Preventing Relapse Among Former Smokers
A Comparison of Minimal Interventions Through Telephone and Mail

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ABSTRACT

This study compared 2 minimal interventions for reducing relapse in ex-smokers. One intervention involved 12-month access to a telephone hot line. In the other intervention, 8 relapse-prevention booklets were mailed to participants over 1 year. The 2 interventions were crossed in a 2 × 2 factorial design, yielding control, hot-line-only, mailings-only, and combined conditions. The criterion of at least 1 week of abstinence at baseline was met by 584 participants, 446 of whom also completed a 12-month assessment. Repeated mailings, but not the hot line, reduced relapse for those participants who had been abstinent for less than 3 months at baseline. At follow-up, 12% of those in the mailings conditions were smoking again compared with 35% in the nonmailings conditions. As predicted, both interventions were effective at attenuating the association between depressive symptoms and poor outcome found in the control condition.

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Progress has been made in developing cessation programs for tobacco smoking, as well as for other forms of substance abuse. However, even the best programs continue to have high rates of relapse. As a result, considerable attention has been paid to the problem of relapse and to the development of interventions designed to prevent relapse. These interventions have been used almost exclusively to enhance or
supplement programs typically designed to produce initial cessation—in most cases, formal, clinic-based treatment programs. Thus, access to relapse-prevention help is made available to no more than the 5% to 10% of smokers who use formal programs in their efforts to quit smoking. The vast majority of smokers either attempt to quit entirely on their own or use self-help manuals; nicotine-replacement products, such as nicotine gum or nicotine transdermal patches; or other pharmacotherapies, such as bupropion (Fiore et al., 1990). However, the relapse rate among self-quitters approaches 90%—even higher than it is for smokers who receive formal treatment (S. Cohen et al., 1989). Even among smokers who successfully abstain for 1 full year, 38% eventually return to regular smoking (U.S. Department of Health and Human Services, 1990). Because approximately 30% of smokers attempt to quit each year, even slight increases in their long-term success rates can produce dramatic decreases in smoking and smoking-related illness (Fiore et al., 1990). In fact, each 1% increase in the success rate of self-quitters would represent over 150,000 additional nonsmokers per year in the United States.

This leads to the question of whether self-quitters can benefit from the progress made in relapse-prevention interventions. Specifically, can relapse-prevention interventions be provided in a way that is accessible to self-quitters and more cost-effective than formal treatment programs? The present study was an attempt to use the knowledge base of relapse prevention developed for formal treatment programs to provide a minimal intervention for individuals who had already quit smoking on their own.

Interventions designed to prevent relapse have met with mixed success. However, a review of the literature reveals three characteristics of interventions that tend to be related to increased maintenance of abstinence, at least in subgroups of smokers: amount of treatment contact, coping skills training, and social support.

Meta-analyses, including those conducted for the Agency for Health Care Policy and Research (AHCPR), have concluded that smoking interventions providing contact over a longer period of time produced superior outcomes (Baille, Mattick, & Webster, 1990; Fiore et al., 1996). Extended contact appears to be especially beneficial when included in minimal-treatment approaches. For example, studies have found that ongoing telephone contact enhances smoking cessation (Orleans et al., 1991; Ossip-Klein et al., 1991) and the National Cancer Institute Expert Advisory Panel on minimal interventions concluded that telephone contact is a cost-effective smoking-cessation strategy (Glynn, Boyd, & Gruman, 1990). Another low-cost means of extending contact is sending smokers information through the mail at regular intervals (Decker & Evans, 1989; Owen, Ewins, & Lee, 1989). Extended contact may reduce relapse because it teaches new information and skills or refreshes previously learned ones or because it maintains ex-smokers' motivation, attention to quitting, and self-monitoring of smoking-related internal and external cues.

Training in coping skills, including identification of high-risk situations, has served as the foundation of most clinic-based relapse-prevention interventions. This is because it follows from well-articulated models of relapse (Marlatt, 1985; Shiffman et al., 1986). Smokers are taught to engage in alternative behaviors when confronted with a desire to smoke. The AHCPR meta-analysis identified skills training as an effective intervention (Fiore et al., 1996). Several studies have found that certain subgroups of smokers benefited from coping skills training (i.e., less dependent smokers [Hall, Rugg, Tunstall, & Jones, 1984], women [Curry, Marlatt, Gordon, & Baer, 1988], and smokers low in negative affectivity [Zelman, Brandon, Jorenby, & Baker, 1992]). Given these data, training in coping skills may be a necessary but not sufficient component of a relapse-prevention intervention. Thus, smokers who are at higher risk for relapse (e.g., more dependent smokers and those prone to depression and other negative affect) may need additional help.

One of the most robust findings in the smoking-relapse literature is that naturally occurring social support is related to long-term success (S. Cohen & Lichtenstein, 1990; Coppotelli & Orleans, 1985; Mermelstein,
Cohen, Lichtenstein, Baer, & Kamarck, 1986; Mermelstein, Lichtenstein, & McIntyre, 1983). The recent AHCPR guidelines also stress the importance of psychosocial support (Fiore et al., 1996). However, clinic-based attempts to improve maintenance of abstinence by actively increasing social support have met with little success. S. Cohen et al. (1988) suggested that this may be because in the context of rich, multicomponent programs, social support components may not have enough salience. In fact, efforts to increase social support appear to be more successful when they are added to minimal-assistance smoking-cessation programs (e.g., Gruder et al., 1993). There is also evidence that smokers prone to negative affect benefit from treatment emphasizing social support (Brandon et al., 1997; Brandon, Copeland, & Saper, 1995; Zelman et al., 1992).

In summary, a review of the relapse-prevention literature suggests that extended contact, coping skills training, and provision of social support are elements of the most successful interventions. This is shown most clearly when these elements are added to minimal interventions. These intervention characteristics appear to be especially important for certain subgroups of smokers, particularly those prone to depression and other negative affect. These smokers are precisely the individuals who are at greatest risk for relapse (Brandon, 1994; Glassman et al., 1990).

The goal of the present research was to apply these advances in relapse prevention to develop minimal, cost-effective interventions for individuals who have already achieved smoking cessation—usually without formal treatment. This strategy offers an integration of both individual and public health approaches to tobacco control (see Abrams, Emmons, Niaura, Goldstein, & Sherman, 1991). There are at least three potential advantages of providing relapse-prevention intervention to self-quit ex-smokers: (a) Because the labor and expense of cessation treatments are avoided, relapse-prevention interventions are potentially very cost-effective compared with cessation treatments; (b) this approach has the potential to reach individuals who would not otherwise seek traditional smoking-cessation interventions; and (c) because the intervention is low cost, this approach may offer an efficient research paradigm to study the efficacy and process of relapse-prevention techniques.

To test the feasibility and demand for a relapse-prevention program for self-quitters, Brandon and DeMichele (1995) placed a single advertisement in Syracuse, New York, newspapers offering help maintaining abstinence to former smokers. This yielded 152 responses, 85% of which were from self-quitters. Participants rated their interest in a variety of possible relapse-prevention interventions, and the two most popular were the provision of repeated mailings (75% indicated interest) and availability of a telephone hot line (41%).

On the basis of the findings from the feasibility study, the present study was designed as a test of the efficacy of both repeated mailings and a telephone hot line as minimal interventions for preventing relapse among former smokers. Both forms of intervention were considered means to provide extended contact and coping skills training, and the hot line also offered more personal social support. Therefore, we hypothesized that both interventions would be more effective at preventing relapse than a control condition. A secondary hypothesis was that both interventions would be particularly beneficial to participants who were prone to depression. For this subpopulation of smokers, the mailings had the advantage of more consistent contact, whereas the hot line had the potential for greater contact and more personal support. Thus, we were unsure which of the interventions would be superior for depression-prone participants, but we predicted an overall interaction between depressed affect and intervention (vs. control).

A small number of studies bear some resemblance to this research. As a means to collect data about the nature of smoking relapse, Shiffman (1986) offered a Stay Quit relapse-prevention hot line for individuals
who had abstained for at least 48 hr, but they did not conduct controlled research on the efficacy of the hot line. Another research group has conducted studies of recruited smokers intending to quit; after participants had abstained for 24 to 48 hr, the researchers provided them with short-term pharmacological and behavioral interventions designed to prevent relapse (e.g., Fortmann & Killen, 1995; Killen, Fortmann, Newman, & Vandy, 1990). Their general findings were that nicotine replacement reduced relapse, but the behavioral interventions did not. Finally, there have been recent attempts to offer relapse prevention to pregnant women who have quit smoking (e.g., Ershoff, Quinn, & Mullen, 1995; Lowe, Windsor, Balanda, & Woody, 1997). These attempts have generally not been successful with this special population of ex-smokers. Unlike the above studies, we recruited participants who already had abstained from smoking (for any length of time of at least 1 week) and provided minimal interventions that maintained contact for up to 1 full year.

Method

Experimental Design

This study was designed as a test of the efficacy of the two minimal interventions endorsed by participants in the feasibility study: repeated mailings and a telephone hot line. A 2 × 2 factorial design was used, with the first factor being whether or not a telephone hot line was provided for participants. The second factor was whether or not participants were sent repeated relapse-prevention mailings. Thus, the four cells were (a) a minimum-contact control condition, in which neither intervention was provided; (b) mailings only; (c) hot line only, and (d) combined mailings and hot line. Participants were randomly assigned to one of the four conditions. The control condition consisted of a single mailing of basic smoking-cessation and relapse-prevention advice. For ethical and public relations reasons, we could not use a true no-intervention control because we recruited participants by offering information on maintaining abstinence.

Participants

Participants were recruited in six metropolitan areas in New York and northern Pennsylvania through ads in daily and weekly newspapers. The advertisements offered free relapse-prevention information to ex-smokers. By necessity, the nature and format of the information offered was kept vague in the ads because of the variety of interventions to which participants could be randomly assigned. A toll-free telephone number was provided to request the information.

Callers to the program were screened for their current smoking status. We ultimately wished to include as participants only those individuals who had abstained from smoking for at least 1 week at the time they completed the baseline questionnaires. At the initial screening, however, we included as potential participants any caller who reported having abstained on at least 4 of the previous 7 days. (Current smokers were sent American Cancer Society booklets on smoking cessation and referred to smoking-cessation programs in their area.) We received 804 calls from individuals who met this criterion. These individuals were randomly assigned to the four intervention conditions, and 792 (99%) agreed to participate. We mailed them baseline questionnaires and offered the incentive of $5 plus a state lottery ticket if they completed and returned the forms. We sent two reminder letters and made multiple reminder phone calls to individuals who did not return the questionnaires within a month. We also contacted collaterals who had been previously identified by participants in order to locate participants who had moved. Of the 792 potential participants, 696 (88%) returned completed baseline forms, with no significant differences in return rates across conditions. These individuals were considered actual participants if they reported at least 1 week of abstinence at the time of
questionnaire completion. This criterion was met by 584 participants, distributed equally across conditions.

One year later, we mailed participants a follow-up questionnaire with the same incentives. We received completed questionnaires from 446 of the 584 participants who had met the baseline abstinence criterion, for a 76% response rate, distributed equally across conditions. The mean interval between completion of the baseline and follow-up questionnaires was 13.08 months. The 446 ex-smokers who were abstinent for at least 1 week at baseline and who completed both questionnaires were considered the participants in the study.

**Materials Assessment instruments.**

On enrollment into the study, participants were sent a baseline assessment package, which included a demographic questionnaire, a smoking history questionnaire, the Fagerström Test of Nicotine Dependence (FTND; **Heatherton, Kozlowski, Frecker, & Fagerström, 1991** ) reworded to reflect prequitting smoking status, the Beck Depression Inventory (BDI; **Beck, Ward, Mendelson, Mock, & Erbaugh, 1961** ), the Profile of Moods States—Short Form (POMS—SF; **Shacham, 1983** ), and the Stages of Change Questionnaire (SOC; **McConnaughy, Prochaska, & Velicer, 1983** ). Twelve months later, we sent participants a follow-up questionnaire that included questions about their current smoking status, the length of their current abstinence, if they ever returned to daily smoking during the follow-up period, and their estimate of how much of the past year (in months) they had spent as a regular smoker. If participants had relapsed, we asked when the relapse had occurred, but this question apparently was unclear to many participants and generated so many out-of-range responses that it was unusable. The questionnaire also included the participants' evaluation of the program as a whole and of the hot line and mailings components specifically.

**Bioverification of reported abstinence.**

Because of the wide geographic distribution of participants, biochemical verification of smoking status was not possible for the entire sample. Instead, we telephoned the 49 participants who resided within 75 miles of our laboratory and who reported abstinence on the follow-up questionnaire. We asked these participants if we could visit them at home or work for a brief interview. Of these, 46 agreed to be interviewed. However, 2 of these participants left for summer vacations before their interviews could be completed and 1 failed to show up for the interview. The remaining 43 received a brief interview about their smoking history. We then asked participants if they would consent to a breath test for carbon monoxide (CO). Each participant consented, and all but 1 produced a reading below 10 ppm, a conservative cutpoint to identify smokers ( **Cummings & Richard, 1988** ). The other participant's breath sample was 25 ppm. He insisted that he was abstinent and attributed his elevated CO to environmental tobacco smoke and industrial exhaust from the construction site where he worked. The CO results from this subsample suggest that participants' self-reported smoking status had satisfactory validity.

**Stay Quit booklets.**

We wrote all eight Stay Quit booklets using desktop publishing software. They average twelve 5.5 × 8.5-in. (14.0 × 21.6-cm) pages, or 3,141 words, and include clip art to enhance their appearance. They were produced by offset printing on white paper, with a colored cover. Average printing cost per booklet was 15¢. Booklets were written at the eighth-grade reading level.

One booklet included an introduction to the basic relapse-prevention principles and techniques. It was used
as the first of the series of eight booklets sent to participants in the mailing conditions. It was also used as the single booklet sent to participants in the control and hot-line-only conditions. The topics covered in this booklet included an introduction and description of nicotine dependence, the stages of quitting (Prochaska & DiClemente, 1983), situations that are high risk for relapse (Brandon, Tiffany, Obremski, & Baker, 1990; Shiffman, 1982), coping with urges to smoke (Shiffman, 1984), making lifestyle changes (Marlatt, 1985), and the abstinence violation effect and ways to handle an initial "slip" (Marlatt, 1985).

Each of the remaining seven booklets included more extensive information on a topic related to maintaining abstinence: Smoking Urges; Smoking and Weight; What If You Have a Cigarette?: Your Health, Smoking, Stress, and Mood; Lifestyle Balance; and Life Without Cigarettes.

**Intervention Conditions** Minimum-contact control.

Participants in this condition received only the single Stay Quit booklet at the time of enrollment.

**Hot line only.**

Participants assigned to this condition received the same booklet as participants in the control condition, plus a laminated wallet card with the toll-free Stay Quit telephone hot-line number. The card instructed participants to call the number if (a) they had questions about smoking or remaining abstinent, (b) they were experiencing a crisis in which they had a desire to smoke, (c) they did smoke (a slip), or (d) they just needed to talk to someone. To disinhibit participants from calling the hot line, we asked them to call once they received their card in order to "verify their registration in the system." Because few relapse episodes occur in the morning (Brandon, Tiffany, & Baker, 1986), the hot line was answered from 11 a.m. to 8 p.m. daily. At other times, one hot-line operator wore a pager that could be activated by participants through voice mail. Operators (graduate and undergraduate research assistants) were trained to assess the caller's current situation, provide advice based on Marlatt's and Shiffman's relapse-prevention models, and provide social support. Each operator received approximately 30 hr of training and had to pass both written and role-playing examinations. The operators worked from a manual and received ongoing supervision from Thomas H. Brandon and Bradley N. Collins. Although telephone calls were intended to be participant initiated, we used a "backup" strategy to maximize continued participation. Telephone operators initiated calls to participants under the following conditions: (a) A new participant did not call to "verify registration" within 2 weeks or (b) a participant did not call the hot line within a 3-month period. The hot line was available to participants for 1 year after their enrollment into the program.

**Mailings only.**

Participants in this condition received the series of eight Stay Quit booklets through the mail. A booklet was mailed immediately after a participant enrolled and at the following times thereafter: 1, 2, 3, 5, 7, 9, and 12 months.

**Combined condition.**

Participants in this condition received both the repeated mailings and the hot-line interventions described above.

**Results**
Participant Characteristics

Participants' demographic and smoking history characteristics are presented in Table 1. There were no differences across conditions on any of these variables or on the BDI, the POMS—SF, and the SOC. We also compared individuals who did versus did not return the follow-up questionnaires. The only differences were that those not returning the questionnaires averaged 3 years younger (45.31 vs. 48.58 years) and had smoked 3 years less (25.96 vs. 28.76 years).

As seen in Table 1, participants tended to be middle-aged, formerly heavy smokers. As expected, most (80%) were self-quitters on the present quitting attempt; that is, they had not used a formal smoking-cessation program or support group. Also, few participants were using nicotine-replacement products. Note that the mean length of abstinence at baseline was more than 16 months. The median was 6.55 months, and 35% of the participants had been abstinent for more than 1 year, with a high of 18.5 years.

Hot-Line and Booklet Usage

Telephone calls were timed by the operators, who also completed a report after each call. There was a mean of 3.89 (SD = 1.81) telephone contacts per hot-line participant, including the initial verification call and operator-initiated calls to participants who had not called within 3 months. Although 1 participant contacted the hot line 27 times, 99% of participants had 6 or fewer telephone contacts. Only 20% of participants ever initiated a call after the verification call (i.e., made a true hot-line call), and such calls composed only 11% of all postverification contacts. The remaining contacts were initiated by the hot-line operators at 3-month intervals. There was a trend in which a higher proportion of participants in the hot-line-only condition (24%) made such a call compared with those in the combined condition (15%), $\chi^2 (1, N = 226) = 3.31, p = .07$. The duration of participant-initiated calls ranged from 1 to 35 min, with a mean of 9.49 min compared with a mean of 3.08 min for operator-initiated calls, $t (541) = 6.42, p < .001$. Table 2 lists the type of information and advice requested by callers for both participant- and operator-initiated calls. Not surprisingly, participants were much more likely to request help during calls that they initiated. Consistent with expectations, participants who ever requested help with handling mood and stress had higher baseline BDI scores ($M = 13.46$) than those who never requested such help ($M = 9.22$), $t (113) = 2.12, p = .04$.

Table 3 shows the type of counseling provided by the telephone operators. Again, specific types of counseling were more likely when participants had initiated the calls. We examined whether those participants who ever initiated a true hot-line call differed from those who never did on any baseline or follow-up measures but found no differences. We also examined whether indexes of hot-line usage (the number of hot-line calls initiated, total minutes on such calls, and total minutes across all types of calls) were related to the various outcome measures described below but found no relationship.

To evaluate usage of the mailed booklets, we had to rely on self-report measures collected with the follow-up questionnaires. According to these measures, 98% of the participants read the booklets, 79% saved them, and 51% gave or lent them to another smoker or ex-smoker.

Outcome at Follow-Up

We analyzed outcome at the 12-month follow-up point using a 2 (mailing) × 2 (hot line) analysis of variance (ANOVA) for continuous variables, such as smoking rate, and chi-square analyses for dichotomous variables, such as smoking status. Although comparison of hot-line versus no-hot-line conditions tended to
show a very slight advantage for the hot-line conditions, none of these differences (or interactions with the mailings factor) approached statistical significance for any of the tests reported in this section. (For example, the percentage of participants who reported smoking during the prior week were 15%, 13%, 9%, and 9% for the control, hot-line-only, mailings-only, and combined conditions, respectively). Therefore, we focus exclusively on the repeated-mailings factor in this report.

The left-hand columns of Table 4 summarize the comparisons between the mailings and no-mailings conditions for all the participants. Although multiple indexes of outcome were used, the indexes were highly correlated (Note that we are not implying that these indexes are orthogonal measures of outcome). Using the entire sample, only two of the indexes (any smoking over the previous month and the previous 3 months) showed a superior outcome of the repeated mailings.

However, we were surprised by the substantial abstinence periods already achieved by many of our participants at the time they enrolled in the Stay Quit program. We had anticipated that most participants would have fairly short periods of abstinence, and we assumed that our interventions would be most potent for such participants. To test this assumption, we divided the sample into quartiles on the basis of participants' length of abstinence at baseline and rounded up to the nearest whole month. We then tested the effect of the repeating mailings on each quartile. Figure 1 illustrates the results using self-reported smoking status at follow-up as the dependent measure. The only significant difference was found among participants who had abstained for less than 3 months at baseline. (The mean abstinence length for this subsample was 44.45 days.) Relapse rates were very low for participants with longer baseline abstinence periods, and the intervention had no additional impact.

The pattern displayed in Figure 1, in which the mailings condition significantly improved outcomes among only those participants with less than 3 months of abstinence at baseline, was found for each of the outcome indexes. Moreover, we found that 3 months was the ideal cutpoint. The right-hand columns of Table 4 list the comparisons between mailings and no-mailings conditions for those 138 participants. All the differences were statistically significant. 4

**Depression**

As a secondary hypothesis, we had predicted that we would find the well-documented relationship between depression proneness and smoking relapse in the control condition but that this relationship would be attenuated in the three active intervention conditions. We had collected two measures of depressed affect at baseline, the BDI and the POMS—SF Depression scale, which were highly intercorrelated, \( r (427) = .72, p < .001 \). We tested the hypothesis using logistic regression, first with 12-month smoking status as the dependent variable and BDI scores and experimental condition as the predictor variables. As hypothesized, this revealed an interaction between condition and the BDI, \( \text{Wald}(3) = 8.89, R = .09, p < .05 \). Simple contrast analyses revealed significant interactions when the control condition was compared with the hot-line-only or mailings-only condition \( (p s < .05) \) and a borderline interaction when the control condition was compared with the combined condition \( (p = .06) \). The nature of the interaction is revealed in Figure 2, which displays the percentage of participants smoking at follow-up by condition and BDI score tercile. As expected, the control condition was particularly ineffective for participants with high BDI scores. The hot-line-only intervention produced much better outcomes for those participants but at a cost of poor outcomes for those with midlevel BDI scores. The two conditions that included the repeated mailings produced outcomes that were uniformly better across the range of BDI scores. When the POMS—SF Depression scale was used as the dependent measure, a similar pattern emerged, but the logistic regression equation did.
not reach significance \( p = .22 \).

**Participants' Evaluations of the Interventions**

The 12-month follow-up questionnaires included Likert rating scales for evaluating the quality of the intervention in general, as well as specific questions about the hot-line and mailings components. The 10 general questions asked participants to rate, using a scale ranging from 1 (poor) to 4 (excellent), the quality of the program, whether it delivered the type of service they wanted, the extent to which it met their needs, whether it helped them remain abstinent, and so on. These 10 items were combined into a single scale, with a coefficient alpha reliability of .91. Two-way ANOVAs revealed significant main effects for both the hot-line factor, \( F (1, 400) = 12.06, p = .001 \), and the mailings factor, \( F (1, 400) = 13.11, p < .001 \). Post hoc pairwise comparisons using the Tukey test revealed that the control condition was rated significantly lower \( M = 2.91 \) than the hot-line-only \( M = 3.21 \), mailings-only \( M = 3.22 \), and combined \( M = 3.31 \) conditions (all \( p s \leq .001 \)), which did not differ from one another.

Because participants in the combined condition received both the hot line and the booklets, we compared their ratings of the two components using paired-sample \( t \) tests. On the 4-point Likert scale, these participants rated the booklets as more helpful \( M = 3.40 \) than the hot line \( M = 3.08 \), \( t (79) = 3.01, p = .003 \). Similarly, they were more satisfied with the booklets \( M = 3.27 \) than with the hot line \( M = 2.95 \), \( t (77) = 3.01, p = .001 \).

**Cost-Effectiveness Analysis**

A post hoc analysis indicated that the estimated net cost per participant of the mailings-only intervention was $21. Costs include the printing of the booklets, envelopes and postage, telephone during enrollment, and clerical work for organizing and sending out the timed mailings. Cost-effectiveness ratios can be computed for the mailings factor by dividing program success figures derived from the outcome differences for the mailings conditions relative to the nonmailings conditions presented in Table 4 into the estimated cost of the intervention. For the subset of 138 participants abstinent for less than 3 months at baseline, we estimated that the cost of keeping 1 individual abstinent during the entire 12-month follow-up was $126. Note that this is the estimated cost of preventing additional relapse as compared with the nonmailings conditions. Because the nonmailings conditions most likely were not inert, these cost estimates are probably inflated.

**Discussion**

This study compared two minimal interventions that we hypothesized would be effective in preventing smoking relapse among individuals who had already reached cessation. Although participants rated both interventions highly, they rarely used the telephone hot line, which was not found to be effective—neither alone nor in combination with the repeated mailings. In contrast, the repeated mailings of Stay Quit booklets significantly reduced relapse for the year during which they were provided. Further analyses showed that the booklets were only effective for those ex-smokers who had less than 3 months of abstinence at the time they entered the program. Among these individuals, there was a two thirds lower likelihood that they were smoking at follow-up if they received the series of booklets compared with participants who received only a single booklet. The relapse rate among participants in the control condition was lower than was expected on the basis of previous research on both treatment programs and self-quitters (Brandon et al., 1990; S. Cohen et al., 1988). This may be because the single informational mailing that even control participants received was itself beneficial, because those ex-smokers who responded to our offer of help were more
motivated or had greater coping skills than the typical ex-smoker, or because those participants who returned the follow-up questionnaire were more likely to be abstinent than those who did not return it. It is, nevertheless, possible that the relative efficacy of the mailings intervention would have been even greater had it been compared with a true no-intervention control. Additional research is needed to evaluate the continued impact of the intervention beyond 1 year.

One unexpected finding was the high proportion of participants who had been abstinent for considerable periods of time when they replied to the advertisement offering help maintaining abstinence. Fully 35% of the sample had already abstained for more than 1 year, 18% for more than 2 years, 5% for more than 5 years, and 2% for more than 10 years, with 1 participant reporting 18.5 years of abstinence. Thus, these ex-smokers apparently continued to feel at risk for smoking relapse. Indeed, 9% of those who had been abstinent for more than 1 year reported some smoking during the following year–including the individual who had been abstinent for more than 18 years. We had expected that our program would appeal almost exclusively to early stage quitters. That relatively long-term quitters continue to feel that they need help maintaining abstinence may itself be a worthy topic for future research (Brandon, Lazev, & Juliano, 1998). Nevertheless, given the low relapse rates for all the smokers who already had achieved 3 or more months of abstinence at baseline, it is not surprising that the interventions had little impact on this floor effect. This suggests that, in the future, we should try to target primarily those former smokers with relatively short periods of abstinence.

The efficacy of the repeated-mailings intervention may have been due to several factors. The informational content of the Stay Quit booklets, which was based on current theory and research on smoking relapse and relapse prevention, may have worked as intended. That is, the booklets may have increased participants' awareness of high-risk situations, enhanced their coping skills, increased their self-efficacy, and altered their smoking-related expectancies. Alternatively, the prepotent element of the mailings may have been the extended contact provided by the booklets. As noted above, the length and intensity of contact have been among the best predictors of successful smoking interventions (e.g., Fiore et al., 1996). Receiving the booklets may have simply prolonged participants' focus and motivation on maintaining abstinence. Perhaps this is sufficient for enhancing long-term outcomes. A future study could dismantle the content versus contact components of the mailings intervention to determine their independent and interactive contributions. Should either content or contact prove to be a sufficient relapse-prevention element, then the intervention could be simplified (and made more cost-effective) either by eliminating the multiple mailings or by reducing the content of the mailings.

The failure of the hot-line intervention to prevent relapse may very well be traced to its lack of use by participants. The average of one contact every 3 months may not have been enough to teach relapse-prevention skills, provide social support, or simply provide extended contact–the three reasons the intervention was hypothesized to be effective. It is not unusual for hot lines to be underused, and the consensus in the field is that only 1% to 2% of a target population will ever use a hot line (Glasgow, Lando, Hollis, & McRae, 1993). In the present study, 20% of the participants made a hot-line call and all the participants received proactive, operator-initiated calls. Nevertheless, this still represents a low level of contact–an average of 1 min per month. Moreover, our operator-initiated calls merely provided participants with the opportunity to ask for assistance, which they rarely did. As seen in Tables 2 and 3, the operator-initiated calls did not have the rich content of the participant-initiated calls. In retrospect, this is not surprising, given that participants most likely initiated calls at times when they were particularly motivated to ask for help. Operator-initiated calls, in contrast, would only coincidentally occur at such times. Perhaps those calls would have been more effective if the operators had been trained to be more aggressive in eliciting requests for assistance from participants. Indeed, there is recent evidence that operator-initiated telephone calls
offering much more structured and proactive smoking-cessation counseling are effective at producing and maintaining abstinence (Zhu et al., 1996). Had we provided this sort of proactive counseling, perhaps the hot-line intervention would have been more effective. In addition, more frequent proactive calls to participants (e.g., monthly rather than every 3 months) might have been useful. Such a calling frequency would have been similar to the frequency that the booklets were mailed to other participants. More frequent and more structured proactive calls would have produced a hot-line intervention more closely matching the mailing intervention in the degree that participants could passively receive information and assistance without actively seeking it out. As it was, direct comparison of the hot-line and repeated-mailings interventions is complicated by the fact that the interventions differed not only in mode of communication but also in the degree of activity required of participants.

We found no outcome differences related to the number of hot-line calls made or total time spent on such calls. This is not surprising, given that the relationship between calling the hot line and outcome may be bidirectional. That is, we would expect the hot line to be most used by individuals who are struggling with maintaining their abstinence. However, if talking to the hot-line operator were beneficial for these individuals, their relapse risk would be reduced to that of noncallers; consequently, no outcome differences would be found between the two groups.

The control condition showed the expected relationship in which symptoms of depression were associated with poorer outcome. As hypothesized, the three active intervention conditions reversed or negated that relationship. This study adds to a growing list of studies in which some form of smoking intervention negates or reverses the association between depression and poor cessation outcome (Brandon et al., 1997; Brandon & DeMichele, 1995; Hall, Muñoz, & Reus, 1994; Zelman et al., 1992). The common characteristic across these interventions appears to be any type of increased contact that involves personal attention. Perhaps for individuals prone to depressed mood, receiving such personal attention is enough to enhance their motivation to quit smoking while simultaneously attenuating the negative affective states that motivate smoking. Although we have progressed in developing interventions that are beneficial to this subpopulation of smokers, more systematic research is needed to identify the mechanisms responsible for Depression × Treatment interactions.

The impact of the mailings interventions on those individuals who recently (within the past 3 months) quit smoking can be evaluated in several ways. The rightmost column of Table 4 shows that the effect of the mailings interventions, compared with the two nonmailings interventions, was highly significant statistically. The mean effect size (w) for the various chi-square outcome analyses was 0.24, which falls between J. Cohen’s (1988) definition of small (0.10) and medium (0.30) effect sizes. Another, increasingly popular, means to evaluate the intervention involves calculating cost-effectiveness ratios. Our post hoc estimate of the cost to keep 1 recent quitter abstinent for 1 year was $126. This cost-effectiveness ratio appears quite favorable as compared with other interventions for smoking. For example, on the basis of the AHCPR meta-analysis of smoking-cessation techniques, Cromwell, Bartosch, Fiore, Hasselblad, and Baker (1997) found that the cost per quitter (based on as few as 5 months of follow-up) ranged from $2,186 (for group intensive counseling without nicotine replacement) to $8,962 (for nicotine gum with minimal counseling). Thus, on the basis of our preliminary analysis, it appears that preventing relapse in a self-quitter is far less costly than producing sustained abstinence in a smoker. (Of course, there may have already been some costs associated with attaining abstinence in the self-quitter, including the costs of public health messages that may have motivated quitting, and the cost of any aids, such as nicotine replacement, that some recent quitters may have used.) Alternative modes of communication, such as the Internet, could further reduce costs of the intervention.
Some limitations to this study should be noted. First, the sample was self-selected. Participants responded to newspaper ads offering relapse-prevention help. Thus, all the participants apparently had at least a minimal understanding of their continued risk for smoking relapse, were concerned about it, and were motivated to seek more information. We, therefore, cannot generalize our findings to the larger population of former smokers. Thus, unsolicited mass mailings of the Stay Quit booklets to all recent quitters, or printing the content of the booklets in the newspaper, would probably produce a much smaller effect than we found in our sample. Indeed, unsolicited massed mailings of smoking-cessation materials do not appear to be effective (Gritz, Berman, Bastani, & Wu, 1992). Note, however, that there appeared to be much less self-selection in our sample than typically occurs when testing formal interventions aimed at smoking cessation. Our participants were primarily self-quitters who would not have enrolled in a formal smoking-cessation program.

Further self-selection occurred when participants returned the baseline and follow-up questionnaires. Selective attrition may have artificially lowered the absolute smoking rates at follow-up; however, that the attrition rates were similar across the four conditions, and that there were few differences on baseline variables between participants who completed the follow-up and those who did not, supports the validity of the differential follow-up outcomes.

Another limitation was that, because of geographic restrictions, we obtained biochemical verification of self-reported abstinence for less than 10% of the sample. One could conjecture that participants who received an active intervention would be subject to demand effects, leading to false reports of abstinence. However, we would then expect greater reports of abstinence in the hot-line-only condition, which involved personal telephone contact between participants and the program. However, self-reported abstinence rates were no higher in the hot-line-only condition than in the control condition, contradicting the experimenter demand concern. Moreover, in a review of minimal interventions for smoking, Curry (1993) found that in no study has biochemical validation altered the pattern of self-reported outcomes.

Finally, it is unknown what the demand among ex-smokers in the population is for the intervention we tested. Recruitment strategies were too complex to calculate a response rate to the advertisements. In the feasibility study (Brandon & DeMichele, 1995), we calculated a conservative estimated response rate of 2%, which compared well with that of other communitywide smoking-control programs. However, in both of these studies, we were forced to be quite vague in our advertisements about what exactly we were offering because of the multiple interventions to which callers could be assigned. (In fact, it was not unusual for a caller to express initial suspicion about the program and our motives.) It is likely that advertisements that specifically offer a free series of booklets sent over the course of a year, with no obligation by the participants, would yield an even higher response rate. Nevertheless, even if response rates did not rise, the low cost and very favorable cost-effectiveness ratios of this minimal intervention suggest that it has potential value as a form of tobacco control.

This study tested two minimal interventions that were developed on the basis of prior research and theory associated with clinic-based interventions. Successful clinical interventions for prevention of smoking relapse were adapted to formats that were acceptable and attractive to individuals who would not be willing to seek traditional face-to-face interventions. Minimal interventions developed in this manner offer a means by which empirically supported techniques can help individuals heretofore considered beyond the reach of clinical psychology. One of the two interventions tested—repeated mailings—was found to be effective at reducing smoking relapse. The most innovative aspect of this study was that the target population composed former smokers, most of whom had quit smoking without formal assistance. This contrasts with the typical smoking
intervention, which has the goal of producing smoking cessation in current smokers. The strategy of limiting the intervention goal to prevention of relapse among individuals who had already achieved abstinence proved to be much more cost-effective than typical cessation-focused treatments for smoking. Given that many behavioral disorders (e.g., other substance abuse disorders, anxiety disorders, and affective disorders) share the characteristic that only a minority of affected individuals ever seek formal treatment, the success of this approach suggests that similar strategies for maintaining other types of self-initiated behavior change should be developed and evaluated.

References


from 10 prospective studies of persons who attempt to quit smoking by themselves. *American Psychologist, 11*, 1355-1365.


We used Stay Quit as the name of our program as well because it succinctly conveys the purpose of the program.
We used only a single follow-up point, rather than the multiple points more typical of smoking-cessation studies, because we were trying to attract ex-smokers who would not normally choose to participate in smoking-cessation trials. We were concerned that multiple assessments would lead to excessive attrition and poor generalizability.

Copies of the booklets are available from Thomas H. Brandon.

We also conducted an exploratory analysis of the smoking status of the 65 participants who did not meet the abstinence criteria at baseline but who nevertheless returned the follow-up questionnaire. Although this small sample yielded little statistical power, only 48% of those who received the mailings were smoking at follow-up compared with 71% of those who were not sent the mailings, a finding that approached significance ($p = .07$). This suggests that the mailings may be helpful even to smokers who have not yet reached abstinence at the time they begin receiving them.

### Participant Characteristics at Baseline Assessment

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**Type of Advice or Information Requested by Callers (in Percentage of Calls) During Participant-Initiated Hot-Line Calls and Operator-Initiated Calls**
Type of Counseling Provided (in Percentage of Calls) in Participant-Initiated Hot-Line Calls and Operator-Initiated Calls

<table>
<thead>
<tr>
<th>Type of Counseling Provided</th>
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<td>Participant-Initiated</td>
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Comparison of Mailings (Mailings-Only and Combined) and Nonmailings (Hot-Line-Only and Control) Conditions at the 12-Month Follow-Up for All Participants Abstinent at Baseline and for Only Participants Who Had Been Abstinent for Less Than 3 Months

Percentage of participants smoking at the 12-month follow-up as a function of the mailings factor (mailings vs. nonmailings condition) and length of abstinence at baseline.

Percentage of participants smoking at the 12-month follow-up as a function of intervention condition and baseline Beck Depression Inventory (BDI) scores. BDI scores are divided into low (