

## Prospective Evaluation of Three Smoking Interventions in 205 Recovering Alcoholics: One-Year Results of Project SCRAP–Tobacco

John E. Martin, Karen J. Calfas,  
and Christi A. Patten  
San Diego State University and  
University of California, San Diego

Mark Polarek, C. Richard Hofstetter,  
James Noto, and Diane Beach  
San Diego State University

A total of 205 (113 male, 92 female) nonhospitalized recovering alcoholics with >3 months of continuous abstinence from alcohol and drugs and relatively heavy tobacco dependence (Fagerstrom Tolerance Questionnaire score = 7.7; mean number of cigarettes per day, 26.8; mean number of years smoked, 24.4) were randomized to standard treatment (ST) American Lung Association quit program plus nicotine anonymous meetings ( $n = 70$ ), behavioral counseling plus physical exercise (BEX;  $n = 72$ ), or behavioral counseling plus nicotine gum (BNIC;  $n = 63$ ). A  $3 \times 4$  repeated measures design was used to evaluate the effectiveness of the interventions on smoking outcome at baseline, posttreatment, and 6- and 12-month follow-ups. Self-reported smoking status was verified with biochemical and informant report. Verified self-report indicated that significantly more smokers in BEX quit by posttreatment (60%) than in either BNIC (52%) or ST (31%),  $\chi^2(2, N = 205) = 17.85, p < .01$ , but not at the 6-month (29%, 27%, and 21%, respectively) or 12-month (27%, 27%, and 26%, respectively) follow-up. Only 4% (7 of 188) relapsed to alcohol or drugs. Alcohol relapse did not differ by treatment group or smoking status. Length of alcohol abstinence was not associated with smoking cessation outcome.

The prevalence of smoking in alcoholics, whether abstinent or not, is substantial, with estimates ranging from 80% to 95% (Bobo, 1989). Given that between 5% and 10% or more of the population may be alcoholics (Helzer, 1987), this constitutes a considerable number of individuals. These smokers are at high risk for cardiovascular and other diseases associated with both excessive drinking and cigarette smoking (Criqui, Wallace, Mishkel, Barrett-Connor, & Hess, 1981). Furthermore, recovering alcoholics tend to be the most heavily addicted to nicotine (Kozlowski, Jelinek, & Pope, 1986) and the most resistant to smoking intervention (Hughes, 1993). Despite these observa-

tions, the treatment of smoking has been largely unaddressed in this high-risk population (Carmody, 1990), and the few studies that have been reported suffer from significant methodological limitations (Toneatto, Sobell, Sobell, & Kozlowski, 1995).

Recent investigations have suggested methods that may be effective in enhancing smoking treatment outcome among recovering alcoholics (Bobo & Davis, 1993; Hughes, 1993). For example, retrospective survey studies indicate that reliance on Alcoholics Anonymous (AA; 1976) principles, as well as treatment focused on gradual reductions in nicotine intake and rate, nicotine replacement therapy and group support significantly increase the likelihood of successful smoking cessation in this population (Bobo, 1989; Bobo & Davis, 1993). Smoking cessation also appears to be associated positively with long-term alcohol abstinence (Bobo, Schilling, Gilchrist, & Schinke, 1986; Hurt et al., 1994).

Additional studies have examined the success rates of recovering alcoholics in stopping smoking, compared with their nonalcoholic counterparts. Covey, Glassman, Stetner, and Becker (1993) observed that 6 months after participation in a behavioral smoking cessation program, quit rates were 25% for abstaining alcoholics versus 27% for nonalcoholic smokers. Perhaps in contrast, however, Hughes (1993) found 1-year quit rates of 7% among those abstaining from alcohol compared with 19% for individuals who did not report a history of alcohol or drug abuse. Although these data are informative with respect to the likelihood of smoking cessation among alcoholic smokers, no published studies have specifically targeted this population for smoking treatment.

In this article, we report results from the first large interven-

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John E. Martin, Karen J. Calfas, and Christi A. Patten, Department of Psychology, San Diego State University, and School of Medicine, University of California, San Diego; Mark Polarek, C. Richard Hofstetter, James Noto, and Diane Beach, Department of Psychology, San Diego State University.

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An extended report of this article is available on request from John E. Martin.

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Correspondence concerning this article should be addressed to John E. Martin, Department of Psychology, San Diego State University, 6363 Alvarado Court, Suite 103, San Diego, California 92120. Electronic mail may be sent via Internet to email:jmartin@sdsu.edu.

Table 1  
Participant Demographic Characteristics by Condition

Demographic	ST ( <i>n</i> = 70)	BEX ( <i>n</i> = 72)	BNIC ( <i>n</i> = 63)	Total ( <i>N</i> = 205)
Mean age (and <i>SD</i> )	41.5 (9.7)	40.5 (8.9)	43.6 (11.0)	41.8 (9.9)
% female	46	43	47	45
% Caucasian	95.7	90.4	91.9	92.7
Mean (and <i>SD</i> ) no. of years of education	14.7 (2.5)	14.3 (2.4)	14.7 (2.6)	14.6 (2.5)
% married—with partner	29	31	32	30
% employed	99	96	89 <sup>a</sup>	95

Note. ST = standard treatment; BEX = behavioral counseling plus exercise; BNIC = behavioral counseling plus nicotine gum.

<sup>a</sup> For % employed,  $\chi^2(2, N = 63) = 6.60, p < .04$ .

All other comparisons between groups were nonsignificant.

tion trial to date with this important population of high-risk smokers in which the relative efficacy and safety (e.g., alcohol relapse) of three specially adapted smoking treatment and maintenance programs were evaluated.

### Method

Participants included 205 smokers (113 men, 92 women) reporting significant histories of alcohol abuse and dependence with at least 3 consecutive months of alcohol and drug abstinence, who were over 18 years of age, consumed an average of at least 10 cigarettes a day, and provided written permission from their physician to use nicotine gum or engage in a supervised and home program of moderate aerobic exercise. Exclusionary criteria included use of psychotropic medications or any physical disabilities that would hinder engaging in a program of moderate physical activity.

Smokers were recruited from the community by means of announcements and fliers directed to AA groups. A total of 363 participants responded to these recruitment efforts and were subsequently screened to assess their eligibility for inclusion in the study. After initial phone screening, volunteers attended an orientation interview. Of the 363 respondents, 220 met all study criteria, and 205 agreed to be randomized to treatment conditions. All accepted participants signed an approved informed consent before formal assessment and treatment initiation. Demographic, smoking, and alcohol history characteristics for each intervention group are presented in Table 1 and Table 2, and they indicate high levels of smoking and nicotine dependence, alcohol abstinence, and AA Program involvement.

### Measures

Smoking self-report was used as the primary dependent measure. Smoking status was assessed at pre- and posttreatment, and at 6- and 12-month follow-ups. Additional self-report measures of number of cigarettes smoked and brand nicotine level were obtained at major assessment points. We performed an alveolar carbon monoxide (COa) assessment at the conclusion of each treatment and follow-up session, following the standard method of Hughes, Frederiksen, and Frazier (1978).

All participants were required to provide one name and phone number of a significant other—informant from each of their home and work environments who agreed to be contacted to corroborate self-report data on smoking and drinking—drug use. These informants were contacted by phone at the major assessment intervals. Alcohol and drug abstinence levels were determined through participant self-report and corroborated through informant report at all measurement points.

Participants assigned to behavioral counseling plus exercise (BEX)

self-monitored their weekly physical exercise activities using a home exercise log. They handed in forms at each of the four maintenance sessions and at all follow-ups. Attendance at the weekly treatment-exercise sessions was also monitored.

Smokers in the standard treatment (ST) group were instructed to report their Nicotine Anonymous meeting attendance during maintenance phase by returning (signed by the meeting secretary) postcards for each meeting attended during the 4 weeks of maintenance.

Finally, smokers assigned to behavioral counseling plus nicotine gum (BNIC) self-monitored their nicotine gum use on a daily basis during the 4-week maintenance phase and retrospectively at the 6- and 12-month follow-ups.

### Procedure

Participants were randomized to one of three treatment groups, in 6 cohorts of approximately 36 participants each, as follows.

**The ST group.** A modified version of the standard American Lung Association (ALA; 1986) 20-day quit program was used, in combination with Nicotine Anonymous meetings and a maintenance counseling intervention. Treatment was implemented by trained, PhD-level, and master's-level smoking health educators in four weekly 60- to 75-min group sessions, followed by four maintenance sessions, and supplemented by 4 weeks of 12-step Nicotine Anonymous meetings. The 4-week treatment included basic behavioral components of self-monitoring, relaxation, urge control instruction, relapse prevention training and quit contracts, and three large-scale smoking rate reductions by one third each week, in addition to facilitated group discussions. Participants were instructed to quit smoking at Week 4. After the four treatment sessions, participants were requested to attend Nicotine Anonymous meetings three times per week to more closely parallel the home-maintenance requirements of BNIC and especially BEX.

**The BEX group.** The behavioral counseling intervention for Groups 2 and 3 consisted of eight weekly, 60- to 75-min sessions, and used a more gradual reduction schedule and treatment delivery adapted specifically for recovering alcoholic smokers, with contrasting maintenance strategies. The behavioral treatment package represented a refinement of a program developed through pilot work with alcoholic smokers (Martin, Calfas, Polarek, Myers, & Hofstetter, 1995), using a gradual nicotine-brand reduction method in addition to standard behavioral components of self-monitoring of smoking and stimulus control over smoking episodes. Treatment groups were conducted by doctoral- and master's-level group coleaders who had at least 1 year of experience cofacilitating at least two former treatment groups using these techniques under supervision. Also, former smoker group "mentors" were employed to adapt the language and techniques of the behavioral interven-

Table 2  
Baseline Smoking and Alcohol History by Condition

Characteristic	M (and SD)			
	ST (n = 70)	BEX (n = 72)	BNIC (n = 63)	Total (N = 205)
Nicotine tolerance (FTQ score)	7.9 (1.8)	7.7 (2.0)	7.6 (1.7)	7.7 (1.8)
No. of years smoked	23.5 (10.0)	23.7 (8.8)	26.1 (11.7)	24.4 (10.2)
No. of previous serious quit attempts	4.1 (34.0)	2.9 (2.6)	5.6 (17.6)	4.1 (10.1)
Longest quit duration (in months)	1.2 (2.6)	0.5 (1.1)	0.8 (1.4)	0.8 (1.8)
% with active sponsor	73.9	70.4	70.0	71.5
No. of years of abstinence from alcohol-drugs	4.5 (4.5)	3.3 (2.7) <sup>a</sup>	5.0 (5.3)	4.2 (4.3)
No. of weekly AA meetings	2.8 (1.9)	2.7 (1.8)	3.3 (3.1)	2.9 (2.3)

Note. All comparisons were nonsignificant except as indicated. ST = standard treatment; BEX = behavioral counseling plus exercise; BNIC = behavioral counseling plus nicotine gum; FTQ = Fagerstrom Tolerance Questionnaire; AA = Alcoholics Anonymous.

<sup>a</sup>  $F(2, 202) = 3.15, p < .05$ . The BNIC (5.0) group had more years of abstinence from alcohol than the BEX (3.3) group.

tions and group discussions to 12-step recovery processes, traditions, and philosophies. These facilitators were chosen from a group of successful graduates of our previous smoking treatment programs for alcoholic smokers, who had at least 6 months of nonsmoking, and were active members of the AA Program.

Beginning in Week 8, all BEX participants were given moderate aerobic exercise prescriptions including on-site moderate-to-brisk walking, around an outdoor track, and use of laboratory exercise equipment (treadmills, stair steppers, stationary bicycles, etc.), progressing from 15 to

45 min, and thrice weekly home exercise of a similar nature, following the recommendations of the American College of Sports Medicine (ACSM; 1991).

**The BNIC group.** Behavioral counseling similar to the BEX, Group 2, was combined with postquit nicotine replacement throughout maintenance. Prescriptions by a consulting Project SCRAP physician were provided, and all Group 3 participants were given free supplies (2 mg) of nicotine gum (Nicorette; Merrill-Dow, Lakeside Pharmaceuticals, Cincinnati, OH). Participants were instructed to chew between one and six pieces of nicotine gum through the day, prophylactically or on strong urges. All participants continuing nicotine gum use beyond 3 months postquit were systematically faded from its use by 6 months postquit.

A treatment deposit of \$50 was collected initially from all participants. Deposits were returned contingent on session attendance and completion of homework assignments.

## Results

The primary smoking outcome was quit status using both point-prevalence rates at 6- and 12-month follow-ups, and continuous abstinence at the 1-week posttreatment quit point. Participants were coded as nonsmokers if they reported not smoking within the previous 24 hr (7 days for 1-week posttreatment measure) and had CO levels less than 10 ppm<sup>1</sup>; also, if data on CO were not available, an informant verified that the participant was not smoking. For data purposes, the investigators assumed that nonresponders, or those for whom verification was unavailable, were smoking. Although in the present report we analyze and discuss only verified smoking outcome data, smoker self-report data are contrasted with verified smoking outcome data in Figure 1.

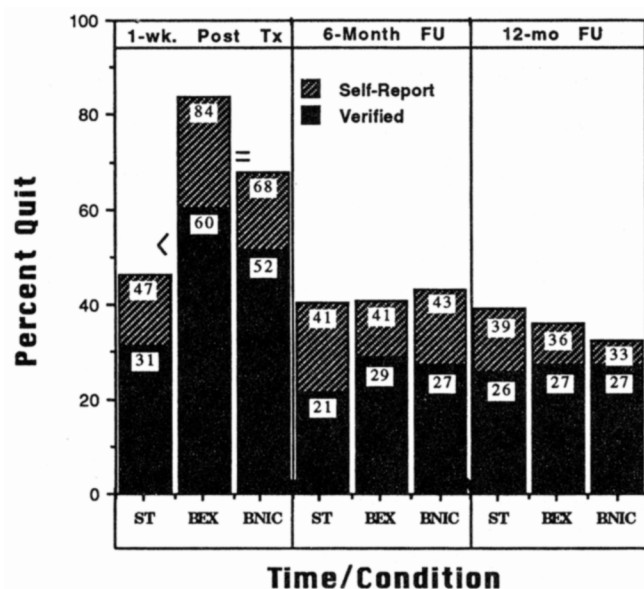


Figure 1. Mean smoking quit rates by group, time, and verified versus self-report outcome. 1-wk Post Tx = 1 week posttreatment; 6-Month FU = 6-month follow-up; 12-mo FU = 12-month follow-up; ST = standard treatment; BEX = behavioral counseling plus exercise; BNIC = behavioral counseling plus nicotine gum. Less-than symbol indicates that abstinence rates for ST were significantly less than those for BEX ( $p < .01$ ); equal sign indicates that rates for BEX were not significantly different from BNIC rates.

<sup>1</sup> Although we recognize that the more conventional border separating nonsmokers from smokers is COa = 8 ppm, we used the slightly more liberal criterion of 10 ppm in part to provide a better margin of error in determining smoking status because of the potential for elevated carbon monoxide levels in nonsmokers resulting from chronic inspiration of automotive smog in warm weather & high traffic conditions in a major Southern California metropolis such as San Diego (although we all know it mainly floats down from Los Angeles).

Verified self-report indicated that significantly more smokers in BEX quit by posttreatment (60%) than in either BNIC (52%) or ST (31%). The superiority of BEX was not maintained over BNIC or ST conditions, respectively, at 6 months (29%, 27%, and 21%, respectively) or at 12 months (27%, 27%, and 26%, respectively) follow-up. Chi-square analysis was performed at each time point on the verified quit status. There was a significant difference in verified quit rate between experimental groups at posttreatment,  $\chi^2(2, N = 205) = 17.85, p < .01$ , with higher quit rates for BEX (60%) compared with ST (31%). No other differences were statistically significant.

Relapses to alcohol and drugs of abuse were assessed through the use of the significant other-informant collaborators. Informants were successfully contacted for approximately 85% of all 205 participants and indicated that at posttreatment only 1% (2 of 177) had relapsed to alcohol or drugs, at 6-months follow-up 2% (4 of 178) had relapsed, and at 1-year follow-up, 4% (7 of 188) had relapsed. All relapsers to alcohol or drugs were smoking at the time of their relapse. The temporal relationship between the two, however, is unknown. No significant group differences were found with respect to alcohol relapse,  $\chi^2(2, N = 205), p < .05$ , or smoking status, at any time point. Informant data indicated there was no relationship between length of sobriety-alcohol abstinence and alcohol relapse at posttreatment ( $r = .07, p = .35$ ), 6 months ( $r = .05, p = .51$ ), or 12 months ( $r = .12, p = .09$ ) follow-up.

### Discussion

This study represents the first prospective clinical treatment comparison study with abstaining alcoholics. The findings indicate the efficacy of all three behaviorally based interventions, with resulting abstinence rates generally consistent with other studies providing treatment for heavy smokers (Hurt et al., 1994; Mothersill, McDowell, & Rosser, 1988). Posttreatment abstinence rates were significantly higher for the group receiving exercise maintenance (60%) than the ST condition (31%) at posttreatment; however, treatment condition differences were not significant at 6- or 12-month follow-ups.

Our ultimate (1-year) cessation rates (27%) compare favorably with overall results of interventions with less nicotine dependent, and perhaps less treatment-resistant, nonalcoholic smokers. Generalizability of findings, however, is limited somewhat by the relatively selective group of alcoholic smokers treated (see Table 1), and caution should, therefore, be exercised in generalizing these results to the alcoholic smoking population as a whole.

Importantly, only a relatively small percentage of relapses to alcohol or drugs was found (2% to 4%), with few attributed to the stress of quitting, or attempting to quit, smoking. These few relapses to alcohol or drugs of abuse appeared to be independent of length of alcohol and drug abstinence. In fact, length of alcohol-drug abstinence was not even associated with likelihood of smoking cessation.

This study supports the finding that the stress of quitting smoking does not appear to prompt relapses to alcohol and drug use (Bobo & Davis, 1993). Rather than jeopardize "sobriety," smoking treatment may actually serve to enhance it, as indicated by a small but growing number of studies. Our results, in combi-

nation with these other findings, clearly indicate the safety and efficacy of providing smoking treatment along with or soon after chemical dependency treatment and lend relatively strong impetus to smoking interventionists, as well as chemical dependency treatment programs to strongly consider a different kind of dual treatment.

The study has several noteworthy limitations. One major drawback is that the present evaluation did not include a no-treatment control group. We know very little about what happens to alcoholics who are not formally treated for their smoking, although prevalence rates for smoking in this population do not appear to necessarily decline with years of alcohol-drug abstinence (Myers & Brown, 1994; Tonneatto, Sobell, Sobell, & Kozlowski, 1995). Additional features of this study that may be somewhat problematic include our inclusion of the ALA (1986) 20-day Quit Program as an ST comparison, given our special adaptation of this intervention to the 12-step group process and Nicotine Anonymous maintenance meetings—all of which may have blended too much the treatment differentiation between the ST and BEX and BNIC groups.

Further clinical research is clearly warranted with this important group of comorbid smokers. Future directions for research should include a more systematic programming and tailoring of treatment and maintaining behaviors and environmental supports and constraints. Studies are most critically needed with respect to the development and testing of comprehensive and clearly effective maintenance interventions that will limit the considerable fall-off in cessation rates observed by 6 months posttreatment.

Interventions with more heavily nicotine dependent smokers who have significant histories of alcohol dependence as well should address the need to assess, adapt, and perhaps individually tailor aggressive smoking interventions to the specific abilities and psychological and behavioral disabilities of these individuals (Orleans & Hutchinson, 1993). A case in point is the relatively high prevalence of major depression in this population (Regier et al., 1990; Schuckit, 1986). Comorbidity of alcoholism and major depression may exert a detrimental effect on the likelihood of smoking cessation (Covey et al., 1993). Other researchers (Hall, Muñoz, & Reus, 1994; Patten, in press) have found that treating depression in smokers can significantly improve overall outcome. Importantly, over one third of all our recovering alcoholic smokers tested have been found to have significant lifetime histories of major depression independent of their drinking (Patten, in press), further suggesting the need to include interventions that may address mood dysregulation in the effort to achieve and especially maintain abstinence from tobacco in this particularly specialized group of high-risk, perhaps even "trimorbid" smokers.

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