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Evaluation of Intrinsic and Extrinsic Motivation Interventions With a Self-Help Smoking Cessation Program

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Personalized feedback and a financial incentive, developed from an intrinsic/extrinsic motivation framework, were evaluated as adjuncts to self-help materials for smoking cessation. Ss ($N = 1,217$) were randomized to 4 treatment groups and were followed up at 3 and 12 months. Consistent with hypotheses derived from the motivation framework, the financial incentive increased the use of self-help materials, did not increase cessation rates among program users, and was associated with higher relapse rates among those who did manage to quit. The personalized feedback increased both smoking cessation and use of the materials 3 months after distribution of the materials. Continuous abstinence (abstinence at 3 and 12 months) in the group that received the personalized feedback alone was twice the rate of the other groups.

Self-help interventions for smoking cessation are promising and cost-effective and may be easily disseminated as part of large-scale health promotion efforts. Several studies have demonstrated that cessation rates for smokers who actually use self-help materials are comparable to those for smokers who participate in more intensive group treatment programs (Davis, Faust, & Ordentlish, 1984; Glasgow, 1978; Glasgow, Schafer, & O'Neill, 1981). Unfortunately, the participation (or usage) rates for self-help programs are considerably lower than for group programs (Curry, Marlatt, Gordon, & Baer, 1988; Schneider, Benya, & Saeger, 1984). Available data indicate that participation rates among smokers who request self-help programs range from 21% to 59%, compared with 80–90% for smokers who sign up for group programs. Given comparable outcomes for program users, the development of effective methods for increasing the proportion of individuals who use self-help programs could lead to significant increases in the proportion who ultimately achieve long-term cessation (Cummings, Emont, Jaen, & Sciandra, 1988).

We evaluated the effectiveness of interventions aimed at increasing the use of self-help smoking cessation materials developed within an intrinsic/extrinsic motivation framework (Curry, Wagner, & Grothaus, 1990; Harackiewicz, Sansone, Blair, Epstein, & Manderlink, 1987). Intrinsic and extrinsic motivation refer to the origins of the desire to engage in a particular behavior. Intrinsic motivation reflects a desire to achieve an internal reward (e.g., a sense of self-competence), whereas extrinsic motivation reflects a desire to receive an external reward (e.g., money). To enhance intrinsic motivation, smokers received written personalized feedback designed to bolster confidence in their ability to successfully use the materials. Extrinsic motivation was approached through a financial (prize-drawing) incentive for using the materials.

Related interventions have been evaluated in smoking cessation. Financial incentives have increased participation in programs and smoking cessation in both worksite and community interventions (e.g., King, Flora, Fortmann, & Taylor, 1987; Klesges, Vasey, & Glasgow, 1986). Attempts to tailor the content of smoking cessation programs to individual characteristics have not shown dramatic improvements in smoking cessation (Best, 1975; Owen, Ewins, & Lee, in press). Although these interventions fit into an intrinsic–extrinsic conceptual framework, they were not specifically designed from this perspective, and none of the studies cited compared the two types of interventions within a single design.

Research on behaviors other than smoking cessation has shown that although extrinsic motivators such as strong incentives offer immediate gains, they are often detrimental to long-term outcome by undermining intrinsic motivation (Deci & Ryan, 1985). Similarly, recent work on the relationship of intrinsic and extrinsic motivation to smoking cessation has shown that higher levels of extrinsic relative to intrinsic motivation are associated with lower probabilities of achieving abstinence (Curry et al., 1990). On the basis of these findings, we hypothesized that the groups receiving the extrinsic strategy alone would show the highest program use, whereas smoking cessation would be highest among subjects receiving the intrinsic strategy alone. It was not clear from a theoretical perspective

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what the effects of a combined strategy might be. Using a factorial design, we assessed the individual and combined impact of such motivation enhancement strategies at several points in the cessation process, including program use, initial cessation, and long-term abstinence. The target population was individuals who requested self-help materials for smoking cessation.

Method

Setting

The study was conducted at Group Health Cooperative of Puget Sound (GHC), a not-for-profit, consumer-governed health maintenance organization serving over 350,000 enrollees in western Washington State. GHC publishes a health-oriented magazine, *View,* which is mailed without charge to all its contract holders on a bimonthly basis. Readership surveys before subject recruitment indicated that over 70% of adult enrollees read at least parts of the magazine.

Subjects

Recruitment. Subjects were recruited over a 4-month period in 1987 using two consecutive full-page advertisements in *View* magazine. Recruitment involved a two-step process in which smokers who mailed in a coupon from the advertisement were mailed a description of the study, a consent statement, and a baseline questionnaire. Of 1,555 persons who initially returned a coupon, 1,217 (78%) returned a signed consent statement and the completed questionnaire and were enrolled in the study. The majority of subjects were women (65%); the average age was 44.1 years (SD = 14.02); 59% were married or living with a partner; 90% were high school graduates; and 68% were employed for wages. Subjects smoked an average of 24.7 cigarettes per day (SD 10.9), had been smoking an average of 25.4 years (SD = 13.0), and averaged 2.9 prior attempts to quit (SD = 3.3). A total of 33% of the subjects indicated they had received prior treatment for smoking cessation.

Randomization. Subjects were stratified on the basis of gender and number of cigarettes smoked per day (dichotomized at ≥30 cigarettes per day) and were randomized to receive either the intrinsic motivation strategy (intrinsic, n = 304), the extrinsic motivation strategy (extrinsic, n = 304), both strategies (both, n = 304), or neither strategy (control, n = 305). There were no significant differences in baseline characteristics across the four study groups (see Table 1).

Self-Help Intervention

All smokers who enrolled in the study received *Breaking Away,* a self-help program for smoking cessation (Curry, Gordon, & Marlatt, 1987). The program consists of eight units that can be completed on a week-by-week basis. Postage-paid progress reports for each unit were included for participants to return to the study office as they completed the program.

Motivation Strategies

The key components of the intrinsic and extrinsic motivation strategies are summarized in Table 2. The intrinsic motivation strategy was written personalized feedback based on previous research on enhancing self-efficacy (Bandura & Schunk, 1981; Bandura & Cervone, 1983) and on work showing that intrinsic motivation to stop smoking focused on two dimensions—health concerns and self control (Curry et al., 1990). Enhancing self-confidence and motivation for quitting was approached by highlighting (a) similarities between smokers' previous experience and their reasons for quitting and (b) the experience and motivations of successful quitters. Subjects could receive a total of three sets of feedback materials. All subjects received the first set, which consisted of (a) a personal analysis of items from their baseline questionnaire regarding their smoking and quitting history (number of earlier quit attempts, longest previous abstinence, and previous participation in cessation programs) and their health concerns and desire for self-control as intrinsic motivation dimensions and (b) a copy of the Reasons For Quitting section of the baseline questionnaire with their most highly rated intrinsic motivations for quitting highlighted in yellow. The second set of personalized feedback materials was sent to subjects who returned the progress reports for Units 1 and 2. This feedback reinforced subjects for the activities they completed, and it discussed possible benefits from activities that subjects did not find useful or did not complete. Subjects returning reports for Units 3 and 4 received a third set of feedback materials that was similar to the second set. Subjects were eligible to receive feedback for 12 weeks after their self-help materials were sent.

The extrinsic motivation intervention was a prize incentive that was contingent on use of the materials (defined as returning unit progress reports); the incentive was not linked directly to smoking cessation. Subjects received a "secret gift" (a ceramic coffee mug) and an entry into a prize drawing if they returned the progress reports for the first

Table 1
Subject Characteristics

Characteristic	Total (N = 1,217)	Intrinsic (n = 304)	Extrinsic (n = 304)	Both (n = 304)	Control (n = 305)
Gender (% female)	65	64	64	65	65
Age	44.1	43.3	44.2	44.3	44.7
Education (% ≥ 12 years)	90	90	90	92	89
Income (% > 10K/year)	93	93	90	95	93
% married	59	58	54	64	58
% employed	68	70	69	67	67
% White	94	95	93	92	94
Baseline smoking (cigarettes/day)	24.7	25.0	24.2	25.1	24.5
Years smoked	25.4	25.1	25.0	25.6	25.8
% previous quit ≥ 1 month	52	56	54	51	49
% smoke within 15 min of awakening	56	56	56	56	56
Previous attempts	2.9	2.9	3.1	2.6	3.1
Desire to quit (1–10)	7.3	7.2	7.4	7.3	7.3

Table 2
Components of Intrinsic and Extrinsic Motivation Strategies

Timing	Intrinsic: Personalized feedback	Extrinsic: Financial incentive
After randomization, when self-help program was mailed	Personal analysis of baseline data and highlighted copy of Reasons for Quitting questionnaire	Description of prize drawing and "secret gift"
After subject mailed in Units 1 and 2 progress reports	Personal analysis of progress reports	Gift and drawing entry
Four weeks after the self-help materials were sent, if no progress reports were received	Reminder postcard to send in progress reports	Reminder postcard to send in progress reports
After subject mailed in Units 3 and 4 progress reports	Personal analysis of progress reports and new set of record-keeping forms to "recycle" through the first four units if still smoking	Bonus entry to drawing and new set of record-keeping forms to "recycle" through the first four units if still smoking

two program units. The drawing's main prize was an all-expense-paid one-week trip for two to Hawaii; second prize was an expense-paid weekend at a resort in the San Juan Islands, and third prize was a weekend at a deluxe hotel in downtown Seattle. A bonus entry to the drawing was sent to subjects who returned the progress reports for Units 3 and 4. Subjects were eligible to enter the prize drawing for 12 weeks after their self-help materials were sent. The prize drawing was conducted 12 weeks after the last subject was randomized.

Assessment

Baseline. The baseline questionnaire assessed demographics (age, sex, education, marital status, employment status, income); smoking history (age at smoking onset, number of years smoking, baseline smoking rate, number of prior quit attempts, number of prior treatment programs, longest prior period of abstinence from cigarettes and physical dependence); and several variables for inclusion in separate analyses of the smoking cessation process: social support, perceived stress, health and lifestyle, and motivation.

Follow-up. Use of the self-help materials and smoking status were assessed by mailed questionnaire (with telephone follow-up of subjects who did not respond by mail within 2 weeks) 3 and 12 months following randomization. We obtained follow-up data from over 98% of participants at the 3-month follow-up and from 95% of the participants at the 12-month follow-up. Subjects were asked to rate their use of each of the 8 program units on a 5-point scale: *did not read* (0); *read unit, did not do any of the activities* (1); *read unit, did less than half of the activities* (2); *read unit, did most but not all of the activities* (3); and *read unit and did all of the activities* (4). We also kept track of whether subjects returned any of the unit progress reports from the *Breaking Away* booklet.

Saliva cotinine. The 12-month mail and telephone follow-ups began by asking all subjects, "If we should need to arrange for a saliva specimen to assess your physical nicotine level, what are the best days and times to call you?" We attempted to obtain saliva samples from all subjects who reported abstinence and who lived within a 25-mile radius (defined on the basis of zip code) of the Center for Health Studies, within one week of self-reported abstinence. All samples were placed in iced coolers at collection and transferred to a laboratory freezer within 4 hr. The frozen samples were shipped, on dry ice, to the American Health Foundation for analysis.

Statistical Analysis

For all outcomes, the first analytic step was an overall chi-square test for differences in proportions among the four treatment groups. If the p value for the overall test was $\leq .05$, then pairwise comparisons of each intervention group with the control group were conducted in a logistic regression analysis. An additional logistic model was constructed comparing the three intervention groups with the control group, controlling for age, sex, and baseline smoking rate (number of cigarettes smoked per day). Because the intervention effects estimated with the adjusted analyses replicated the estimates from the unadjusted models, the results are reported for the unadjusted analyses.

Results

Use of Self-Help Materials

The impact of the motivation strategies on use of the self-help materials was examined with both behavioral and self-report measures. The behavioral measure was defined as returning the progress report for Unit 1. A dichotomous self-report measure indicated whether participants reported doing one or more activities in at least two of the last six program units. This measure was intended to reflect a significant commitment to the program. The first two units were excluded from the measure in order to assess the impact of the interventions on program use independent of the requirements for entering the prize drawing.

The groups receiving the extrinsic intervention had significantly higher rates of returning the first unit's progress report (see Table 3). Compared with the control group, subjects receiving the extrinsic motivation strategy were about twice as likely to return the first unit's progress report. Self-reported completion of program activities in the last six of the eight program

Table 3
Proportions, Odds-Ratios (OR), and Confidence Intervals (CI) for Outcome Measures

Outcome	Treatment group				p^a
	Intrinsic (n = 304)	Extrinsic (n = 304)	Both (n = 304)	Control (n = 305)	
Returned Unit 1 progress report					
%	17	32	29	16	.0001
OR	1.1	2.5	2.1	1.0	
CI	(0.7, 1.6)	(1.7, 3.7)	(1.4, 3.2)		
Reported completing at least one activity in more than one of the last six units					
%	31	34	31	24	.039
OR	1.4	1.7	1.4	1.0	
CI	(1.1, 2.1)	(1.2, 2.4)	(1.1, 2.1)		
Reported 24-hr cessation at 3-month follow-up					
%	51	53	49	43	.11
Seven-day abstinence at 3 months					
%	13	8	9	8	.06
OR	1.8	1.1	1.0	1.0	
CI	(1.1, 3.1)	(0.8, 2.4)	(0.9, 1.3)		
Seven-day abstinence at 12 months					
%	17	13	12	15	.32
Seven-day abstinence at 3 and 12 months					
%	10	4	4	5	.004
OR	2.0	0.7	0.7	1.0	
CI	(1.1, 3.7)	(0.4, 1.6)	(0.4, 1.6)		

Note. Odds ratios and 95% confidence intervals from a logistic regression analysis for pairwise comparisons with the control group are presented when the p value for the overall chi-square test was $\leq .05$ (also given for 7-day abstinence at 3 months, $p < .06$).
[a] p value for χ^2 (3, N = 1,217) test of whether the proportions for the four groups were equal.

units was higher for all three intervention groups compared with the control group. Subjects receiving either or both the personalized feedback and the financial incentive were about 1.5 times as likely to report completing at least one activity in more than one of the last six program units than were subjects who did not receive a motivation intervention. These results were replicated in additional analyses with a continuous measure calculated as the sum of the ratings for use of the last six program units.

Smoking Cessation

The proportions of subjects in the four groups reporting smoking abstention for at least 24 hr during the 3-month period after they received the self-help program are also reported in Table 3. There were no significant differences among the four groups. At 3 months, there was a marginally significant ($p < .06$) difference in 7-day abstinence among the four groups. Pairwise comparisons with the control group confirmed our prediction that the intrinsic group would have a significantly higher rate of cessation. Subjects receiving only the personalized feedback were 1.8 times as likely to achieve abstinence than were control group members. In contrast, neither group receiving the financial incentive did any better than the control subjects.

At the 12-month follow-up, there were no significant differences in 7-day abstinence among the four groups. However, there was a highly significant difference in continuous abstinence, defined as 7-day abstinence at both the 3- and 12-month follow-ups. Pairwise comparisons indicated that subjects receiving the personalized feedback alone were twice as likely to report continuous abstinence compared with the control group and nearly three times as likely (odds-ratio = 2.67, 95% confidence interval = 1.34, 5.31) to report continuous abstinence as were the groups receiving the financial incentive.

Saliva Cotinine

Table 4 summarizes the results of the saliva collection and cotinine analyses from the 12-month follow-up. Nonconfirmation of abstinence was defined as (a) self-reported smoking or refusal to cooperate when subjects were contacted to make an appointment to obtain a saliva sample or (b) the presence of >10 ng/ml of cotinine in an analyzed sample. The estimated nonconfirmation rates for 12-month abstinence prevalence were 11% (control), 16% (intrinsic), 30% (both), and 31% (extrinsic). Reducing the 12-month abstinence prevalence rates for the

Table 4
Summary of Collection and Analysis of Saliva Samples at 12-month Follow-Up

Variable	Intervention			
	Intrinsic	Extrinsic	Both	Control
No. of subjects reporting abstinence at 12 months	58	44	43	51
No. (and %) of subjects in geographic area for saliva collection	32 (55)	29 (66)	30 (70)	38 (75)
Number of subjects relapsed when phoned to obtain specimen	1	3	5	1
Number of refusals	3	4	4	1
No. (and %) of specimens obtained	28 (88)	22 (76)	21 (70)	36 (95)
No. of specimens with cotinine > 10 ng/ml	1	2	0	2
Cotinine values (ng/ml)	121	87, 180	—	89, 145
% of self-reports not confirmed with saliva cotinine[a]	16	31	30	11

Note. Dash = not applicable.
[a] Calculated by dividing the sum of the number of relapses, number of refusals, and number of samples with cotinine values > 10 ng/ml by the number of subjects eligible for saliva testing (i.e., number of subjects who lived within the geographic boundaries for collection). The disconfirmation rates for the four treatment groups did not differ significantly; χ^2 (3, N = 129) = 6.29, $p > .05$.

total sample by these proportions yields the following estimates: intrinsic, 14%; extrinsic, 9%; both, 9%; and control, 13%; χ^2 (3, N = 1,217) = 7.11, $p > .05$. The estimated nonconfirmation rates among subjects who reported abstinence at both the 3- and 12-month follow-ups were 0% in the intrinsic, both, and extrinsic groups and 10% (1 out of 10) in the control group. The outcome percentages for 12-month continuous abstinence do not change when adjusted.

Program Use, Cessation, and Relapse

Relations among program use, 3-month cessation, and relapse between the 3- and 12-month follow-ups across the four study groups are summarized in Table 5. The pattern of these results suggests that the effects of the motivation interventions were primarily among subjects who used the program materials. Program use was associated with significantly higher abstinence rates at 3 months, χ^2 (3, N = 1,217) = 17.85, $p < .001$. It also appears that the higher long-term abstinence rate among subjects who received only the personalized feedback resulted both from higher abstinence rates at 3 months and lower relapse rates between 3 and 12 months among program users. It also appears that program users who received the financial incentive and who were abstinent at 3 months had the highest relapse rates. Small sample sizes precluded statistical comparisons for these outcomes.

Subject Characteristics Associated With Program Use and Continuous Abstinence

The intrinsic and extrinsic interventions, alone and in combination, significantly increased use of the program materials,

Table 5
Summary of the Relationship Between Program Use, Smoking Cessation, and Relapse Across the Four Treatment Groups (by Percentage)

Intervention	Used program	Seven-day abstinence at 3 months	Relapsed between 3 and 12 months	Total abstinent at 3 and 12 months
Intrinsic (n = 304)	31			
Used		22	24	17
Did not use		10	30	7
Extrinsic (n = 304)	34			
Used		12	67	4
Did not use		6	38	4
Both (n = 304)	31			
Used		15	64	5
Did not use		6	42	3
Control (n = 305)	24			
Used		12	44	7
Did not use		6	27	5

Note. Use is defined as completing at least one activity in more than one of the last six program units.

whereas the intrinsic intervention alone was associated with significantly higher rates of continuous abstinence. Given these findings, one might ask if the same types of smokers responded to all of the interventions or whether different kinds of smokers responded to the different interventions. To address these questions, we used multivariate logistic regression models to test for interactions between treatment group and the variables listed in Table 1 (gender, age, education, income, marital status, employment, baseline smoking rate, years smoked, smoking within 15 min of awakening, number of previous quit attempts, and desire to quit). Separate sets of logistic models were tested with use of the materials and continuous abstinence as dependent variables.

There were no significant interactions among the baseline sociodemographic, smoking history, or desire to quit variables and treatment group for both outcomes. Different subject characteristics predicted use of materials and continuous abstinence across the four treatment groups. Participants who used the materials were more likely to have post-high-school education: 32% versus 26%, χ^2 (1, N = 1,217) = 4.40, $p < .04$; reported significantly more previous quit attempts: M = 3.28 versus 2.76, $t(1183) = 2.48$, $p < .02$; and expressed significantly higher desire to quit smoking: M = 7.84 versus 7.08, $t(1208) = 5.54$, $p < .001$. Continuous abstainers had significantly lower rates of baseline smoking: M = 19.97 versus 24.97 cigarettes per day, $t(1204)$ = 3.67, $p < .001$; were more likely to have previously abstained for more than one month: 78% versus 51%, χ^2 (1, N = 1,217) = 20.74, $p < .001$; and expressed significantly higher desire to quit: M = 7.81 versus 7.27, $t(1208) = 1.20$, $p < .05$.

Discussion

This study represents the application of an intrinsic–extrinsic motivation conceptual framework to the design of interventions aimed at improving the effectiveness of self-help smoking cessation programs by increasing their use among smokers who request them. Consistent with the hypotheses derived from the motivation framework, an extrinsically oriented financial incentive increased the use of self-help materials, but it was also associated with no increase in cessation rates among program users and with higher relapse rates among those who did manage to quit when compared with those who received only the self-help manual. As a result, it had no effect on long-term cessation rates. The intrinsically oriented personalized feedback increased use of the materials and was associated with higher rates of smoking cessation 3 months after distribution of the materials in both users and nonusers of the program. Continuous abstinence at 12 months was twice the rate in the group that received the personalized feedback alone (10%) because of a higher initial cessation rate and substantially lower rate of relapse. This continuous abstinence rate represents a considerable improvement over the current state of the art; the median rate among 10 prospective studies of unaided (self-help) smoking cessation was 4.3% (Cohen et al., 1989).

It appears that the financial incentive somehow diminished the positive impact of the personalized feedback. How the impact may have been diminished is unclear. Data obtained at the 3-month follow-up indicated that subjects receiving the personalized feedback alone and those receiving it along with the financial incentive were equally aware of having received the feedback and were equally positive in their evaluation of its usefulness. A possible explanation is that the lower quit rates and higher relapse rates among subjects receiving the financial incentive represent what social psychologists call an *overjustification effect* (Lepper, Greene, & Nisbett, 1973). Subjects receiving the financial incentive may attribute their early behavior (i.e., use of the materials and initial cessation) to a desire to enter the prize drawing rather than to their desire and ability to quit smoking. This may reduce their sense of commitment to quitting and their self-confidence for coping with the difficulty of avoiding relapse after cessation.

The findings from this research suggest the old cliche, "You can lead a horse to water, but you can't make him drink." We have found that simply increasing use of self-help materials does not automatically result in higher overall cessation rates. Interpreted within a staged model of the cessation process (Prochaska & DiClemente, 1983), a financial incentive may push contemplators into the action stage before they have developed the necessary inner resources for achieving cessation. On the other hand, highlighting smokers' intrinsic motivations for quitting and providing confidence-boosting feedback appears to enhance use of the materials and improve the chances of success.

Our findings support concerns that some leaders in health promotion have raised regarding the generalizability and durability of incentives for health behavior (Green, Wilson, & Lovato, 1986). However, the negative effect of the financial incentive found in this study is also at odds with studies that have reported positive effects on quitting motivated by financial incentives (Winett, King, & Altman, 1989). There are several possible explanations for this discrepancy. Notably, the financial incentives used in many studies have been contingent on smoking behavior rather than on the use of self-help materials, suggesting that such incentives are better applied directly to the major outcome of interest (i.e., smoking cessation) than to an intermediate behavior (i.e., use of a self-help booklet). Additionally, many studies that demonstrate the effectiveness of financial incentives have applied them in worksite settings in which other factors, particularly social support and normative pressure (e.g., group contests, buddy systems for pooling money), are operating at the same time. Thus it is possible that extrinsically oriented motivation strategies work better in a more personalized context than is possible with mailed self-help materials.

Although the impacts of the extrinsic and intrinsic interventions differed, we do not have evidence of differences in the sociodemographic characteristics, smoking histories, or levels of motivation for smokers who responded to the different interventions. Consistent with other processes analyses, lighter smokers with previously successful cessation attempts and higher motivation to quit were most likely to be successful (e.g., Curry, Thompson, Sexton, & Omenn, 1989; Pomerleau, Adkins & Pertshuk, 1978).

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