monitored SECs, DRKMN, and DDQ for the long-term follow-up period (average of 12- and 24-month assessments) revealed high reliability, $r(87-97)$ ranged between .66 and .75. In addition, mean values for long-term follow-up were quite comparable across the two measures of weekly consumption ($M = 9.68$, $SD = 8.57$ SECs per week; $M = 8.92$, $SD = 5.79$ drinks per week from the DDQ).

¹ Subjects who were not completely exposed to treatment but did complete follow-up assessments are included in follow-up analyses ($n = 7$).

² Because of administrative error, the third treated cohort did not receive program evaluations. End-of-treatment program evaluations for those in classroom and individual advice conditions are based on a sample of 40.

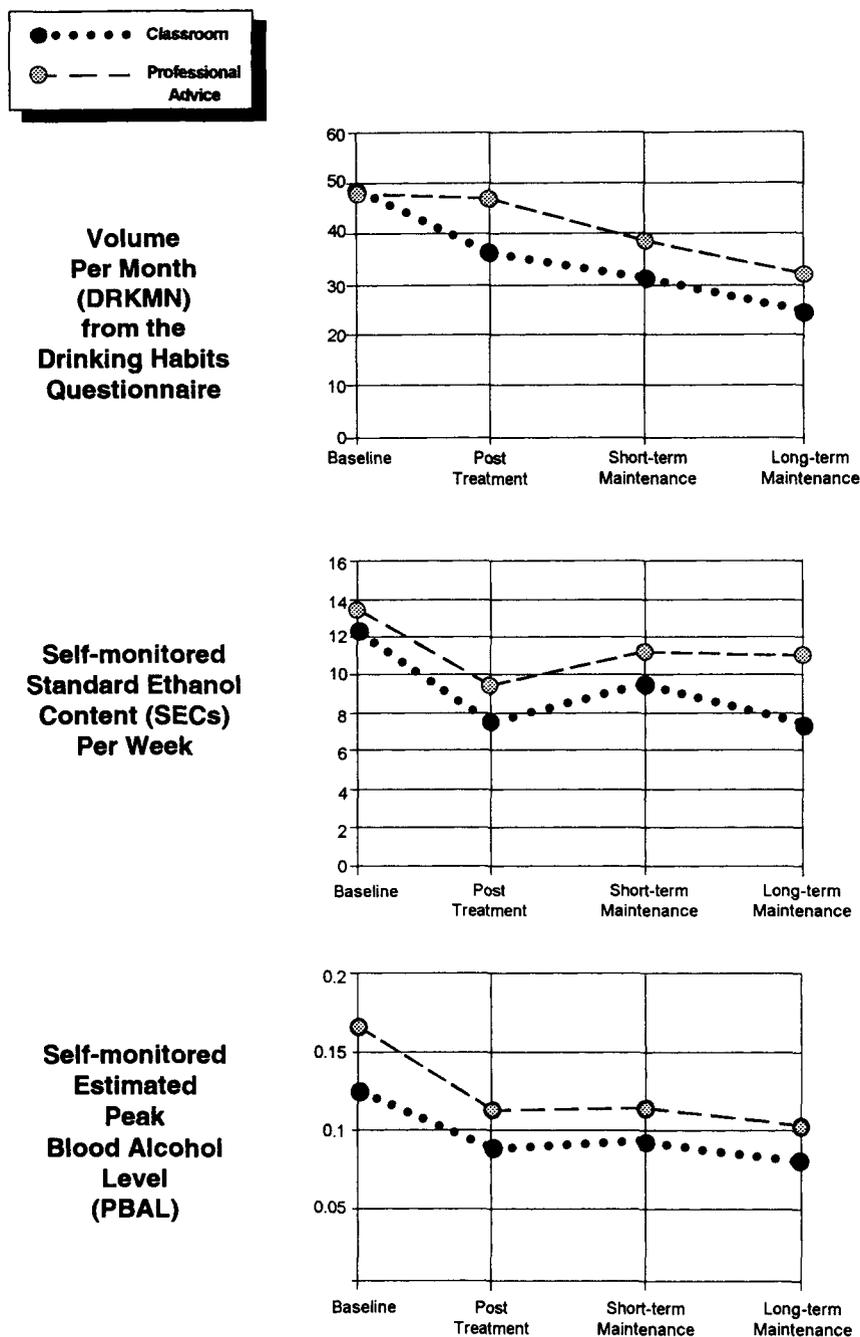


Figure 1. Self-reported drinking at baseline, end of treatment, and across 2-year follow-up assessments for subjects in two forms of alcohol risk-reduction programming.

Post Hoc Analyses of Mediating Variables

Key demographic (age, gender, and family history of drinking problems) and psychological (stress and symptomatology) variables were examined as moderators of treatment impact. A series of regression analyses tested for concurrent and lagged predictions of drinking rates and changes in drinking rates from levels of hassles, uplifts, and symptomatology throughout treatment and follow-up periods. No significant relations were

found. Demographic factors were analyzed using analysis of variance (ANOVA) procedures. Significant interactive effects were noted with subject age only.

For analysis of the effect of age on follow-up drinking, pre-treatment, end of treatment, and 1- and 2-year follow-up assessments were included to reveal 1-year trends. Subjects in all three treatment groups were included to maximize statistical power. Results of three separate ANOVAs (4 repeated measures over time: baseline, end of treatment, 1-year, and 2-year, by four age

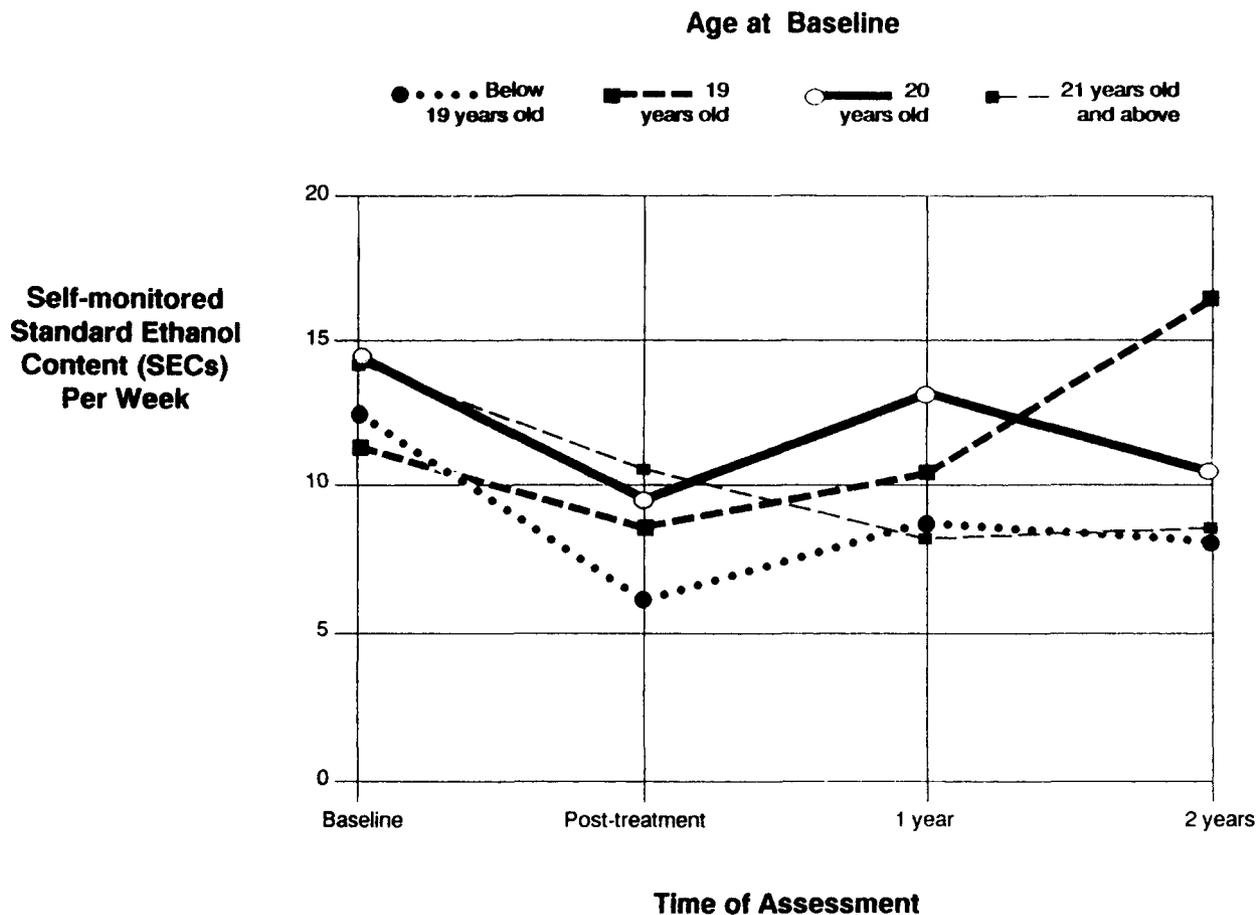


Figure 2. Self-reported drinking across a 2-year follow-up period as a function of subject age.

groups at pretreatment: younger than 19 years old, 19 years old, 20 years old, and 21 years old and older) revealed significant Age \times Time interactions for SECs, $F(9, 264) = 3.05, p < .002$; PBAL, $F(9, 267) = 2.04, p < .035$; and DRKMN, $F(9, 270) = 2.36, p < .014$.

Differential trends in self-monitored SECs for different age groups are shown in Figure 2. Post hoc comparisons of means indicated that the oldest group, those 21 years old and older at the beginning of the program, showed a relatively linear downward trend. The youngest subjects, those younger than 19 years old at the time of treatment and not reaching 21 years old during the follow-up assessment, also showed few changes in drinking across follow-up. Subjects between these extreme age groups, however, seem to increase drinking at different points in time. Those subjects who were 20 years old at the beginning of the program reported increased drinking at the 1-year follow-up but their drinking decreased again at 2-years. Subjects who were 19 years old at baseline reported increased consumption at the 2-year follow-up. It appears that drinking increased during the year of subjects' 21st birthday.

Discussion

The data reported here represent a replication of successful skills-based interventions for high-risk drinking (Kivlahan et

al., 1990). Young adults, primarily college students, recruited to a skills-based risk-reduction program were able to reduce their drinking rates by approximately 40% and maintain such reductions over a 2-year follow-up period. The current study is limited by the absence of an assessment-only control group. It is possible that social desirability reporting biases or nonspecific effects of program participation may have contributed to observed drinking reductions in this study. Conclusions from this data must therefore be considered preliminary. Nevertheless, the consistency of drinking reductions over time and between measures, as well as successful comparisons with control groups in previous studies (Kivlahan et al., 1990) causes us to doubt that response bias is a large contributor to the observed patterns of results.

These data are consistent with other successful efforts to reduce drinking on the basis of brief, nonconfrontive motivational interviewing (Miller & Rollnick, 1991). In this study a 6-week class program and a single session of individual feedback and advice yielded comparable drinking reductions, although subjects preferred the classroom format. In addition, approximately one-third of the subjects assigned to the self-help manual treatment completed reading assignments, and they reported drinking patterns comparable with those in other experimental conditions. Future efforts at prevention may allow

young people to choose forms of programming or step-up interventions on the basis of severity of drinking problems or motivation.

Recent reports have documented that children of alcoholics are not more likely to drink heavily in college (Alterman, 1987). Our data suggest that they do not respond differentially to early intervention programs. The only individual difference for which differential treatment effects were noted was age. Achieving the legal ability to purchase alcohol appears to be one important, albeit perhaps temporary, factor in understanding patterns of drinking for young people. Further research is needed to explore how early intervention interacts with developmental processes.

References

- Alterman, A. I. (1987). Patterns of familial alcoholism, alcohol severity, and psychopathology. *Journal of Nervous and Mental Disease*, 176, 167-175.
- Baer, J. S., Kivlahan, D. R., Fromme, K., & Marlatt, G. A. (1991). Secondary prevention of alcohol abuse with college student populations: A skills-training approach. In N. Heather, W. R. Miller, & L. Greeley (Eds.), *Self-control and the addictive behaviors* (pp. 339-356). New York: Macmillan.
- Cahalan, D., & Room, R. (1974). *Problem drinking among American men*. New Brunswick, NJ: Rutgers Center for Alcohol Studies.
- Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, 53, 189-200.
- Derogatis, L. R., Lipman, R. S., & Covi, L. (1973). The SCL-90: An outpatient psychiatric rating scale. *Psychopharmacology Bulletin*, 9, 13-28.
- Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, 48, 150-170.
- Heather, N. (1986). Change without therapists: The use of self-help manuals by problem drinkers. In W. R. Miller & N. Heather (Eds.), *Treating addictive behaviors: Processes of change* (pp. 331-359). New York: Plenum Press.
- Kivlahan, D. R., Marlatt, G. A., Fromme, K., Coppel, D. B., & Williams, E. (1990). Secondary prevention with college drinkers: Evaluation of an alcohol skills training program. *Journal of Consulting and Clinical Psychology*, 58, 805-810.
- Matthews, D. B., & Miller, W. R. (1979). Estimating blood alcohol concentrations: Two computer programs and their applications in therapy and research. *Addictive Behaviors*, 4, 55-60.
- Miller, W. R., & Marlatt, G. A. (1984). *Brief Drinker Profile*. Odessa, FL: Psychological Assessment Resources.
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people for change*. New York: Guilford Press.
- O'Brien, R. G., & Kaiser, M. K. (1985). MANOVA method for analyzing repeated measures designs: An extensive primer. *Psychological Bulletin*, 97, 316-333.
- Selzer, M. L. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry*, 127, 1653-1658.

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