

Prospective analysis of two modes of unaided smoking cessation

Edward Lichtenstein¹ and Sheldon Cohen²

Abstract

Smokers attempting to quit by themselves ($n = 218$) or with the aid of brief, written materials ($n = 195$) were assessed prior to quitting and 1 month and 12 months after their quit date. While the two samples used somewhat differing quitting strategies and showed some differences in short-term quitting, the 12-month outcomes were similar: point prevalence quit rates of 16 and 20%; continuous quitting rates of 0.5 and 5.5% respectively. Demographic and smoking history characteristics of the samples approximated those seen in cessation clinic samples. Participants reported using an average of over five quitting strategies with one sample reflecting use of the written materials they had requested. Reported use of, and satisfaction with, the written materials—at 1 month—was related to quit status at 12 months. However, neither use of specific quitting strategies, reasons for quitting, demographic and smoking history variables, or motivation and confidence were related to smoking status outcomes. Only baseline smoking and other indicators of dependence were prospectively predictive of smoking status.

Introduction

Most of the estimated 37 000 000 people who have stopped smoking since the Surgeon General's first

report on smoking and health have done so without the aid of formal cessation programs (American Cancer Society, 1986). Survey data indicate that one in three of current smokers made a quit attempt at least once per year (Harris, 1980) and there is also evidence that Americans express a preference for quitting without the aid of formal cessation programs (Schwartz and Dubitsky, 1967; Gallup Opinion Index, 1974). Until recently, however, most studies of smoking cessation—including both outcome and process work—utilized samples from formal cessation programs (Lichtenstein, 1982).

In recent years, growing recognition of the importance of unaided quitting (DHHS, 1982) and the relative limitations of clinic-based cessation programs in dealing with what is basically a public health problem (Epstein *et al.*, 1989) have given rise to a growing literature on unaided or minimally assisted quitting. As with studies of aided quitters, the earlier literature on unaided smoking cessation was characterized by small-scale studies, many with methodological weaknesses, e.g. small sample sizes and, especially, reliance on retrospective self reports (Guilford, 1972; Baer *et al.*, 1977; Perri *et al.*, 1977). More recent studies, however, have employed larger, more representative samples and prospective designs with significant follow-up.

These emerging studies suggest that self or unaided quitting is not a unitary concept, but rather one that requires definition. Studies have reported on the effects of materials received through the mail (Jeffrey *et al.*, 1982), community-wide quitting contests (Glasgow *et al.*, 1985), New Year's resolution quitter (Marlatt *et al.*, 1988; Gritz *et al.*, 1989), persons requesting self-help manuals (Davis *et al.*, 1984; Cummings *et al.*, 1988), and computer-

Oregon Research Institute, 1899 Willamette, Eugene, OR 97401, USA and ²Department of Psychology, Carnegie Mellon University, Pittsburgh, PA 15213, USA

¹To whom reprint requests should be sent

assisted self-quitting programs (Prue *et al.*, 1989). We construe unaided quitting to have two major defining characteristics: first, the smoker initiates the self-quitting attempt with minimal prompting from a health-care provider or health educator; and second, that the effort involves no face-to-face counseling or advice from a health professional. We examine two modal kinds of unaided quitting within this definition: quit attempts using publicized self-help manuals or brochures put forth by voluntary health agencies, e.g. the American Cancer Society and American Lung Association; and self-initiated quit attempts often occurring around the yearly tradition of the New Year's Resolution.

We examine two basic questions. First, what are the outcomes or quit rates of such unaided quitting efforts up through one year follow-up. There is some controversy as to whether self quitting is more or less successful than aided quitting (Schachter, 1982; Cohen *et al.*, 1989). Previous studies suggest there is much variability in the outcomes of unaided quit attempts especially when examining point-prevalence abstinence (Davis *et al.*, 1984; Marlatt *et al.*, 1988; Gritz *et al.*, 1989). For example, one year quit rates have been reported to range from 12–13% (Davis *et al.*, 1984; Marlatt *et al.*, 1988) to 25% (Gritz *et al.*, in press). Continuous 1 year abstinence rates appear to have more consistency across studies, being primarily 3–5% (Cohen *et al.*, 1989). It would be naive to expect to find a constant rate of success across studies but it is useful to gather more descriptive information about expected outcomes for different kinds of self-quitting attempts.

The second issue addressed concerns the processes involved in self quitting. We examined demographic and smoking history variables (e.g. baseline smoking rate, often related to cessation outcomes; Marlatt *et al.*, 1988), the quitting strategies employed, and smoking and psychosocial characteristics of successful and unsuccessful quitters. Data were also collected on subjects' reasons for quitting, presence of smoking-related symptoms or illness and motivation to quit. All subjects were assessed prior to their quit attempt permitting prospective analyses for most variables.

Methods

Subject recruitment

Booklet sample

Two different samples of self quitters were recruited. The 'booklet' sample was recruited with the active cooperation of a major voluntary health organization (American Lung Association of Western Pennsylvania). The organization's self-quitting program is advertised through public service announcements in a large metropolitan area. Interested smokers who write or call are first sent a self-monitoring form, asked to self monitor for 7 days, and then mail the form (on a postcard) back to the organization. They are then mailed a self-quitting booklet which features a tapering down procedure geared to their self-monitored baseline smoking rate and a second booklet which offered standard quitting tips and strategies conveyed primarily by means of testimonials from former participants.

We were given permission to telephone persons who requested the materials prior to their receiving them. For practical purposes, only those residing in the central urban area were contacted. Potential subjects were invited to participate in a federally funded research project on the process of quitting smoking by oneself. It was explained that contact with the research team would be primarily by telephone and consist of a lengthy pre-quit interview followed by shorter phone probes at 1, 2, 3 and 12 months. A moderately lengthy phone assessment occurred at 6 months. Subjects were also informed that they would be asked to provide a breath sample and saliva sample to confirm their smoking status at some point during the study. Subjects were paid \$35.00 for their participation and were mailed checks proportionately after each assessment. Subjects who completed all assessments were eligible to participate in a lottery that could win them a VCR.

During the recruitment phone call, the subjects' intentions about quitting in the near future were determined and only persons willing to set forth a specific or near-specific quit date were eligible. A subject was eligible if they had not yet started to quit,

were at least 18 years of age, and smoked at least 10 cigarettes a day.

Of the 519 names provided for us by the voluntary agency, we were able to make initial phone contact with 310 within our 2-week window. Of these, 244 met eligibility criteria, 49 declined to participate and 195 received a baseline assessment. Of the exclusions ($n = 66$) most had already started the quitting process.

New Year's resolution (NYR) quitters

The second sample of 218 self quitters comprised persons who spontaneously decided to quit smoking either at the start of the new year ($n = 144$) or during the year ($n = 74$). Both in December of two different years and in August and June of different years, mass media (public service announcements, news stories, paid advertisements) publicity was used to recruit persons planning to quit smoking on their own to participate in a research project. Eligibility criteria, compensation, scheduling of assessments, and assignment of interviewers were the same as noted above. Of the 430 persons responding to our advertising, 218 were eligible, agreed to participate and received a baseline assessment. Again, the major reasons for exclusion were having started the quitting process, or residing outside the central urban area.

Most subjects were assessed again at 1 month after their professed quit date, given a short probe at 2 and 3 months, a longer assessment at 6 months, and a final probe at 12 months. All data, except biochemical measures, were collected by telephone interview. The same interviewer called subjects on each occasion thereby promoting rapport. While a few relapsed subjects expressed irritation with the follow-up calls, cooperation was generally very good. At each panel, all subjects were told that at some point in the study, they would be asked to provide both a breath sample and a saliva sample to confirm their smoking status. In fact, only subjects reporting abstinence at 6 month follow-up were asked to provide a breath and saliva sample either by coming to the research site or being visited at home.

To assess the possible effects of multiple contacts

on smoking behavior, a minimal contact control group (booklet sample $n = 51$); (NYR sample $n = 34$) was established. Subjects randomly assigned to the minimal contact group were given a brief baseline telephone interview and then re-assessed at 12 months. Subjects ($n = 69$) receiving the full assessment who failed to at least reduce their baseline smoking by 50% during their quit attempt—as ascertained at 1 month—were not recontacted except at 12 months (to reduce costs and to avoid perceived badgering of these subjects). Because of this decision, we opted to report data only on the three panels—baseline, 1 month, 12 month—where all Ss (excepting the reactivity controls at 1 month) were assessed. Inspection of the data at 2-, 3- and 6-month panels revealed results consistent with those reported here.

Measures

Smoking

Point prevalence smoking status was determined by the question 'Have you smoked any cigarettes during the last week ... even a puff?' Subjects responding 'no' were considered abstinent at that assessment point. Continuous abstinence was assessed by determining those participants who were abstinent at all panels and who reported no more than 3 days of 'slipping' since their original quit date. Smoking rate, for those subjects not abstinent, was determined by the question 'On the average, how many cigarettes have you smoked in the last week?' Self reports were not corroborated at the 1 or 12-month panels. At the 6-month assessment point, however, subjects reporting abstinence were requested to provide biochemical samples (expired air analyzed for carbon monoxide and saliva assayed for cotinine). Biochemical samples were obtained from 25 of the 28 subjects reporting abstinence at 6 months. For those reporting abstinence, no subjects had a CO level of ≥ 10 p.p.m. and only one had a cotinine level >9 ng/ml. This subject was classified as a smoker as were the Ss who declined to provide saliva samples.

Smoking history, demographics, psychosocial predictors

Information on motivation to quit (100-pt scale), perceived self-efficacy for quitting (10-pt scale), the Horn-Waingrow reasons for smoking scale (Ikard and Tomkins, 1973), demographics and smoking history, and data on smoking-related symptoms were all collected at baseline. In addition, measures of perceived stress, stressful life events, social support and coping strategies were also obtained but will be reported in a separate publication.

At the 1-month follow-up assessment, all subjects were questioned about the quitting strategies they had employed. For the booklet sample, additional questions were structured around the self-quitting materials that the participants had received and can be construed as indicators of use of that self-help program.

Results

Table I presents a summary of the demographic and smoking characteristics of the two samples. The two

samples were similar on 10 of the 12 measures. The voluntary sample had a significantly lower proportion of college graduates and reported significantly less success (fewer non-smoking days) in controlling their smoking the previous year. The voluntary group also had a non-significant ($P < 0.10$) tendency to smoke more quickly upon arising, an indicator of tobacco dependence (Fagerstrom, 1978). Differences between the New Year's resolution subsamples (those recruited at New Year and those recruited in the spring) were explored. While a few significant demographic and smoking history differences emerged, there was no consistent pattern; nor were there differences in quit rates. Therefore, the two subsamples were merged for all analyses.

Table II presents the percent of subjects who reported quitting for at least 24 h during the first month (retrospectively) and who were point-prevalent abstinent at 1-month and 12-month assessment points. The reactivity control Ss are not included at 12 months. Twelve-month point prevalence quit rates for the reactivity controls (19.1 and 18.5%) were very similar to the main sample

Table I. Demographic, smoking history and social smoking characteristics by group.

	Booklet (<i>n</i> = 187-195)	New year's resolution (<i>n</i> = 209-218)	Total (<i>n</i> = 396-413)
% Female	68.2	67.4	67.8
Mean age	41.8	40.3	41.0
% Currently married	59.0	50.2	54.4
% College grads	21.0 ^a	34.0	27.8
% Employed	61.9	66.2	64.1
No. of cigs/day	27.8	27.6	27.7
No. of minutes to first cig	22.6	30.1	26.6
No. of quit attempts	2.9	3.2	3.1
Longest no. of days without smoking in last year	5.5 ^b	22.1	14.1
No. in household currently smoking	0.53	0.48	0.51
No. in household trying to quit	0.12	0.14	0.13
% in good or excellent health	77.1 (<i>n</i> = 144)	76.5 (<i>n</i> = 183)	76.8 (<i>n</i> = 327)

Note: includes all participants assessed at baseline. The range in *n* reflects missing values on some items. Health status was not asked of reactivity controls yielding a smaller *n* for that item.

^aSignificant at 0.01 level

^bSignificant at 0.001 level

indicating no influence of the multiple interviews. The NYR sample had a significantly higher point prevalence 24-h quit rate ($\chi^2 = 35.1$, $P < .001$) than the booklet sample. The difference was only marginally significant at 1 month ($\chi^2 = 3.2$, $P < 0.10$) and the two groups were similar in 1-year point prevalence rates ($\chi^2 = 0.81$, NS). Point prevalence quit rates increased from 1 month to 12 months. The NYR sample had a higher continuous abstinence rate since this calculation also reflects point-prevalence differences ($\chi^2 = 5.5$, $P < 0.05$). Continuous quit rates are much lower especially in the booklet sample but are conservative considering the definition employed: abstinent at all panels (including those not reported here); missing one panel permitted—if abstinent at all other panels—except coded as smoking if missing at 12-month panel.

The booklet program places some emphasis on smoking reduction as a legitimate program goal. Subjects were asked whether their primary goal was to totally quit, reduce by more than half, or just achieve some reduction. While the great majority of subjects elected total abstinence (86%), the booklet program subjects were less likely to do so (81.3 versus 89.6%), ($\chi^2 = 7.6$, $P < 0.05$) and this may have slightly lowered their quit rates. Percent of baseline smoking rates were examined for non-

abstinent subjects in both samples. At 1 month, smokers in the booklet sample reported greater reductions in rate than did the NYR sample (41.5% of baseline versus 55.2%, $F = 11.9$, $P < 0.001$). This difference is likely a function of the tapering feature of the booklet program. At 12 months, nonabstainers in the NYR sample reported non-significantly less smoking than the booklet sample (62 versus 66.7%).

Stability of quitting, not quitting, slipping

As shown in Table II, there were very few continuous quitters over the 12-month follow-up period. Of the 172 participants who reported (retrospectively) quitting for 24 h, 24 (13.95%) remained quit through 1 month. Of those who did not quit for 24 h during the first month ($n = 150$) only 16 (10.7%) were abstinent at 12 months. Although 95% of both samples reported making a serious quit attempt during the first month, 58 (17.6%) participants (both samples combined) never were quit at any panel (including those not reported here) during the year.

Subjects who met the point-prevalence criterion (1 week) for abstinence at any panel were asked about slips; limited episodes of smoking occurring since the last panel. Of the 33 subjects who reported a slip at any panel, 16 (48.5%) were smokers at 12-month follow-up (not counting three who were not assessed). Thus about one-half of the slippers seemed able to remain abstinent.

Table II. Point-prevalence and continuous quit rates by group

	Booklet	New Year's resolution
24-h quit	34.8% (141)	68.0% ^c (181)
1 month	7.1% (140)	13.4% ^a (179)
12 months	16.2% (130)	20.2% (163)
Continuous quit	0.7% (140)	5.5% ^b (181)

Note: the *ns* reflect subjects lost to follow-up at a particular panel; percentages are based on subjects who were assessed. Reactivity controls are not included.

^a $P < 0.10$; ^b $P < 0.05$; ^c $P \leq 0.001$

Descriptive and predictive analyses

Given the relative similarity of the two samples in demographic and smoking history characteristics, and the similar outcomes in and predictors of smoking cessation and reduction, the two samples were combined for several descriptive and predictive analyses. This both facilitates presentation of data, and provides a larger number of quitters at the various assessments.

Motivation and reasons for quitting

Descriptively, the data indicate that participants were highly motivated to quit. The importance of quitting received a mean rating of 87.1 (100-pt scale); the

average subject had tried to quit three times (only 47 subjects reported not trying to quit before), 51% had tried to quit in the past year, and about one in six had previously tried an organized program. Thirty-four percent of the participants reported at least one smoking-related symptom or illness and 52% had been told to quit by a physician.

Participants were also asked about their reasons for wanting to quit; they rated a number of reasons on a five-point scale. This information can be useful in guiding educational programs to motivate smokers to quit. Table III presents these ratings by sex (there were no significant age differences although older Ss tended to give more weight to pleasing a loved one and having friends who did not smoke). Reasons pertaining to exerting control over one's health and life were rated highest similar to the findings of Griz *et al.* (1989). Women were significantly more motivated by aesthetic (smell, stains) issues and a desire to establish more control of their lives. Women also tended to be more concerned about reducing their risk and setting an example for their children. The reasons for quitting were unrelated to smoking status at any of the three panels.

Predictors of outcome

With the exception of younger smokers being more likely to quit for 24 h, neither age nor sex were related to quitting at any assessment. None of the three quitting history measures (number of prior quit attempts, tried to quit last year, tried a quit program) nor the two measures of household smoking (smokers in household, household smokers trying to quit) were associated with successful abstinence at any panel. Subjects told to quit by a physician were less likely to quit for 24 h ($\chi^2 = 6.3$, $P < 0.05$) and at 1 month ($\chi^2 = 4.35$, $P < 0.05$) but the report of a smoking-related illness was unrelated to outcome. The rated importance of quitting (i.e. motivation), was not related to quitting at any panel but confidence (self-efficacy) in being able to quit was related to 24-h quitting only ($F = 7.7$, $P < 0.01$).

Only indicators of cigarette dependency displayed consistent relationships with abstinence at the three panels. The number of cigarettes smoked per day at baseline was significantly related to quitting at all

Table III. Mean ratings (five-pt scale) of reasons for quitting by sex

Reasons	Women (n = 222)	Men (n = 104)
Save money	2.18 (1.4)	1.91 (1.4)
Set example for children	2.92 (1.4) ^a	2.61 (1.5)
Reduce risk of future illness	3.68 (0.8) ^a	3.49 (0.9)
Take more control of life	3.35 (1.0) ^b	3.06 (1.2)
Please or help loved one	2.61 (1.45)	2.57 (1.4)
Feel better physically	3.48 (1.0)	3.62 (0.6)
Most friends don't smoke	1.33 (1.4)	1.33 (1.3)
Smell, taste or teeth stains	2.24 (1.45) ^c	1.70 (1.4)

Note: standard deviation in parentheses
^a $P < 0.10$; ^b $P < 0.05$; ^c $P < 0.01$

three panels; subjects point-prevalent abstinent at 1 year smoked a mean of five cigarettes a day less at baseline than nonquitters ($F = 10.6$, $P < 0.001$). The number of minutes to the first cigarette of the day was significantly related to abstinence at 24 h ($F = 5.7$, $P < 0.02$), 1 month ($F = 7.2$, $P < 0.01$) and marginally related at 12 months ($F = 3.5$, $P < 0.07$). The nicotine content of the cigarette smoked was related to abstinence at 1 month, most days without a cigarette in the past year related to 24 h quitting, and withdrawal symptoms reported at 1 month were related to quitting status at 1 month ($F = 12.9$, $P < 0.001$). Finally, the craving and habit scales of the Horn-Waingrow reasons for smoking scale were related to quitting: craving for 24 h ($F = 4.1$, $P < 0.05$) and 1 month ($F = 34$, $P < 0.10$); and habit at all three panels (all at $P < 0.02$ or better at 12 months; $F = 6.9$, $P < 0.01$). In all instances, greater dependence on cigarettes was associated with a lesser likelihood of quitting.

Quitting strategies and compliance

At the 1-month assessment, participants were asked whether they had (or had not) used 18 typical quitting

Table IV. Frequency (%) of quitting strategies used by each sample

Strategy	NYR (n = 152)	Booklet (n = 99-102)
Cut down	64.5	96.1 ^c
Cold turkey	76.3	28.4 ^c
Lower nicotine cigs	13.2	21.6
Plastic filter	2.0	8.8 ^b
Nicotine gum	13.2	17.6
Substitute gum, candy, etc	55.9	60.8
Substitute pipe, cigar, chew	2.6	4.9
Deep breathing relaxation	22.4	45.1 ^c
Exercise, physical activity	42.1	48.0
Thought about benefits	94.1	94.1
Rewards	24.3	28.4
Avoided/changed situations	44.1	68.6 ^c
Told others about quitting	84.9	82.4
Made a bet	9.9	9.8
Quit with spouse or friend	18.4	21.6
Threw away smoking items	38.3	24.5 ^b
Prayer or meditation ^a	25.0	25.0
Avoided other smokers ^a	23.7	21.9
Other	30.9	36.4

Note: The *ns* exclude reactivity controls and *Ss* who did not quit for 24 h or reduce smoking by $\geq 50\%$ of baseline

^aItem given to only 59 NYR and 32 booklet subjects; excludes reactivity controls

^b $P < 0.05$.

^c $P < 0.001$

strategies, plus one open-ended item. The data for each sample are presented in Table IV. The data for the NYR sample reflect quitting strategies held by smokers receiving no special advice or help while the booklet sample data may reflect both generally held ideas plus strategies presented in the materials. Consistent with this reasoning, the booklet sample tended to use more strategies (5.85 versus 5.16, $F = 6.6$, $P < 0.02$) suggesting a small influence of the written materials.

Two of the quitting strategy times, 'cutting down' and 'cold turkey', were strongly related to the booklet sample's recommended program. Thus over 95% of the booklet sample 'cut down on number of cigarettes', as recommended by their materials, and this

variable could not discriminate successes and failures. For the NYR sample, only 64.5% cut down and this strategy was strongly associated with failure to quit for 24 h (93.5 versus 57%; $\chi^2 = 14.4$; $P < 0.001$). Although a minority of the booklet sample tried to quit 'cold turkey' (28.4%), successful 24-h quitters were much more likely to do so (45.8 versus 13.0%; $\chi^2 = 15.5$; $P < 0.001$). For the NYR sample, the cold turkey strategy was even more strongly associated with 24-h quitting (29.0 versus 88.4%, $\chi^2 = 48.2$; $P < 0.0001$). Cutting down was also strongly associated with not being quit at 1 month (41 versus 82.8%; $\chi^2 = 29.1$; $P < 0.0001$), but not at 12 months. Cold turkey was strongly related to 1 month quitting (82.4 versus 53.2%; $\chi^2 = 10.2$; $P < 0.01$) but also not at 1 year.

With respect to specific strategies, the booklet sample was significantly more likely to use deep breathing or relaxation techniques, and to avoid or change smoking situations. Two other items approached significance: using a plastic filter or water pik and throwing away smoking items. Overall, thinking about the benefits of quitting, telling others about quitting, using substitutes, and avoiding or changing smoking situations are the most frequently used strategies. Very few subjects switched to another tobacco product or made a bet.

Since the pattern of more and less frequently used strategies was similar, the two samples were combined to increase sample size and quitters and non-quitters were compared on each strategy (besides cutting down and cold turkey noted above). Twenty-four-hour quitters were less likely to use deep breathing or relaxation ($\chi^2 = 5.5$, $P < 0.05$) or prayer or meditation ($\chi^2 = 4.1$, $P < 0.05$) and much more likely to throw away smoking-related items ($\chi^2 = 15.9$, $P < 0.0001$). This latter item also differentiated quitters at 1 month ($\chi^2 = 5.0$, $P < 0.05$) but not at 12-month follow-up. The only other item related to quit status at 1 or 12 months was the report of using some other strategy not on the list: at 1 month, 54.5 versus 29.8% ($\chi^2 = 7.9$, $P < 0.01$); at 12 months, 50 versus 29.3% ($\chi^2 = 7.0$, $P < 0.01$).

At the 1-month assessment, the booklet sample was

asked six questions pertaining to their use of and satisfaction with the materials they received in the mail. Ratings of the helpfulness of the materials ($F = 3.96, P < 0.05$), more reported readings of the materials ($F = 5.35, P < 0.05$) and following the gradual reduction plan ($F = 5.07, P < 0.05$) were related to 12-month quit status as was a total score based on all six items ($F = 5.96, P < 0.05$).

Discussion

Prospective data from two different approaches to quitting smoking without formal assistance yield a reasonably consistent picture. Point-prevalence quit rates were modest at 1 month (7–13%) but increased to a respectable 16–20% at 1 year. Minimal contact subjects showed very similar quit rates indicating no effects of repeated interviews. The point-prevalence (1 month; 12 month) quit rates in Table II would be slightly lower if subjects lost to follow-up were counted as smokers, and are likely a bit inflated by false reporting. (Attrition was largely a function of inability to reach subjects within the given time window. Only two subjects refused to give data when contacted; three subjects died during the study. If living subjects not assessed are all, conservatively, assessed to be smokers, the quit rates become as follows: booklet, 34.0, 6.9 and 14.9%; NYR, 66.8, 13.0 and 17.9%.) The biochemical data obtained at the 6-month panel—counting refusals as smokers—suggests they might be reduced by 14%. The increase in point-prevalence quit rates over time has been occasionally observed in other studies of unaided quitting (e.g. Davis *et al.*, 1984) and contrasts with the usual pattern of falling quit rates over time observed in clinic studies (Glasgow and Lichtenstein, 1987). It does not appear to be an artifact of attrition since the trend maintains when missing 5s are counted as smokers (see insert above). Subjects were probably making additional, and sometimes successful, quit attempts.

These point-prevalence rates are lower or certainly not higher than 1-year quit rates produced by formal cessation programs (Schwartz, 1987) and tend to refute Schachter's (1982) suggestion that self quitting is superior to aided quitting. The more stringent

criterion of continuous quitting revealed a more conservative outcome; only 5.5% or fewer subjects reached this criterion. As we reported elsewhere (Cohen *et al.*, 1989), these findings are consistent with continuous quit rates from other studies.

The booklet program strongly emphasizes tapering down over 21 days and this accounts for the large between-groups difference in 24-h quitting and most likely the marginal difference at 1 month. The point-prevalence quit rates at 12 months are similar in both groups. Continuous quits again favor the NYR sample, although this likely reflects the lower 1 month quit rates for the booklet sample. Subjects still smoking at 1 month could not, by definition, be continuously abstinent. The fact that significantly fewer booklet subjects opted for total abstinence as a goal—prior to quitting—may also have contributed to the slightly lower quit rates in that group. Given that different treatment programs typically produce similar long-term outcomes (Schwartz, 1987; Glasgow and Lichtenstein, 1987), it is not surprising that minimal assistance or self-quitting programs do likewise (e.g. Cummings *et al.*, 1988).

Two different samples, one using self-help written materials offered by a voluntary health organization and the other simply trying to quit on their own, were studied. The demographic and smoking history characteristics of the samples were quite similar (Table I), perhaps not surprising given that they were recruited from the same metropolitan area. More notably, these self quitters seemed quite similar to smokers who attend cessation clinics (e.g. Lichtenstein *et al.*, 1986; Lando and McGovern, 1985). Certainly, in terms of age ($\bar{x} = 41$) and amount smoked (28/day) these self quitters were reasonably dependent smokers quite like those attending clinics. We acknowledge, however, that our participants were self selected and are not necessarily representative of self quitters in the population.

While direct comparisons are difficult to make, our samples of self quitters seemed as motivated and willing to utilize strategies as do clinic participants. Ratings of the importance of quitting, reasons for quitting (Table III) and reports of recent and prior quit attempts reflected considerable motivation. The (admittedly retrospective) reports of use of quitting

strategies also suggested substantial behavioral commitment: an average of over five quitting strategies employed and about one-third of subjects reporting they used some strategy not on our list. Few cessation experts would quarrel with the number and nature of the strategies employed reported in Table IV.

The level of reported compliance of the booklet sample with program recommendations was reasonably high and compliance and satisfaction with the materials at 1 month were predictive of point prevalence quitting at 12 months. This, however, is not a purely prospective relationship since the 12-month quitting rates of the subjects were in good part determined by their smoking status at 1 month which was when compliance and satisfaction were assessed. Overall, the effort or compliance of these unaided quitters seems comparable to adherence data reported on clinic subjects (e.g. Kamarck and Lichtenstein, 1988). Against this general picture of motivation and commitment, it should be noted that 58 participants never quit at any panel during the year and an additional 69 failed to reduce by $\geq 50\%$ of baseline during the first month.

The number of participants reporting slips—limited episodes of smoking since the last panel—was not large. A slip in this study was not as predictive of relapse as in other studies (Baer *et al.*, 1989; Brandon *et al.*, 1986), even though participants were given little specific instruction in managing slips. Given the small number of slips in this study, this finding should be interpreted cautiously.

Although reasons for quitting were not related to outcome, some interesting sex differences emerged. Women more strongly endorsed reasons pertaining to appearance or sensory consequence of smoking, and a wish to take more control of their lives. Reducing risk of illness and setting an example for children were also rated higher by women but not significantly so. These data suggest some bases for differentially aiming health promotion messages toward women.

Few predictors of successful or unsuccessful quitting outcomes emerged from this study. The relatively few numbers of quitters at any panel probably worked against finding significant pre-

dictors. Only baseline smoking rate and scales from the Horn—Waingrow reasons for smoking scale were correlated with 1-year smoking status. These variables may be construed as indicators of dependency and are consistent with other findings that heavier, more dependent smokers have more difficulty quitting than lighter smokers (e.g. Gritz *et al.*, 1989). Helping heavy smokers to quit remains a problem for workers in smoking cessation.

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