Journal of Consulting and Clinical Psychology
1991, Vol. 59, No. 3, 439-448

0022-006X/91/$3.00

Self-Help Quit Smoking Interventions: Effects of Self-Help Materials, Social Support Instructions, and Telephone Counseling

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Smokers requesting self-help materials for smoking cessation (N = 2,021) were randomized to receive (a) an experimental self-quitting guide emphasizing nicotine fading and other nonaversive behavioral strategies, (b) the same self-quitting guide with a support guide for the quitter's family and friends, (c) self-quitting and support guides along with four brief counselor calls, or (d) a control guide providing motivational and quit tips and referral to locally available guides and programs. Subjects were predominantly moderate to heavy smokers with a history of multiple previous quit attempts and treatments. Control subjects achieved quit rates similar to those of smokers using the experimental quitting guide, with fewer behavioral prequitting strategies and more outside treatments. Social support guides had no effect on perceived support for quitting or on 8- and 16-month quit rates. Telephone counseling increased adherence to the quitting protocol and quit rates.

Most smokers who try to quit do so without outside help, and most smokers prefer do-it-yourself quitting methods over formal face-to-face treatments (Fiore et al., 1990). An estimated 90% of America's 40 million ex-smokers *have* quit on their own (USDHHS, 1989). Yet, the success of self-quit attempts could be improved. Each year over 30% of American smokers attempt to quit, but fewer than 10% succeed (Fiore et al., 1990). The present study is one of seven funded by the National Cancer Institute (NCI) to evaluate minimal interventions to aid self-quitters (Glynn, Boyd, & Gruman, 1990).

Many guides have been developed to help smokers quit on their own (e.g., American Lung Association, 1980; Danaher & Lichtenstein, 1978). Most convert effective clinic programs into a self-administered format. Past research has shown that self-help quitting guides represent a promising alternative to clinic treatments (Cummings, Emont, Jaen, & Sciandra, 1988; Curry, Marlatt, Gordon, & Baer, 1988; Davis, Faust, & Ordentlich, 1984; Glasgow, Schafer, & O'Neill, 1981; Gritz et al., 1988). Quit rates have correlated with the amount of materials read and with degree of adherence to prescribed quitting activities (Cummings et al., 1988; Davis et al., 1984; Glasgow et al., 1981). However, problems of nonadherence have been common. Glasgow et al. (1981), for instance, found that smokers using standard behavior therapy manuals failed to complete many of the recommended self-quitting activities. Similarly, Gritz et al. (1988) found that only approximately half of the nurses enrolled in a self-quitting program used the self-help materials provided. Curry et al. (1988) found poorer adherence to behavioral quit-

This research was supported by Grant CA-38223 from the National Cancer Institute to the University of North Carolina Health Services Research Center. Portions of this article were presented at the annual meeting of the American Public Health Association, Boston, November 1988.

We are grateful to Brenda Allen, William Beery, Edward Brooks, John Hogan, William Kalsbeek, T. Robert Konrad, Mary Passmore, Kathryn Rose, Kathleen Saunders, Etta Short, Cheryl McCoubrey Sofian, Rebecca Thompson, Elizabeth Whelan, and Alison Woomert for vital assistance in the design and implementation of this trial, and to Tony Okinczyc for his help in analyzing biochemical validation data. We are also grateful for the support and resources of Group Health Cooperative of Puget Sound, the Fox Chase Cancer Center, and the Smoking, Tobacco and Cancer Program of the National Cancer Institute's Division of Cancer Prevention and Control, especially for guidance provided by Joseph Cullen, Thomas Glynn, and Gayle Boyd. Finally, thanks are due to Joan Magee, Marion Horn, and Alisa Salerno for clerical assistance, and to Edward Lichtenstein for his review of a draft of this article.

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ting protocols among smokers assigned to a self-help format than among those assigned to parallel group treatments. The high 10th–12th grade reading levels (O'Farrell & Keuthen, 1983) and complex behavioral assignments of many clinic-based manuals have been cited as adherence barriers (Glasgow et al., 1981).

Our study attempted to minimize adherence barriers in self-help materials and to improve self-quitting outcomes. An experimental quitting guide converted Foxx and Brown's (1979) nicotine fading clinic treatment into an easy-to-follow self-quitting format. A reading level suitable to the target audience was selected, and concrete adherence aids were supplied. In addition, two adjuncts to the guide were evaluated: (a) social support instructions designed to foster social support for quitting in the smoker's natural environment and (b) brief telephone counseling to promote and reinforce adherence to the self-quitting protocol.

Providing support instructions for the quitter's family, friends, and co-workers seems a promising avenue for improving self-quitting outcomes. Successful quitters report more positive support from significant others than do relapsers or continued smokers (Coppotelli & Orleans, 1985; Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986). Measures of partner and co-worker support for quitting generally predict long-term quit rates among treated and untreated smokers (Lichtenstein, Glasgow, & Abrams, 1986). Although interventions to boost natural supports have not proven effective with clinic participants, who already have the benefit of therapist or peer support or both (Lichtenstein et al., 1986), we believed that efforts to enhance natural supports might prove more effective for *self*-quitters. In fact, the best results with self-help materials have occurred when outside supports have been present in the form of a supportive workplace environment (Gritz et al., 1988; Nepps, 1984).

Several lines of research suggested that minimal telephone counseling might boost adherence to self-quitting protocols and promote initial cessation and long-term maintenance. Glasgow et al. (1981) found that smokers receiving behavior therapy guides read more of the guides and achieved higher 6-month quit rates if they attended eight weekly therapist-led groups than if they used materials on their own. Dubren (1977) found that access to prerecorded reinforcing phone messages doubled 1-month maintenance among new ex-smokers who had quit in response to a televised clinic. Likewise, Davis et al. (1984) evaluated a variety of self-help materials and found the highest 12-month quit rates for smokers with access to reinforcing prerecorded phone messages. Janis's (1983) landmark review established that brief therapist support can promote adherence to a variety of demanding life-style change programs (e.g., smoking cessation, weight loss).

It was hypothesized that smokers receiving the experimental self-help guide would achieve higher long-term quit rates than would those receiving motivational quit tips and referral to outside resources. Furthermore, a cumulative treatment effect was predicted. Smokers receiving the experimental guide plus social support instructions were predicted to achieve better long-term outcomes than subjects receiving the guide alone. The best outcomes were predicted for subjects receiving the experimental guide with social support instructions plus minimal telephone counseling to promote adherence and to reinforce quitting efforts.

Method

Subjects

Subjects in the study were 2,021 enrollees (1,273 women and 748 men) of Group Health Cooperative of Puget Sound (GHC), a large health maintenance organization in western Washington State. Smokers "wanting to quit" were recruited to take part in a free "self-help quit smoking program" primarily through publicity and enrollment coupons in the GHC's monthly *View* magazine for enrollees: only 76 subjects were referred by their physicians or recruited through promotions in four GHC clinics. Recruitment procedures are described in detail by Wagner et al. (1990). No incentives were offered for participation or cessation. Prospective subjects completing a baseline questionnaire were included if they planned to remain in the Puget Sound area for at least 2 years, were 21 years or older, were not pregnant, had smoked for at least 1 year, and currently smoked three or more cigarettes per day.

Baseline Measures

The baseline questionnaire obtained standard sociodemographic data, a detailed smoking and quitting history, measures of health, smoking-related symptoms/illnesses, health life-style, anxiety, depression and stress, and measures of social network smoking and general and smoking-related social supports (Mermelstein et al., 1986; Moos, Cronkite, Billings, & Finney, 1986). Subjects supplied the uniform product code number from a pack of their usual brand of cigarettes for accurate brand identification. The Federal Trade Commission Report (USFTC, 1985) was used to estimate nicotine per cigarette and per day (number of cigarettes/day × mg nicotine/cigarette). Additional smoking history items covered motives for quitting, desire to quit, beliefs about smoking health harms and quitting benefits, perceived quitting barriers, use of past quitting treatments, confidence in quitting ability, and nicotine dependency (Fagerstrom, 1978). Informed consent information stipulated that subjects might be asked for periodic saliva samples to assess physical nicotine level.

Subjects were predominantly White (94%), married or living as married (69%), employed full-time (61%), and well-educated (49% high school; 29% college or beyond). They averaged 44.4 years of age (SD = 13.3) with a mean smoking history of 26.7 years (SD = 12.8). The mean number of cigarettes smoked per day was 26 (SD = 11), which is somewhat greater than the national average of 21 cigarettes/day (USDHHS, 1989). The average nicotine yield was .75 mg per cigarette. Fifty-one per cent of subjects were heavy smokers (25 or more cigarettes per day). Subjects had a mean score of 5.7 on the 11-point Fagerstrom (1978) Tolerance Questionnaire, and 77% said they smoked their first cigarette within 30 min of arising, a reliable index of high nicotine dependency (Pomerleau, Pomerleau, Majchrzak, Kloska, & Malakuti, 1990).

Subjects reported a mean of 3.5 previous quit attempts and many formal cessation treatments: 43% reported previous use of self-help guides; 35% reported previous use of intensive individual or group treatments; and 25% reported previous use of nicotine gum. In all, 64% reported past use of one or more of these different treatments. Subjects were relatively highly motivated to quit (M = 8.2 on a 0–10 scale) but only moderately confident in their ability to do so (M = 5.9 on a 0–10 scale). Most (85%) rated their health as good or excellent; 54% reported medical advice to quit smoking during the past year. Data comparing smokers participating in this trial with a random sample of smokers in

the GHC enrollee population are presented elsewhere (Wagner et al., 1990).

Research Design

Subjects were randomly assigned to one of three experimental intervention groups or a control group. Randomization was carried out separately within eight strata defined by three dichotomous variables: living alone or not, medical advice to stop smoking in the last 12 months or not, and nicotine content of cigarette brand (≤0.4 mg vs. >0.4 mg). Subjects enrolling from the same family or household were assigned to the same group.

Experimental Conditions

Self-quitting materials only group (Group M). Group M subjects (n = 502) received a copy of a 28-page self-quitting guide, which we entitled *Free & Clear*. The guide incorporated nicotine fading and standard behavioral abstinence and relapse prevention techniques (e.g., cognitive and behavioral strategies for avoiding smoking triggers and coping with urges and withdrawal symptoms, advice about how to garner support from friends and family, directions for recovering from a slip). Foxx and Brown's (1979) 4-week monitored nicotine fading protocol was converted to a self-administered format: Smokers made up to three weekly brand switches, each week switching to brands with up to 30% lower estimated nicotine yields. Abrupt target date quitting was scheduled after the 4th week. Instructions advised *quitting*, not continued smoking of low nicotine cigarettes, and warned against compensation through smoking more cigarettes, covering filter air holes, or inhaling more deeply or more often.

We wrote the *Free & Clear* quitting guide at the eighth–ninth grade reading level (Fry, 1968) and pretested it for appeal and readability among GHC enrollees. It included four postage-paid mail-back cards assessing treatment initiation and progress through the protocol. An accompanying "Quit Kit" contained concrete aids to cue and facilitate adherence (e.g., pack-sized cigarette tally cards for fading weeks, "Thank You For Not Smoking" signs, "I Quit" buttons, wallet-sized slip recovery tips) and a copy of the American Lung Association (ALA) maintenance manual, *A Lifetime of Freedom from Smoking* (ALA, 1980).

Self-quitting materials plus social support instructions (Group MS). Group MS subjects (n = 501) received Group M materials plus two copies of a 16-page social support guide. A cover letter asked subjects to read the support guide, then give copies to two "allies" (e.g., a spouse, close friend, or co-worker, preferably nonsmoking). In this support guide we described *Free & Clear's* quitting strategies and common withdrawal effects and recommended specific supportive actions for each stage of quitting (Coppotelli & Orleans, 1985; Mermelstein et al., 1986). We included advice for ex-smokers, smokers, and never smokers and wrote the guide at an eighth–ninth grade reading level (Fry, 1968).

Self-quitting materials, support instructions, and telephone counseling (Group MST). Group MST subjects (n = 510) received MS materials plus four prescheduled phone calls from a briefly trained counselor, with an invitation to call a "*Free & Clear* Quitline" for additional counseling as needed. Counselor calls were made at progressively longer intervals after the mailing of self-help materials (at a mean of 6, 18, 34, and 60 weeks). Following Janis's (1983) model, counselors sought to (a) provide positive, nonjudgmental feedback and reinforcement appropriate for the quitter's particular stage of change (contemplation, action, maintenance, relapse; Prochaska & DiClemente, 1983); (b) address personal quitting barriers; (c) elicit statements of intention to comply with stage-appropriate quitting actions; and (d) enhance self-efficacy and self-attributions for progress quitting. Counselors followed a *Free & Clear Counselors Guide* and written stage-based protocols for each call and estimated that it took 15–30 min to complete each call and call record.

Two of the counselors had master's-level training in health education and previous experience leading smoking cessation groups; a third bachelor's-level counselor had no previous training in smoking cessation. All were ex-smokers. Subjects always received calls from the same counselor, who sent a postcard asking that the subject call the Quitline in the event of repeated unsuccessful call attempts (only 6–12% of MST subjects at any phone follow-up). Only 25 MST subjects made calls to the Quitline during the 16-month follow-up period. One counselor handled all of these calls but had access to each subject's records from previous counselor-initiated calls.

Control condition (Group C). Group C subjects (n = 508) received an enhanced "usual care" intervention, which met GHC's standard of care for enrollees: We wrote a 13-page *Free & Clear* referral guide describing available self-help materials and local quitting treatments along with a copy of the NCI pamphlet *Clearing the Air*, the American Heart Association's guide *Weight Control Guidance in Smoking Cessation*, and a modified Quit Kit. The referral guide included motivational text; guidelines for selecting the most appropriate self-help or formal treatment; advice to quit abruptly on a target quit date; descriptions of state-of-the-art, low-cost cessation guides and behavioral treatment programs; and the name and phone number of a specific contact person for each guide or program listed. Free and low-cost resources were emphasized.

Reinforcement mailing. One year after enrollment, a random half of the subjects in each intervention group (M, MS, MST) were sent a reinforcement mailing. This 13-page guide provided specific recommendations for subjects in four different stages of change (contemplation, action, maintenance, relapse) and attempted to remotivate and reinforce quitting and use of the *Free & Clear* guide.

Dependent Measures

Eight-page questionnaires were sent to subjects approximately 8 and 16 months after enrollment. Subjects not returning a questionnaire were administered a shorter version by telephone. At the 16-month follow-up, an abbreviated telephone questionnaire was used for 72 subjects declining the standard 10-min interview. Interviewers were blind to the purpose of the study and avoided counseling or reinforcement for adherence to the self-quitting protocol.

Primary outcome measures at the 8- and 16-month follow-ups were the percentage of subjects who reported quitting smoking for at least 1 week and at least 1 month. Subjects were classified as abstinent only if they also reported no use of other tobacco products in the preceding month. These point-prevalence quit rates are recommended as primary outcome measures by the NCI because abstinence during these intervals (particularly 1 week) can be biochemically verified (NCI, 1986).

Follow-up assessments also covered quit attempts, smoking status, smoking rate, cigarette brand, nicotine dependence, desire to quit, confidence in quitting ability (confidence one would be smoke-free in 6 months), use and ratings of the different intervention components, and use of outside treatments. Measures of reduction in estimated nicotine intake were included as standard outcomes for nicotine fading protocols (Foxx & Brown, 1979), not as indices of presumed "safer" smoking. Measures of quitting and prequitting strategies were adapted from checklists previously developed to assess general approaches to quitting as well as specific behavioral and cognitive strategies (Cummings et al., 1988; Glasgow, Klesges, Mizes, & Pechacek, 1985). All subjects were asked how many of 12 different prequitting strategies they had used (e.g., setting a quit date, switching to lower nicotine brands, listing reasons for quitting), and subjects who had tried to quit were asked how

frequently they had used 11 different quitting methods (e.g., deep breathing, exercise, nonsmoking rewards, positive thinking).

Three quitting-related social support measures were used at 8 months. Subjects were asked to rate the frequencies of specific quitting-related behaviors of their primary supporter. A 10-item measure of positive support (e.g., expressing pleasure at your efforts to quit, participating in an activity with you that kept you from smoking) and a 5-item measure of negative support (e.g., expressing doubt about your ability to quit, criticizing your smoking) were created using items from the Partner Interaction Questionnaire developed and validated by Mermelstein et al. (1986). In addition, subjects were asked to rate the amount of understanding and support they received for their quitting efforts from family, friends, and co-workers, using an 11-point Likert-type scale.

Biochemical assessment. To improve the veracity of smoking self-report, all follow-up questionnaires and interviews began with a reminder that the subjects might be asked for a saliva specimen for nicotine assessment, creating a sort of "bogus pipeline" (e.g., Murray & Perry, 1987). Biochemical verification using standard saliva cotinine or saliva thiocyanate markers or both (Haley, Axelrad, & Tilton, 1983) was carried out at the 16-month follow-up. All self-reported quitters and a random sample of 58 self-reported continued smokers living in the Seattle metropolitan area (determined by zip code) were telephoned to arrange for saliva assessment.

Two specimens were obtained from each subject still reporting abstinence and agreeing to saliva collection. Cotinine analyses were performed by the American Health Foundation using a standard radioimmunoassay technique (Haley et al., 1983). (Specimens were sent to the laboratory with samples from 11 known nonsmokers and pairs of specimens from 20 randomly selected smokers. All negative and positive controls were correctly identified.) Subjects with saliva cotinine levels below the standard cutoff of 10 ng/ml were considered abstinent. Saliva thiocyanate analyses were performed by the University of Washington Biomedical Laboratories for 9 quitters reporting nicotine gum use at follow-up. Subjects with thiocyanate levels at or below the cutoff of 2,400 micromoles/liter were considered abstinent (Haley et al., 1983).

Results

Univariate analyses of variance (ANOVAs) for continuous measures and chi-square tests for dichotomous variables were used to compare groups. Tukey's multiple comparison procedure was used to evaluate pairwise group differences in the event of a significant ANOVA. Chi-square tests and t tests were used to evaluate the relationship of selected dependent measures to 8- and/or 16-month 1-week quit status. Two-tailed p values were used, and Satterthwaite (1946) t-test corrections were introduced in cases of unequal cell variance.

Treatment Group Comparability

Significant ($p < .05$) group differences emerged for only three of 80 baseline variables: perceived health status, sleep difficulties, and importance of greater control over one's life as a quitting motive. None of these three variables was significantly associated with 1-week quit status at the 8-month or 16-month follow-up. Therefore, no adjustments were made in subsequent analyses.

Loss to Follow-Up

Excluding subjects who were deceased ($n = 11$) or seriously ill ($n = 3$) yielded a 16-month follow-up population of 2,007. Response rates at the 8- and 16-month follow-ups were 91% and 94%, respectively, and did not differ across the four treatment groups at either follow-up. Outcome analyses presented in the remainder of this article are based on the 1,877 subjects who completed the 16-month follow-up.

The majority of respondents at the 8- and 16-month follow-up completed the mailed questionnaire (70% and 69%, respectively). There were no group differences in the proportion of mail versus phone response at either follow-up point.

A comparison of 16-month responders and nonresponders on 48 baseline variables showed that responders were significantly more likely to be female, to have completed more than high school, and to report a greater number of concerns about possible negative quitting outcomes (such as withdrawal and weight gain), more previous quit smoking treatments, more social network contacts, and more close personal relationships. Responders and nonresponders did not differ with regard to baseline daily smoking rate or estimated nicotine dose, nicotine dependency (Fagerstrom, 1978), desire to quit, quitting self-efficacy, number of previous quit attempts, or social support expected.

Use and Ratings of Self-Help Materials

At 8 months, 84% of subjects said they read "most" or "all" of the core *Free & Clear* materials (quitting guide or referral guide), and 77% said they read most or all of the supplementary booklets (ALA guide or NCI guide). There were no significant group differences in amount read, and there were no significant differences between 16-month (1-week) quitters and nonquitters in the amount read.

At 16 months, the *Free & Clear* quitting guide was rated by combined Group M, MS, and MST subjects as easy to follow ($M \pm SD = 1.84 \pm 1.27$), encouraging ($M = 1.99 \pm 1.22$), practical ($M = 2.13 \pm 1.26$), helpful ($M = 2.16 \pm 1.26$), attractive ($M = 2.10 \pm 1.20$), and teaching a lot that was new ($M = 2.72 \pm 1.29$; rating scale 1–5, 1 = *most favorable*). Multiple t tests showed significantly higher ratings for Group C control materials: ts (1328–1356) = 3.18–6.19, two-tailed, ps < .001.

At 16 months, subjects also rated how closely they had followed the materials, from *not at all* (1) to *read them through carefully, following the quitting plan step-by-step* (4). There was a significant overall treatment effect, $F(3, 1257) = 50.98$, $p < .001$. Paired comparisons showed that subjects in the control group followed their materials less closely ($M = 2.1 \pm .70$) than subjects in Groups M ($M = 2.7 \pm .92$), MS ($M = 2.7 \pm .89$), and MST ($M = 2.9 \pm .87$) and that Group MST subjects followed their materials most closely. This measure did not significantly differentiate subjects who were abstinent (for 1 week or more) at 16 months and subjects who were smoking at 16 months.

Thirty-nine percent of subjects in the three intervention groups (M, MS, MST) returned "Quit Date" mail-back cards indicating that they had taken the initial step of setting a quit date. The mean interval between the quit date set and the receipt of the guide was 7.25 weeks. Subjects who returned a quit date card were significantly more likely to be abstinent at the 16-month follow-up (23%) than were subjects who did not (14%), $\chi^2(1, N = 1,412) = 19.6$, $p < .0001$. Smaller proportions of subjects returned each of the three subsequent mail-back cards: 16,

11, and 8%, respectively. There were no significant group differences in mail-back return rates.

Treatment Outcomes

Biochemical verification. Fifty of the 58 self-reported smokers (86%) and 183 of the 210 self-reported quitters (87%) agreed to saliva sampling. Five quitters relapsed during the 1- to 3-week period between being called and having saliva collected, leaving 178 (85%) for cotinine analyses—which represents 54% (178/331) of all self-reported quitters. There were no significant group differences in the proportions of self-reported quitters selected for sampling or in sampling refusal rates.

Ninety-four percent (167/178) of these self-reported abstainers had cotinine values below the 10 ng/ml cutoff. Nine of the remaining 11 abstainers reported nicotine gum use, and all but 1 of the 9 had salivary thiocyanate levels below the 2,400 micromoles/liter cutoff. Therefore, biochemical analyses verified self-reported abstinence for 98% (175/178) of the self-reported abstainers tested. A worst case scenario, assuming that all those refusing or relapsing before sampling were smokers at the time of self-report, would yield an 80% confirmation rate (167/210). However, the similarity of refusal rates for self-reported smokers and quitters suggests that other factors in addition to deception contributed to refusing saliva testing.

Smoking and quitting outcomes. Self-reported quit rates averaged 17% across the four experimental conditions at 8 months and 18% at 16 months (Table 1). Mean duration of abstinence at 16 months was 8.7 months, with an average of 12% of subjects abstinent 6 months or longer. There were significant treatment effects for each major smoking outcome, generally favoring the MST group at both follow-ups. Quitters (abstinent for 1 week or more at 16 months) used more *pre*quitting strategies, $t(1193) = 4.63$, $p = .0001$, but not more *quitting* methods than nonquitters. Eighty percent of all subjects reported making at least one serious quit attempt after enrolling, with a significantly higher proportion of MST subjects doing so. Mean mg/nicotine per last cigarette smoked (an index of nicotine fading adherence) at the 16-month follow-up was significantly lower for all treatment groups than for the control group, and lower for Group MST than for Groups M and MS. Mean quitting confidence was significantly higher among MST than among C, M, or MS subjects.

Table 2 presents 16-month smoking behavior outcomes among continued smokers. Overall, there was a significant reduction in cigarette nicotine level, $F(3, 1195) = 7.41$, $p < .0001$. Subjects in each group decreased smoking rate, and subjects in all but the control group significantly reduced nicotine level per cigarette. MST subjects reported a greater mean reduction in nicotine per cigarette than did C, M, and MS subjects; they were more likely to reduce their daily estimated intake by at least 50% and also more likely to smoke within 30 min of awakening. Reductions in nicotine per cigarette and in estimated daily nicotine intake were greater for M and MS subjects than for C subjects. Mean desire to quit remained relatively high, with no significant differences between groups.

Reinforcement mailing effects. Effects of the 1-year reinforcement mailing among subjects in the M, MS, and MST conditions were examined for 15 selected 16-month outcomes (including quit rates, quit attempts, use of outside treatments, and quitting self-efficacy) using 3×2 ANOVAs. There were no significant interactions and only one significant ($p < .05$) main effect: subjects who received the mailing had significantly higher scores than those who did not on a composite variable reflecting having tried to cut down on the number of cigarettes, to switch to a lower nicotine brand, or to set a definite quit date. This result was considered spurious, and this treatment variable was dropped from further analyses.

Social support effects. Subjects in all conditions were asked at 8-months to indicate the number of people they invited to support their quitting efforts, the amount of overall quitting support received from friends and family, and the frequencies of positive support (e.g., expressing pleasure, helping the quitter think of substitutes) and negative support (e.g., expressing doubt about the quitter's ability to succeed) from a primary supporter (Mermelstein et al., 1986).

Subjects who were abstinent (for 1 week or more) at 16 months had higher 8-month ratings of overall support, $t(1714) = 5.92$, $p < .0001$, and higher 8-month ratings of positive support, $t(1028) = 3.44$, $p < .001$, and had lower 8-month ratings of negative support, $t(1032) = 1.99$, $p < .05$, than did subjects who were smoking at 16 months. However, as Table 3 shows, there were no treatment differences in the numbers of people invited to provide support, and the few differences in ratings of support received displayed no consistent patterns.

Distribution of social support instructions. The number of guides given out in Groups MS ($M = .96$) and MST ($M = 1.07$) did not differ significantly and was positively associated with 16-month 1-week quit status, $t(592) = 2.16$, $p = .031$. Overall, only 58% of subjects (55% MS, 60% MST, *ns*) reported handing out one or more social support guides. Subjects who gave out one or more guides reported higher overall support, $t(465) = 5.5$, $p = .0001$, and higher positive support, $t(512) = 4.6$, $p = .0001$, at 8 months. They also had higher 16-month 1-week abstinence rates, 27% vs. 18%, $\chi^2(1, N = 598) = 6.98$, $p = .008$.

Telephone counseling ratings. At 8 months, Group MST subjects were asked to rate how helpful they found the phone counseling they received and how helpful they found knowing that a telephone Quitline was available. Counseling ($M = 1.5, \pm.90$) and Quitline availability ($M = 1.6, \pm.96$) were rated as somewhat helpful (rating scale 0–4, 4 = *most helpful*). At 16 months, counseling ratings on five 5-point Likert-type scales (encouraging, personal, practical, helpful, helped me stay on track) were summed, yielding a favorable mean score of 9.33 (±4.6; range 5–25, 5 = *most favorable*). ANOVAs showed no significant differences in ratings given for the three different counselors.

Use of outside cessation treatments. At 8-months, 40% of Group C subjects said they had started a guide or program, and 22% said they had completed one. These subjects were more likely to be abstinent at 16 months (for 1 week or more) than were subjects who had not started or completed a guide or a program, $\chi^2(1, N = 159) = 14.49$, $p < .0001$, and $\chi^2(1, N = 141) = 25.27$, $p < .0001$, respectively. At 16 months, 59% of control subjects had used an outside treatment, including another book or guide, an individual treatment, a group treatment, or nicotine gum.

At 16 months, subjects were asked to report any outside quitting treatments used since enrolling in the study. As Table 4

Table 1
Percentages, Means, Standard Deviations, and Treatment Effects for Quitting Processes and Smoking Outcomes at 8- and 16-Month Follow-Ups

Variable	Condition				Treatment effect
	Group C (n = 465)	Group M (n = 467)	Group MS (n = 471)	Group MST (n = 474)	
8 months					
% ≥1-week abstinence	16.0_a	14.7_a	14.2_a	23.0_b	$\chi^2(3, N = 1{,}777) = 16.04$***
% ≥1-month abstinence	13.0_a	11.5_a	11.6_a	19.0_b	$\chi^2(3, N = 1{,}786) = 14.28$**
Prequitting strategies used (0–12)					
M	5.2_a	6.3_b	7.0_c	7.7_d	$F(3, 1193) = 42.29$***
SD	2.5	2.9	2.9	2.7	
Frequency of quitting methods (0–33)					
M	13.0	12.6	13.0	13.9	$F(3, 928) = 2.04$
SD	6.2	6.1	5.9	5.8	
16 months					
% ≥1-week abstinence	18.2_{ab}	15.2_a	14.2_a	23.0_b	$\chi^2(3, N = 1{,}874) = 15.75$**
% ≥1-month abstinence	15.2_a	13.7_a	12.3_a	21.5_b	$\chi^2(3, N = 1{,}875) = 17.63$***
% ≥6-month abstinence	11.2_a	9.1_a	10.7_a	18.1_b	$\chi^2(3, N = 1{,}860) = 20.90$***
Months since last quitting (quitters only)					
M	8.3	7.8	9.1	9.7	$F(3, 315) = 2.39$
SD	5.3	5.0	5.4	5.3	
% ≥1 serious quit attempt	76.9_a	77.2_a	80.9_{ab}	84.6_b	$\chi^2(3, N = 1{,}534) = 9.48$*
Nicotine last cigarette (mg)					
M	0.7_a	0.6_b	0.6_b	0.5_c	$\chi^2(3, N = 1{,}233) = 25.8$***
SD	0.29	0.35	0.36	0.36	
Quitting confidence (0–10)					
M	5.1_a	5.1_a	5.1_a	5.8_b	$\chi^2(3, N = 1{,}748) = 4.94$**
SD	3.3	3.3	3.1	3.3	

Note. Group C = control condition; M = self-quitting materials only; MS = M + social support instructions; MST = MS + telephone counseling. Means or percentages with different subscripts differ significantly ($p < .05$) on the basis of the Tukey multiple comparison procedure or single *df*, two-tailed chi-square tests.
* $p < .05$. ** $p < .01$. *** $p < .001$.

shows, control subjects (Group C) were significantly more likely than subjects in the three treatment groups (Groups M, MS, and MST) to report using other cessation guides, group treatments, and nicotine gum. Across all four groups, only the use of another guide was significantly related to 16-month 1-week quit status, and the effect was negative: Subjects using an additional guide were less likely to be abstinent, $\chi^2(1, N = 1{,}741) = 23.71$, $p < .0001$. However, 5 of the 16 within-group analyses showed significant differences between quitters and nonquitters in the use of outside treatments—with results indicating that outside treatments proved beneficial only for control subjects and detrimental only for treatment group subjects. Specifically, use of group treatment was associated with a significantly greater 16-month 1-week quit rate in Group C, $\chi^2(1, N = 434) = 8.86$, $p < .003$. Use of other guides was associated with significantly lower 16-month quit rates in Groups M, $\chi^2(1, N = 440) = 4.07$, $p < .04$; MS, $\chi^2(1, N = 433) = 11.88$, $p < .001$; and MST, $\chi^2(1, N = 440) = 9.07$, $p < .003$, and use of nicotine gum was associated with a significantly lower 16-month quit rate in Group M, $\chi^2(1, N = 451) = 4.97$, $p < .026$. Negative relationships between use of outside treatments and 16-month quit status among treatment group subjects suggest that these subjects may have turned to outside treatments *after* failing to quit with the experimental treatment.

Discussion

It was anticipated that smokers enrolling in this trial would self-select for a minimal contact treatment and therefore would consist largely of lighter, less addicted smokers with few past quit attempts or cessation treatments (Orleans, 1985; Wilcox, Prochaska, Velicer, & DiClemente, 1985). However, in the absence of efforts specifically to recruit such "ideal" self-quit candidates, this trial attracted smokers who had an extensive history of addiction, were veterans of multiple past quit attempts and treatments, and reported many pathophysiologic effects of smoking (Wagner et al., 1990). These older, heavier, more extensively treated smokers are less likely to succeed in quitting on their own than are younger, lighter smokers (Cohen et al., 1989; Cummings et al., 1988; Glasgow et al., 1985; Gritz et al., 1988; Wilcox et al., 1985). Future trials may benefit from efforts to recruit more appropriate self-quitting candidates (Schoenbach et al., 1990).

A major objective was to develop a self-quitting guide that would be helpful, easy to read, and easy to follow. To a considerable extent, this objective was achieved. The majority of subjects said they read most or all of the materials and followed the self-quitting program to some degree. The quitting guide was rated as generally helpful and easy to follow. These results com-

Table 2
Percentages, Means, Standard Deviations, and Treatment Effects for Smoking Outcomes Among Smokers at 16-Month Follow-Up

Variable	Condition				Treatment effect
	Group C (n = 465)	Group M (n = 467)	Group MS (n = 471)	Group MST (n = 474)	
Change in cigarettes/day					
M	−4.6	−3.7	−4.7	−4.7	$F(3, 1390) = 1.00$
SD	9.1	8.9	8.9	10.6	
Change in mg nicotine/cigarette					
M	$-.01_a$	$-.15_b$	$-.15_b$	$-.24_c$	$F(3, 1195) = 33.83$**
SD	0.17	0.29	0.29	0.30	
% reducing estimated daily nicotine intake ≥ 50%	16.5_a	30.9_b	36.3_b	48.7_c	$\chi^2(3, N = 1,175) = 67.00$**
% smoking within 30 min	66.8_a	70.1_a	68.8_a	78.5_b	$\chi^2(3, N = 967) = 8.84$*
Desire to quit (0–10)					
M	7.4	7.3	7.4	7.5	$F(3, 963) = .24$
SD	2.4	2.4	2.4	2.5	

Note. Group C = control condition; M = self-quitting materials only; MS = M + social support instructions; MST = MS + telephone counseling. Means or percentages with different subscripts differ significantly ($p < .05$) on the basis of the Tukey multiple comparison procedure or single *df*, two-tailed chi-square tests.
* $p < .05$. ** $p < .001$.

pare favorably with those reported in other studies of self-help materials (Cummings et al., 1988; Gritz et al., 1988). In contrast with past studies (Cummings et al., 1988; Glasgow et al., 1981; Gritz et al., 1988), the amount read did not predict long-term abstinence—perhaps because most subjects reported reading most or all of the materials. But 16-month quitters reported using a greater number of prequitting strategies (including brand switching) than did nonquitters.

The numbers of subjects returning mail-back adherence cards was disappointingly low. Reinforcement or feedback for their return might have heightened their use and adherence to the guide. In the future, mail-back cards might be used to identify nonadherent subjects needing additional help. Subjects who did not return an initial quit date card were significantly less likely to be abstinent at 16 months: They might benefit from a motivational prompt or offer of assistance 6–8 weeks after the mailing self-help materials.

The lack of an *un*treated control group limits the conclusions that can be drawn about the efficacy of the experimental quitting guide. Hypothesized differences in quit rates between the control and experimental guide did not occur. Smokers receiving the control guide achieved the same quit rates as did those receiving the experimental guide without telephone counseling. However, control and experimental subjects appear to have reached abstinence through somewhat different routes. Subjects receiving the experimental guide were more likely to use behavioral prequitting strategies (like setting a quit date, switching brands, listing quitting reasons); subjects receiving the control guide were more likely to use outside treatments (other guides, group treatments, nicotine gum). The very specific re-

Table 3
Means, Standard Deviations, and Treatment Effects for Social Support Ratings at 8-Month Follow-Up

Variable	Condition				Treatment effect
	Group C (n = 465)	Group M (n = 467)	Group MS (n = 471)	Group MST (n = 474)	
No. of people invited to help					
M	2.4	2.7	2.4	2.3	$F(3, 1143) = .84$
SD	2.9	4.1	2.9	2.1	
Overall quitting support (0–10)					
M	5.6	6.0	5.6	6.1	$F(3, 1715) = 2.66$*
SD	3.5	3.5	3.4	3.3	
Positive quitting support (0–30)					
M	10.0_{ab}	11.0_{ab}	9.7_a	11.2_b	$F(3, 1029) = 3.73$**
SD	5.7	6.5	6.3	6.5	
Negative quitting support (0–15)					
M	5.8	5.5	5.2	5.5	$F(3, 1033) = .94$
SD	3.9	3.9	4.0	3.8	

Note. Group C = control condition; M = self-quitting materials only; MS = M + social support instructions; MST = MS + telephone counseling. Means with different subscripts differ significantly ($p < .05$) on the basis of the Tukey mutiple comparison procedure.
* $p < .05$. ** $p < .01$.

Table 4
Percentages and Treatment Effects for Use of Outside Quitting Treatments at 16-Month Follow-Up

Treatment used (by %)	Condition				Treatment effect
	Group C (n = 435)	Group M (n = 451)	Group MS (n = 444)	Group MST (n = 444)	
Other books or guides	32_a	21_b	23_b	22_b	$\chi^2(3, N = 1{,}745) = 16.83$**
Individual treatment	11	7	9	8	$\chi^2(3, N = 1{,}748) = 5.53$
Group treatment	14_a	8_b	7_b	9_b	$\chi^2(3, N = 1{,}759) = 13.64$*
Nicotine gum	33_a	28_a	27_b	23_b	$\chi^2(3, N = 1{,}777) = 11.63$*

Note. Group C = control condition; M = self-quitting materials only; MS = M + social support instructions; MST = MS + telephone counseling. Percentages with different subscripts differ significantly ($p < .05$) on the basis of single *df* chi-square tests.
* $p < .01$. ** $p < .001$.

ferral information given in control materials; the emphasis on easily accessible, low-cost programs and materials; and the inclusion of advice on how to "self-triage" either to self-help or to more intensive treatments may have contributed to the relatively high use of outside treatments by control subjects. Incorporating these features into standard referral practices might boost the low rates of referral follow-through typically documented (e.g., Thompson et al., 1988).

Overall, our results indicate positive absolute outcomes for quitters using minimal contact strategies. The 14–18% 16-month quit rates for subjects receiving self-help materials approximate the 13–15% 12-month quit rates reported by Cohen et al. (1989) for two similar NCI trials with over 900 smokers receiving self-help materials, and these rates compare favorably with the 10% self-quit rate for the U.S. population as a whole (Fiore et al., 1990). The 23% 16-month quit rate among subjects receiving the self-help guide plus brief telephone counseling approximates the 20–25% long-term quit rates typically achieved with more intensive treatments (Glasgow & Lichtenstein, 1987; USDHHS, 1989). More than three quarters of the subjects in all groups reported making at least one serious attempt to quit smoking, and continued smokers reported significantly lower daily smoking rates and estimated nicotine intake at the 16-month follow-up. These findings may be less important as evidence of reduced smoking than as an index of progress from contemplation to action stages of change (Prochaska & DiClemente, 1983). Interventions that help smokers move ahead even one stage can double the chance that they will take further action on their own in the near future (Rossi, 1989).

A single reinforcement mailing sent 12 months after enrollment had no effect on program adherence or smoking behavior change. Earlier or more frequent (serial) mailings, or mailings containing personalized feedback, might have proven more effective (Glynn et al., 1990), but it is likely that the greatest benefit would come not from additional *print* materials but from reinforcements using different modalities (face-to-face, telephone, video; Kottke, Battista, DeFriese, & Brekke, 1988). In fact, this view is consistent with present findings concerning telephone counseling effects.

We hoped that intervening to raise natural social supports for quitting might prove more effective among self-quitters than it has proved among treated quitters. Lichtenstein, Glasgow, and Abrams (1986) reviewed five studies evaluating a variety of interventions to boost natural quitting supports (including coworker and spouse training programs and support manuals) and concluded that "the addition of a social support component to a standard behaviorally based cessation program in no case resulted in significant improvements in treatment outcome" (p. 617) or, for that matter, in the amount of support received.

Results of this self-help trial paralleled those of the studies Lichtenstein and colleagues reviewed: (a) Measures of naturally occurring social support for quitting strongly predicted long-term cessation, and (b) the intervention to heighten support (supporter guides) influenced neither support ratings nor long-term quit rates. As has been observed in other self-help studies (Gritz et al., 1988), the social support guides were not utilized as fully as expected: Only 58% of subjects handed out one or more support guides to significant others; and although they were written to facilitate quitters' requests for social support, the support guides did not appear to have this effect. Subjects in all conditions invited a similar number of people to help them quit.

Interestingly, those smokers who handed out supporter guides received more support from their natural environments and had higher 16-month quit rates than those who did not. However, these differences appear to reflect self-selection rather than any effect of the supporter guide per se. Future analyses will explore baseline differences between self-selected "social" and "solo" quitters—those who did and did not choose to use the support guides (K. Brownell, personal communication, June 20, 1987)—and will attempt to identify smokers most likely to utilize or benefit from support instructions.

Brief telephone counseling significantly improved long-term outcomes with self-help materials. Counselor calls boosted quit rates by a relative 50%. This effect was clear at the 8-month follow-up (after only two of the four calls had been made) and persisted through the 16-month follow-up. A higher proportion of subjects receiving counselor calls made one or more serious quit attempts. Subjects in this condition also had higher mean self-confidence scores. Nonquitters receiving counselor calls reported a greater mean reduction in nicotine per cigarette and were more likely to reduce their daily estimated intake by 50% or more, although they were also more likely to smoke.

The better outcomes of quitters receiving counselor calls appeared to reflect greater adherence to quitting protocol in the guide. Subjects receiving calls did not read more of their materials, but they did follow them more closely, and they used more

of the recommended prequitting strategies. Subjects rated the counseling they received as somewhat helpful but not "too" helpful. It may be that the calls were not so intrusive or coercive as to eclipse a personal attribution for success (Janis, 1983).

In summary, telephone counseling was found to be an effective strategy for assisting self-quitters. Reducing the costs of phone counseling could increase its potential for widespread application, for instance, in medical settings (Kottke et al., 1988). The strong counseling effect apparent at 8 months, after just two calls, suggests that four calls may not have been necessary. The similar outcomes achieved by the different counselors suggest that the role of lay counselors should be explored (Lando, 1987). Further research to identify the types of smokers most likely to benefit from counselor calls would be helpful. Finally, it is unknown whether comparable benefits might accrue if smokers could be induced to initiate calls *into* a telephone Quitline, eliminating costly contact time and telephone expenses. Additional research on the efficacy of calls into existing telephone quitlines, such as the NCI Cancer Information Service, is needed (Ossip-Klein, et al., 1991).

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Received May 7, 1990
Revision received December 17, 1990
Accepted December 17, 1990 ■