

USING INCENTIVES AND REWARDS IN
WORKSITE SMOKING INTERVENTIONS

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(ABSTRACT)

Smokers require high motivation to quit smoking and to remain smoke-free. Worksites might enhance motivation to be smoke-free by offering incentives to employees who quit smoking.

A pilot study was conducted where one worksite offered a smoking cessation group plus several incentive programs. The incentives included money and public recognition based on individual performance, and dinners based on group performance. After 12 months, 48% of participants remained smoke-free. This result is significantly different [$\chi^2(1) = 3.910, p < .05$] from the results of a smoking cessation group conducted a comparable company (here, 18% of participants remained smoke-free).

Another study was designed where one worksite would offer a smoking cessation group, and another worksite would offer an incentive program plus a smoking cessation group. Treatment conditions were randomly assigned. Both worksites were part of the same parent company (General Electric), thus minimizing differences between the companies. Many dimensions of the worksites and of participants at each worksite were assessed to demonstrate comparability between the worksites.

In the incentive condition monetary incentives were offered. Participants received \$10 for not smoking for two weeks, four weeks, five weeks, six weeks, eight weeks and ten weeks. They received \$20

for not smoking after three, four, five and six months. They received \$25 for not smoking after nine months and 12 months. Their exhaled air was assessed on a carbon monoxide detector before receiving monetary rewards. As a result, 54% of the 28 participants were smoke-free after nine months.

In the non-incentive condition, participants were offered the same smoking cessation program but without major incentives. Participants were assessed on the carbon monoxide machine for five of the six consecutive months after the program ended. They were also assessed at the nine-month mark. Here, 44% of the 16 participants were smoke-free after nine months. Both interventions, then, were very successful. As a result none of the hypotheses of this study were supported.

This study did not employ a strong research design, and unforeseen changes in procedures weakened the study's validity. Despite these shortcomings, these interventions have merit. The intervention enabled a high percentage of people to quit smoking. These results might encourage smokers who want to quit. Given the success of these programs, hopefully a well-controlled study will be conducted to ascertain the effects of incentives and rewards upon worksite smoking interventions.

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LITERATURE REVIEW

The cigarette smoking problem

Out of all health behaviors, cigarette smoking causes the most disease and death in the U.S. (U.S. Department of Health and Human Services, 1984). About 340,000 premature deaths are caused each year by smoking through increased prevalences of heart disease, cancer, and stroke (U.S. Department of Health, Education and Welfare, 1979). Americans are becoming aware of the dangers of smoking. For instance, fully 80% of those answering survey questions said they knew that smoking can cause cancer (American Cancer Society, 1986).

Roughly 37 million Americans can now call themselves ex-smokers. The proportion of adult male smokers in the U.S. has declined from 42% to 33% between 1976 and 1985. During this period women have a much smaller rate of decrease, from 32% to 28% of all adults. Still, about 54 million Americans smoke (American Cancer Society, 1986). More than 90% of smokers say they would like to stop smoking if there were an easy way to do it (U.S. Public Health Service, 1982).

To understand the smoking problem, several stages of smoking can be identified. These stages include continuing to smoke, contemplating quitting smoking (known as contemplators), actually quitting, and relapsing back to smoking (Levanthal & Cleary, 1980; Lichtenstein, 1982; Prochaska & DiClemente, 1983).

Within each stage, various factors can be important. A combination of physiological, psychological, social, and environmental factors might factor into smoking behavior. For instance,

physiological reasons (frequently getting bronchitis) and social and environmental reasons (nonsmoking roommate prohibiting smoking at home) might prompt a person to quit smoking. In a reciprocally deterministic manner (Bandura, 1986) that quitter might seek out interactions with nonsmokers which then increase motivation to remain a nonsmoker. Intervention into any one of these factors; physiological, psychological, social or environmental; could potentially move a person to the next stage of smoking behavior.

Continuing smoking

Understanding why people continue to smoke can help psychologists generate ways to help people quit smoking. Lichtenstein (1982) views smoking as a physiological addiction and a psychological habit. Some researchers focus primarily on the addictive aspects of nicotine (Schachter, 1979), while others focus on how smoking regulates affective states. Smoking induces relaxation and lessens anger and anxiety, for instance (Tompkins, 1966). Leventhal and Cleary (1980) attribute continued smoking both to regulation of affect and of bodily nicotine levels.

The influence of external cues are apparent when rearranged environmental cues change smoking rates. The amount smoked can vary depending upon whether the smoker is in the presence of someone who smokes or of someone who does not approve of smoking. Also, signs prohibiting smoking decrease smoking behavior in the designated area (Jason & Savio, 1978).

Whether or not cigarette advertisements prompt smoking behavior is

a controversial point. No data specific to cigarette advertising shows its exact effect, but in general psychologists know modeling can prompt performance of desired behaviors (Bandura, 1986); and advertising models behavior.

The wide availability of cigarettes is also likely to increase the incidence of smoking. Availability has been seen to affect even heroin usage; many servicemen used heroin in Vietnam, then stopped upon returning home (Robins, 1974).

Psychologists have little experience in knowing what psychological processes help smokers seriously think about quitting within the next year. Prochaska and DiClemente (1983) call this moving from a precontemplative stage to a contemplative stage. They found those at precontemplative stages were defensive, avoided changing their thinking, and used the processes of change less than those at other stages. These hypotheses give little guidance on how to encourage smokers to contemplate quitting.

Contemplating quitting

Few studies in psychology journals address how to move contemplators towards taking the initial step in quitting smoking. Psychologists have done little work in this area. Prochaska and DiClemente (1983) provide pioneering work in examining how to move these smokers towards quitting. They note that contemplators frequently use two processes. One process is consciousness raising (for example, "I look for information related to smoking"). Another process is self-reevaluation ("My depending in cigarettes makes me feel

disappointed in myself").

More recently, Brownell, Marlatt, Lichtenstein, and Wilson (1986) note "A major challenge is to enhance motivation when it is low in order to maximize readiness for (initial) change. Little systematic work has been done in this area." (p.773). They contrast motivation enhancement to skill building. Brownell et al. (1986) speculate that motivation and commitment are the most important processes of change for contemplators -- much more important than teaching skills.

Brownell et al. (1986) advocate that psychologists develop methods to enhance motivation. Such methods could include teaching dangers of smoking, structuring social support, giving feedback about physical status, and constructing contingency contracts. Unfortunately these techniques are mostly group-administered. These techniques would not reach smokers who have yet to join a smoking cessation group.

Instead psychologists are learning to use social marketing principles and the mass medias to reach people in their daily environments. Through marketing contemplators might be taught some skills, but more importantly their motivation to quit smoking might be enhanced.

Social marketing principles include examining the product characteristics, the product's price and the place where the product might be purchased. These variables can be changed so as to better tailor the product to the targeted audience. Decisions on how to promote the product are often based upon analyses of the target audience, and on formative research such as holding group interviews

where people reflect on the product's characteristics and its promotion. Product analyses can also include identifying the cognitive steps taken before the purchase behavior; for instance, consumers might move from becoming aware of the product, forming interest in the product and forming positive attitudes about the product. The next steps might be intending to buy and then actually buying the product (Ray, 1982).

Researchers in the Stanford Five-City Project used these principles and formative research techniques when designing a smoking cessation program and other health programs for a large-scale health intervention. These principles and techniques aided in enhancing motivation and teaching skills through mass media communication channels and through community organizations (Flora, Fortmann, Farquhar, & Maccoby, 1986).

Quitting smoking

Focus and impact of psychological interventions

Psychologists have devoted most of their attention to this stage of smoking since these are the people who ask for psychological assistance. Psychologists have more specifically focused research on helping groups of individuals quit smoking (although some research has examined self-help manuals). Yet 90% to 95% of all ex-smokers quit without the use of group or self-help programs (U.S. Department of Health and Human Services, 1983). Psychologists, then, have not had anything close to a major impact upon the nation's smoking problem.

Much psychological research has been devoted to seeing how the

effectiveness of smoking cessation groups (and to a lesser extent, self-help manuals) might be increased (Hunt & Bespalec, 1974; Lichtenstein, 1982). Reviews of smoking cessation research in the early seventies (Hunt & Bespalec, 1974) concluded that most smoking cessation studies resulted in uniformly low abstinence rates. In the eighties, Lichtenstein (1982) generally found many studies still offered uniformly low rates. Lichtenstein did note that two characteristics distinguished more effective programs from less effective programs. Programs with multiple components seemed to be more effective than singular component programs, as long as the components complemented one another. Also, programs having an aversive component were more effective than programs not utilizing aversive procedures. Lichtenstein did not discuss motivation enhancement through procedures such as contingency contracting.

Lichtenstein (1982) also noted other treatment procedures which appeared promising at that time. Studies with small sample sizes (e.g., Foxx & Brown, 1979) suggested that nicotine fading was efficacious. Nicotine-laced gum was also mentioned as promising. Since 1982 studies have shown that nicotine gum can significantly improve the efficacy of smoking interventions (e.g., Killen, Maccoby, & Taylor, 1984; Hall, Tunstall, Ginseberg, Benowitz, & Jones, 1987), although some studies (e.g., Gottlieb, Killen, Marlatt, & Taylor, 1987) show no difference in quit rates between those chewing nicotine-laced gum and those chewing placebo gum.

Lichtenstein (1982) noted that enhancing social support might

result in higher quit rates, but little work had been done by that date to show how social support related to quitting smoking. Since then Etringer, Gregory, and Lando (1984) conducted two groups where group cohesiveness was systemically enriched and two groups where typical group procedures were used. Those in the enriched cohesiveness group did score higher on indexes of cohesion, and for a short period had significantly higher abstinence rates than did the typical group.

Biochemical verification

Psychologists have made progress in the last decade in assessing smoking status through biochemical measures. This is important because it provides a means to corroborate self-report of smoking status. One measurement tool is carbon monoxide detectors. The amount of carbon monoxide inhaled through cigarettes can be measured in exhaled breath with carbon monoxide detectors. The half life of carbon monoxide remaining in the lungs from cigarettes is about four to five hours, so the smoking status of a pack-a-day smoker can be rather easily ascertained (Lichtenstein, 1982). Low-tar cigarettes generally produce as much carbon monoxide as do full-strength cigarettes. After four hours of not smoking, carbon monoxide levels of those smoking low-tar and full-strength cigarettes are both about 19 parts per million in exhaled breathe, with a confidence interval of plus or minus 8 parts per million (Ossip-Klein, Epstein, Winter, Stiller, Russell, & Dickson, 1983). Nonsmokers seldom have carbon monoxide levels up to eight parts per million in their exhaled breathe, although working in smoky rooms or around car exhaust fumes can increase carbon monoxide levels in

exhaled breath (Hughes, Frédericksen, & Frazier, 1978). Ten parts per million of carbon monoxide in exhaled air is a commonly used criterion for separating smokers from nonsmokers (Murray, O'Connell, Schmid & Perry, 1987).

Biochemical verification of smoking status can have several effects upon participants in smoking interventions. The following discussion points out these effects. These points will influence the procedural design of the proposed study.

First, biochemical verification of smoking status may not provide new information to participants. Participants are aware, after all, whether or not they smoked a cigarette. The carbon monoxide detector feeds new information back to participants on the accuracy of the carbon monoxide detector, but it tells participants nothing new about their own smoking status.

Biochemical verification would feed back new information to participants if partial reductions in smoking were valued. But when total abstinence is reinforced as the only worthy goal, partial reductions in carbon monoxide levels are devalued. The only important variable is whether or not a person has smoked: and the participant already knows this.

A second point to be made is that biochemical verification of smoking status has an effect upon self-reported smoking status largely because people believe in its accuracy. Jones and Sigall (1971) labelled this the "bogus pipeline effect." "Pipeline" refers to biochemical verification, and "bogus" means verification need not occur

in actuality. All that need occur, according to the bogus pipeline effect, is that participants believe their smoking status will be biochemically verified. This belief is built, of course, on actual behavior; if participants suspected their breath samples were not being biochemically verified, their honesty levels would drop. Yet if participants do not doubt this belief that air samples will be biochemically verified, the belief itself promotes honesty.

The bogus pipeline has generally been upheld through a series of subsequent studies. Studies not showing the significant effect of the bogus pipeline were, in general, methodologically unsound (Murray et al., 1987).

The first and second points made above have interesting implications. Antecedents have a strong influence in promoting accuracy in self-reporting smoking status. The antecedent is information that biochemical verifications will be conducted and also the belief that the biochemical verification is accurate. The participant who knows their smoking status will be independently verified is more likely to be accurate in self-report of smoking status than is someone who does not know such verification exists (Murray et al., 1987). And participants who believe biochemical verification is accurate are likely to be more honest in self-report of smoking status than are those who doubt its validity.

The act of having one's breath analyzed probably has consequential reinforcers. Much of this has to do with the human interaction between assessor and participant. When the person says they have not smoked,

they receive social reinforcers for this behavior. Participants can talk about how they live without cigarettes, and the assessor can congratulate them and encourage them to continue being smoke-free.

Relapses

Extent of relapse

Psychological intervention might enable many to quit smoking, but the interventions are weak in preventing relapses back to smoking. Lichtenstein (1982) summarized the results of smoking cessation group programs, on the average, as helping 85% to 90% of the participants quit smoking by the group's end. Yet six to 12 months after the group ends, the average participant only "has a 15% to 20% chance of being abstinent. More successful programs report abstinence rates of 30% to 40%." (Lichtenstein 1982, p.806). Hunt and Bospalec (1974) notes that the majority of group participants might relapse back to smoking as early as by the fifth week.

Model of relapse which emphasizes cognitions

To understand the relapse phenomenon, Marlatt and Gordon (1979, 1985) produced a seminal theory. The theory concerns lapses and relapses (lapses involve smoking one cigarette; relapses involve returning to the smoking habit). The theory notes that people move towards a lapse by not avoiding situations which put them at a high risk for relapse. There are many reasons that this occurs. Marlatt and Gordon (1979) acknowledge situational and motivational factors to sometimes be responsible for this.

Subsequent steps in the relapse model proposed by Marlatt and

Gordon (1985) focus on cognitive processes. Once in the high-risk situation, certain cognitive processes are commonly used as ex-smokers relapse back to smoking. Marlatt and Gordon (1979) posit that the soon-to-be relapser does not use a coping response within the high risk situation. The absence of a coping response leads to decreased self-efficacy, then to using the substance, and then to attributing the slip to not feeling capable of controlling one's actions.

Work by Mermelstein et al. (1983) and Shiffman (1982) substantiates this model. They found that particular situations often precipitate lapses of smoking one cigarette. Yet few situations consistently precipitated total relapses. Relapses were more often precipitated by certain emotional states and by whether or not coping strategies were used (Mermelstein et al., 1983; Shiffman, 1982).

This model has promoted some research to understand precipitants to lapses. These lapses include environmental factors. Shiffman (1986) has identified four situations where recent ex-smokers often have a lapse. The situations identified by Shiffman are in social situations, particular when eating or drinking with smokers. The second situation is when relaxing. The third situation is while at work, particulary when under stress, and the fourth situation is when emotionally upset.

In his analysis of over 800 lapsers, Shiffman (1986) found lapses in social situations and while upset to be especially difficult to resist. He noted that behavioral coping responses were most often used to resist lapses in work situations and while relaxing.

Far more research has investigated the cognitive factors associated with relapses. For instance, recent ex-smokers who use coping skills in high-risk situations are more likely to remain nonsmokers than those who do not use coping skills (Glasgow, Klesges, Mizes, & Pechacek, 1985; Shiffman, 1984). Some research (Glasgow et al., 1985; Perri, Richards, & Schultheis, 1977) indicates that the cognitive coping strategies of self-reward and positive self-statements are more effective than self-punitive techniques. Other research (Shiffman, 1984) indicates that as long as the person does not classify their cognitive coping strategy as "willpower," all types of cognitive coping strategies are equally effective.

More research on self-cognitions is provided by Curry, Marlatt and Gordon (1987). They showed that once lapses occur, the manner in which the lapse is understood can effect eventual smoking status. Relapsers made attributions about their lapse which were more internal, stable and global than did those who returned to abstinence. An example of an internal, stable and global attribution is that the person smoked because they were weak (internal), have always been weak (stable), and has no willpower with any endeavor (global). O'Connell and Martin (1987) similarly found relapsers to attribute lapses to internal causes while those returning to abstinence made external attributions.

These studies on the cognitions of lapsers may be very interesting, yet the results have had little impact to date on the success of smoking interventions. When some participants in smoking interventions are taught cognitive coping strategies and other

participants are not, sometimes the added effect of training coping skills leads to higher abstinence rates (e.g., Lando, 1976) but sometimes not (e.g., Lando, 1977).

Explanations of relapse emphasizing affect

Other researchers have examined stress reactions. Mermelstein, Cohen, and Lichtenstein (1983) found 43% of all relapses occur when a person experiences stress. Shiffman (1982, 1984) found 71% of recent ex-smokers who smoked one or more cigarettes felt negative affects such as anxiety, anger, frustration, and depression. Abrams, Monti, Pinto, Elder, Brown and Jacobus (1987) evaluated physiological functioning in quitters and relapsers. They found relapsers to have higher heart rates during relaxation, and higher anxiety than did abstainers at the end of a procedure tapping reactions to "high risk for relapse" situations.

Investigations of affect have focused upon assessment. Few studies have examined how the teaching of stress management techniques can significantly improve the success rate of smoking interventions.

Environmental influences upon relapse through social support

Social support can help solidify new health habits in regards to smoking and other addictive behaviors (Brownell et al., 1986). Cohen (1986) offers a framework for understanding the affect of social support for recent ex-smokers. Cohen's preliminary studies suggest that partner support and the perceived availability of stress-buffering support improve abstinence rates for a short period of time. The presence of smokers in the participants' social network, on the other

hand, influence both cessation and long-term maintenance.

The effects of spouse support upon success in quitting smoking has been clearly established. For instance, Mermelstein et al. (1983) found spouse support correlated at .48 with smoking status at the six month follow-up. Both general support and support specific to quitting; cooperative participation, reinforcement, and not nagging nor policing; were dimensions of this support.

Similarly, Coppotelli and Orleans (1985) found support shown by husbands to accurately discriminate between successful and unsuccessful quitters in 85% of the cases. These husbands encouraged self-reward, minimized stress by avoiding interpersonal conflict and minimized stress by taking over some of the quitter's usual responsibilities. The husbands also offered general problem-solving assistance and specific help with cravings or cigarette substitutes. They also showed empathy, tolerance of moodiness, and concern about quitting.

Ginsberg, Hall and Rosinski (1987) demonstrated the influence of partner support through behavioral observations. They observed smokers and their partners who were discussing how the partner could support the smoker (who was about to quit smoking). Smokers were less likely to quit smoking for two weeks if their partners avoided talking about quitting smoking, and more likely to quit smoking if partners reinforced comments by the smoker and discussed self-help strategies. In summary, the effects of specific types of spouse support have been rather clearly delineated.

In contrast, research examining social support offered by

co-workers has made little headway. Fisher, Lowe, Levenkron, and Newman (1982), for instance, found that perceived support from one's supervisor was not correlated with success in a worksite weight loss group: In fact, such support was negatively correlated with pounds lost! Additionally Malott, Glasgow, O'Neill, and Klesges (1984) found that the presence of social support did not correlate with success in a worksite smoking intervention. They did find that the presence of nonsupportive behaviors were correlated with higher relapse rates. Such behaviors were undefined in the article, but could be presumed to include behaviors such as a co-worker smoking in front of the recent ex-smoker, and by offering the recent ex-smoker a cigarette.

Numerous types of social support could conceivably affect the behavior of recent ex-smokers. For instance, social support for undesirable behaviors could affect antecedents to a relapse, such as socializing with a smoker (Shiffman, 1982). Undesirable social supports might occur after a relapse. The relapser may doubt their ability to control urges to smoke (Marlatt and Gordon, 1979), and a well-meaning friend might console the relapser with rationalizations as to why they should not quit smoking at that time.

Ideas for future specification of social support might arise from observing successful mutual-help groups such as Alcoholics Anonymous and Weight Watchers. One reason these groups might work is that their influence, unlike the influence of therapeutic relationships, is often longlasting. Gottlieb (1983) speculates that these groups also work because participants give as well as receive help. This makes the

relationships mutually rewarding, providing an incentive for relationships to continue. Gottlieb (1983) additionally notes that these groups promote empowering attributions. They normalize help-seeking behavior and often encourage participants to make external attributions about causes for their problems. Mutual-help groups, he notes, invariably encourage participants to take control over their lives and to feel personally responsible for the solution to their problems.

Influence of motivational level

Emphases on cognitions of recent ex-smokers has overshadowed another domain of psychological functioning; namely, staying motivated to remain tobacco-free. Motivation is critical to remaining an ex-smoker. Even if a recent ex-smoker knew what coping skills to use when tempted to smoke, they might not be motivated to practice those coping skills.

Motivation is critical not just to smoking cessation but to changing other addictive behaviors as well. In weight loss, for instance, Brownell (1986) states "the greatest improvements in program effectiveness will come from a shift in emphasis from educational to motivational factors" (p.156).

To some extent leaders of smoking cessation groups have always understood the need to enhance participants' motivations to quit smoking. Lando (1977) and Winett (1973), for instance, heighten motivation to remain smoke-free by using formal commitment procedures and contingency contracting.

In smoking cessation groups, Hall (1980) emphasizes motivation and commitment even further by making motivation a central part of her model on smoking relapse prevention. She explicitly enhances motivation, and uses the rationale that by remaining highly motivated, participants will consistently use coping skills.

Defining how motivation is enhanced can be difficult. Hall (1980) gives one example of motivation enhancement as being the discussion of the severity of withdrawal symptoms. Her other examples are giving feedback on immediate effects of actions, and circumventing obstacles involved in making changes. Yet perhaps any nonspecific factor such as high therapist credibility can enhance motivation. Certainly the teaching of skills to resist smoking can build motivation. Most relevant to the proposed study, giving incentives and rewards to recent ex-smokers might enhance motivation. This topic is covered in more detail below.

Summary of the smoking problem

This brief review showed that several facets of the smoking problem are relevant to the proposed study. Psychologists have focused their efforts on people who wish to quit smoking, even though few people who quit smoking seek formal psychological services. Yet psychologists could help people who are contemplating quitting smoking. Psychologists could also help reduce the high relapse rate of people returning to smoking. Both contemplators and recent ex-smokers could benefit from psychological assistance.

Psychologists tend to focus on cognitive factors when studying

facets of the smoking problem. Yet other frameworks can be useful when trying to help people kick the smoking habit. Marketing, for instance, could be very useful when trying to help contemplators. Understanding parameters of beneficial and detrimental social support might help psychologists understand how to prevent relapses. Addressing situational variables and motivational variables could especially help psychologists make an impact upon the smoking problem.

Facing the smoking problem

Group-level interventions

Psychologists have traditionally worked with groups of people who wish to quit smoking. Group interventions carry with them certain assumptions and parameters. Some procedures can be conducted within groups and other procedures cannot.

One dimension that is strongly affected by the structure of group interventions is the influence of the group. The influence of groups are limited by the length of the meetings and by how long the meetings last. Because the group's only purpose is to get participants to quit smoking, the groups only last for one hour a week. During this time nonsmoking behavior is praised: Yet prompts to smoke are generally encountered many times during a day. Also, the group's effects are short-lived. These groups traditionally end after people quit smoking for several weeks. But exsmokers perceive prompts to smoke for many months and years after quitting.

Since groups last for so short a time, psychologists have focused upon teaching skills that hopefully will be generalized across

situations and over time. By counting on such generalization and maintenance, psychologists assume or hope they are having a strong influence upon participants.

Yet some psychologists are recognizing that the next advance in smoking interventions might come from emphasizing motivation over education (Brownell et al., 1986). Motivation may not generalize across situations or time; motivation might simply need to be enhanced on a regular and frequent basis. To enhance motivation more prompts may be needed over a longer length of time than can be done in group interventions, since smoking groups are limited in time.

Another limitation of group interventions is that those contemplating quitting smoking are not reached through group interventions. Contemplators are not at the point where they would join a group.

In short, current weaknesses in smoking interventions may stem in part from the type of intervention which psychologists generally use to address the smoking problem. If other levels of intervention are more able to address weaknesses in smoking interventions, then our inability to affect the prevalence of smoking may not just be due to the tenacity of the smoking problem. Group interventions may not be ideally suited for addressing the identified weaknesses in smoking interventions.

Organizational interventions:

an alternative intervention

Rappaport (1977) advocates that psychologists loosen their allegiance to individual and group interventions and be more open to matching interventions with specific situations. Specific levels of intervention might be chosen because of their practicality and feasibility (Winett, King, & Altman, 1989).

Allen and Kraft (1982) state we have "made some progress in developing individual motivation techniques (in changing health behaviors) but have paid too little attention to the forces of the cultures in which the individual lives." (p.71). They describe the rationale behind individual interventions as similar to going into a school of fish and asking one or two of the fish to turn around and swim in the opposite direction.

Allen and Kraft (1982) see cultural norms which promote illness as powerful norms. These norms are expressed in numerous dimensions, and slowly but eventually overcoming most initial changes in health behavior. Thus, they conclude that a supportive cultural environment is essential for the maintenance of new health behaviors. Making cultural environments supportive is not done through individual or group interventions, but through organizational interventions or societal interventions (Rappaport, 1977).

With cigarette smoking, physical proximity to smokers can precipitate lapses. The amount a recent ex-smoker is exposed to smokers can be strongly influenced by structures and norms within a physical environment. Witness what can occur after a worksite

smoking cessation group ends. After quitting smoking in a group employees may have no alternative but to take work breaks in an unventilated cafeteria among smokers. Some recent ex-smokers might lapse because they were forced to relax in a smoky room. Once the recent ex-smoker responds to environmental cues and inhales smoke from his or her own cigarette (instead of from others' cigarettes), they can become demoralized about ever quitting. They, their fellow coworkers, and company executives make attributions about the relapser's weak will-power. The problem is seen as within the individual.

Using the Marlatt and Gordon (1985) to analyze this situation, the environment largely precipitated the lapse back to smoking. Marlatt and Gordon (1985) acknowledge this. Relapses, on the other hand, are seen by them as caused by internal cognitions. Yet in this situation, internal cognitions were strongly influenced by a commonly-held belief; those with willpower can resist temptations. This "internal cognition" might be changed, then, by changing the commonly-held belief. Such a change would require an organizational intervention.

Using a systems model to analyze this situation, an imbalance exists between systems of functioning. The group environment promotes not smoking, but the organization promotes smoking. Company executives might believe they are allowing individuals the freedom to choose their smoking status, but the cues to smoke do promote smoking through tempting ex-smokers to

have a cigarette.

The company is partially responsible for the cigarette smoking problem; not for the initiation of the problem, but for the continuation and resolution of the problem (Rappaport, 1977).

By not recognizing the organization's responsibility, the company makes some individuals who relapse a victim of the problem (Allegante & Sloane, 1986).

On the other hand, if the organization's responsibility is recognized and a company's policies on smoking are integrated across various levels of functioning, a company is more likely to promote nonsmoking behavior in an effective manner. A series of company initiatives could create a situation whereby many people have recently quit smoking. The norms and rules governing smoking behavior could be changed. These changes would best occur gradually, over a period of time. In this way the positive effects and the negative by-products of one intervention might be assessed and used to structure the subsequent initiative.

The new norms and rules might reinforce nonsmoking to such a large extent that employees find it easier to resist relapsing back to smoking. At some point, a critical mass is reached whereby nonsmoking behaviors are reinforced and practiced by many new converts in the natural environment (Brady & Fischman, 1986).

Behavior Change Principles

Behavioral psychologists might use the same basic behavior change principles for organizational as they use with individual

and group interventions. Participants enter into a relationship with someone who offers credible information (Goldfried, 1980) about how antecedents and consequences to the problem behavior can be changed. Participants receive information about desired behaviors, observe models exhibiting those behaviors, and are told how to perform those actions. Their efficacy expectations are raised (Bandura, 1986). Participants perform the specified skills, then receive feedback on their performance (Goldfried, 1980). This feedback loop is critical to changing behavior. By reinforcing the desired behavior through feedback, the probability is heightened that the individual will continue to exhibit the desired behavior.

Illustrating the use of these principles in organizational and other large-scale interventions, Fawcett, Mathews, and Fletcher (1980) write about using behavioral specifications, modeling, practice, and feedback with communities. They identify a second form of community change as being through behavior management techniques. These are the systematic application of reinforcers such as feedback, prizes, certificates, and cash incentives following behaviors of interest.

Incentives and rewards could be seen as influencing behavior in a direct, unilinear fashion. Given the complexities of relationships in organizations, the reciprocal deterministic model (Bandura, 1986) might portray a more accurate picture of how incentives and rewards influence behavior in organizations.

Incentives and rewards might affect cognitions about nonsmoking behavior, which in turn might influence conversations about nonsmoking behavior, which in turn might reinforce nonsmoking behavior. Those proud of not smoking might continue to discuss the value of not smoking. Others overhearing such a discussion might become more motivated to not smoke, and then actually change their smoking behavior.

Given the complexity of the variables which promote smoking and nonsmoking behavior, one initiative taken by an organization is not likely to create major changes in personnel attitudes, beliefs and actions about smoking. This point is critical to the proposed study. Several or more interventions might be needed to change norms and attitudes on smoking. The difference between one intervention and a true organizational intervention is similar to the difference between "interest" and "commitment." An organization interested in the smoking problem will offer one smoking intervention; an organization committed to changing organizational norms and behavior will offer a series of interventions. Those told about one intervention can easily ignore that intervention; far stronger messages are given when an organization offers a series of interventions. Each intervention might prepare some individuals for participating in the next intervention. Thus, while the proposed study entails one intervention, a true organizational intervention entails a series of interventions.

Benefits of worksite smoking interventions

For psychologists

Behavioral psychologists might see worksites as optimal places to make organizational smoking interventions for several reasons. First, unlike our current efforts which result in 90% to 95% of all ex-smokers quitting without the apparent help of psychologists (U.S. Department of Health and Human Services, 1983), worksite interventions may allow psychologists to have a major impact on the number of smokers in the U.S. (Hallett, 1986). Sixty million Americans work (Leviton, 1985). Worksite interventions could prove to become quite popular if research shows worksite smoking interventions to be effective and if companies continue to see the value of offering smoking interventions.

An additional benefit of having access to 60 million Americans is that groups of people seldom seen at university clinics, mental health centers, or hospitals might be seen in worksite interventions. Blue collar men, for instance, are less likely to participate in smoking programs held in traditional settings than are women of all classes and white collar men (Leviton, 1985).

More than any other organization, worksites might be able to finance interventions internally. This provides opportunities for worksite interventions to be self-supporting, either at all points or after grant monies have been spent. Psychologists see

the possibility of worksite interventions, then, as having excellent opportunities for diffusing innovations and for supporting the innovators.

Psychologists also see worksite interventions as potentially addressing the aforementioned problems of enhancing motivation and for creating nonsmoking norms in natural environments.

Worksites are potentially rich sources of reinforcements; employees spend about half of their waking hours at the worksite.

During that time smokers contact their networks of acquaintances and friends. Employees also receive written communications; memos, newsletters, and notices on bulletin boards. These naturally occurring reinforcers can potentially be strong influences upon behavior.

Behavioral psychologists are familiar with designing environments so that desirable behavior will be reinforced and increased in frequency. Tangible rewards could, for example, be given to reinforce desirable behavior. Money is one such reward which is universally desired and easily dispensed. Other types of tangible rewards can also be dispensed; T-shirts, trophies and certificates. Tangible items can communicate praise and recognition, and can increase social support (Fredericksen, 1985).

Social support among coworkers might be emphasized within each smoking cessation group. If the smoking cessation groups are comprised of employees who form an ongoing and naturally

occurring social groups, social forces such as group standards and customs might develop which enhance the contingency's impact over time (Suedfeld, 1982).

Social support can also originate from organizational supports. For instance, support might come from congratulatory announcements from a plant manager or from an article in a company newsletter. Organizational support might be manifested by information on a bulletin board about which people in which groups are still abstinent, and which group is winning.

These procedures can be complementary not only at one point in time, but over time as well. Once an organization has made a commitment to reinforce nonsmoking behavior, a series of smoking interventions can be instituted. An evaluation of one nonsmoking program can influence the selection of the next nonsmoking program.

For employers

Cost benefit

Since executives are the gatekeepers by which psychologists are invited into or prohibited from worksites, executive perceptions of smoking interventions are critical. In general, executives perceive a different set of costs and benefits than do psychologists to worksite smoking interventions. Some executives intuitively summate all the costs and benefits. If the costs are seen as smaller than the long term monetary benefits as a result of the intervention, the intervention might be considered as cost

beneficial. If one company found a smoking intervention to be cost beneficial, all similar companies might have an incentive for offering smoking cessation programs.

Smoking interventions might be intuitively considered to be more likely than other health promotion programs to be cost beneficial to companies. The cost of setting up a gymnasium might be substantial and the financial benefits of creating a fit body slim. In contrast, smoking intervention programs need little equipment, thus incurring few costs. The benefits of quitting smoking can be great; much money could be saved by preventing one case of lung cancer or heart disease.

The process of specifying the costs benefit of smoking interventions is quite vague. Weiss (1981) has estimated that a smoker incurs \$4600 more than nonsmokers to a company. A more realistic estimate is provided by Kristein (1983), who took aggregate data and applied that inexact data to prototypic companies. He identified three areas where smokers incur more costs than do smokers to companies; health insurance costs, absenteeism, and productivity. A number of line items with smaller costs were also identified; fire and life insurance, workmen's compensation, health costs due to passive smoking, and chances of losing a smoking-related lawsuit which were translated into a dollar figure. Kristein (1983) assigned costs, actually confidence intervals to each line item and then summed the confidence intervals. He estimated that each average smoker can

incur \$340 to \$600 more than do nonsmokers to companies (1980 dollars). Fielding (1984) basically took Kristein's figures and similarly estimated that each average smoker incurs \$200 to \$500 more than do nonsmokers to companies. He estimated that given low-cost smoking cessation programs, company benefits can exceed company costs for the smoking intervention after three years.

Other benefits from smoking interventions can also occur. Employee morale might be effected by a successful smoking program. Heightened morale might be translated into costs through categories of greater productivity or lower job turnover.

Company executives often have their own formulas for knowing how to estimate the worth of heightened morale (S. Zaccaro, personal communication, August 13, 1986). Another benefit which is hard to measure is how smoking interventions might make the company look more attractive to desirable job candidates. Other subtle, organization-wide benefits includes the publicity a company might receive in the community media and in trade journals.

These benefits might be contrasted to the costs of a smoking intervention. Costs might be simply defined as a facilitator fee and as the lost productivity of employees if the intervention is held on company time. Other costs might include the cost of sponsoring an unsuccessful program. For individuals, failing at quitting smoking might reduce one's self-efficacy about personal control over health habits and other behaviors (Brownell et al., 1986). An organizational cost might be anything that could go

wrong. Company morale could decrease if many employees failed to quit smoking, if nonsmokers or adamant smokers resented the attention paid to those ready to quit smoking, if the smoking intervention were used to mask other organizational issues, and so on.

All of these costs and benefits could vary greatly from one company to another. Because of this, data from individual companies might be most useful in helping companies of similar characteristics decide if smoking interventions might be worthwhile. Regrettably, no data to date shows any smoking intervention saves more money than it costs. Not even one line item from Kristein's (1983) list of benefits has been validated with case studies. Executives, having heard the line "it will save you money in the long run" before, tend to distrust this line of reasoning. The only clear evidence to date is that health promotion programs cost money (Fielding, 1984). The first step psychologists might take to being fiscally responsible is to document the cost effectiveness of their approaches.

Cost containment

Executives seem somewhat more open to viewing smoking interventions as resulting in another type of savings; namely, a savings in health care costs without regard to the initial costs.

This perspective might arise from executives being pressured by internal sources or by insurance companies to lower health care costs. Health care costs represent a crisis to companies; for

example, in Fortune 500 companies, health care costs represented 24% of after-tax profits. Moreover, health care premiums have been rising at an average rate of 20% a year (Herzlinger & Schwartz, 1985). Thus, some executives are frantic for finding ways to contain these costs. Smoking interventions represent one possible way.

Employee benefit

Many executives combine the above advantage of smoking interventions with a final advantage for justifying smoking interventions; smoking interventions are a benefit to employees. Some executives believe that by sponsoring smoking interventions, they show their commitment to employees. In response they hope employee morale is lifted and commitment to the company is heightened. Some executives see heightened commitment to the company as a justifiable outcome measure in itself; others might translate this into reduced employee turnover, and in turn, savings in training new employees.

For employees

Finally, employee perspectives are also important. They might perceive smoking interventions to be a benefit. Smoking interventions are convenient, requiring a minimum of scheduling and travel. Also, the employee assumes the executives reviewed the program and found it acceptable. If the employee trusts the judgement of executives, a substantial proportion of people's natural suspicions are eliminated when the company sponsors the

program (Parkinson, 1982).

Often, however, work conditions are such that employees do not trust the judgement of executives. Some employees might see other work conditions as more important to change first, such as toxic dust levels in the worksite air. Others might feel smoking helps them function in the face of deadlines and poor work conditions. Or employees might resent being underpaid or resent past managerial decisions. This resentment could lead to the subverting of any smoking intervention.

Summary of perspectives upon
worksite smoking interventions

Many advantages exist to sponsoring worksite smoking interventions. Psychologists see worksite interventions as a means of impacting on the smoking problem and of redressing current weaknesses in modifying smoking behavior. Some executives who are concerned about health care costs might perceive smoking interventions as a way to contain or reduce health care costs. Some executives may alternatively or additionally justify smoking interventions as a benefit to employees. Finally, employees might perceive smoking interventions as a benefit.

Types of organizational interventions

Hallett (1986), in a review of worksite smoking interventions, identifies four types of interventions. These are a treatment approach, a partial or total restrictions on smoking,

an incentive program, or some combination of these three. The treatment approach of smoking cessation groups have already been discussed, although the effect of such an approach upon the whole company is unknown (Fielding, 1985).

Restricting smoking

Little is known about the impact of partial or total bans on smoking, even though about half of U.S. companies have some restrictions on smoking (NISCH, 1979). Most restrictions are partial bans on smoking. Without supportive data only hypothesized effects of partial smoking bans can be examined. One effect might be that smokers develop a pattern of smoking which compensates for periods when they cannot smoke. For instance, sometimes professional staff can smoke in their own offices but not in common meeting areas. They might learn to interact with others without smoking but might still associate working individually with smoking. Restrictions in blue collar worksites often allows smoking in common areas but not work areas, leading employees to associate smoking with relaxed socializing. Partial bans, then, might not weaken the smoking habit.

Even total bans may not significantly affect smoking rates. In the one published study of this nature, Rosenstock, Stergachis and Heaney (1986) examined a total ban on worksite smoking in a Health Maintenance Organization spanning 35 locations and employing 6,000 people. They had an employee

advisory board and free smoking cessation classes. Four months after the total ban was instituted, they sent questionnaires to 11% of all employees, and received 445 (65%) responses. Only two of the responding smokers (67) were in the free smoking cessation classes. Only three ex-smokers had quit around the time the smoking ban began. Overall, this study tends to suggest that total bans may not have strong effects.

Moreover, restrictions can easily engender resentment; certainly a strong cost in terms of company morale. A recent survey (Fielding, 1986) indicated only 12% of nonsmokers and 4% of smokers support total smoking bans at worksites. Resentment from restrictions arose when executives at the Mansville Company instituted a total ban on smoking at the worksite in 1976. Unions took legal actions which resulted in the reestablishment of smoking areas (Hallett, 1986). All smoking restrictions need not cause so much strife: the Mansville Company had a record of poor management-labor relations. Rosenstock et al. (1986) and Fielding (1986) give specific suggestions on how to market worksite smoking bans so as to minimize resentment. For the purposes of the present study, however, another smoking intervention procedure appears to be more promising.

Incentives and rewards: rationale

Unlike restrictions, incentives fulfill Koop's (1987) admonition to be instructive and persuasive rather than coercive when we promote health. Restrictions focus on what should not be

done while incentives focus on the desirable behavior. Rather than requiring people to make changes, incentives motivate people. Incentives can provide a game-like and light-hearted atmosphere, contrasted to the prohibitive and paternalistic message of restrictions. Thus restrictions may be one obvious way to physically structure an environment, but the greater acceptance of incentives may make incentives a more viable way of changing norms that govern health behaviors.

The operative mechanism in incentives is information. Information about incentives rearranges the antecedents of nonsmoking behavior. Once the incentive is awarded, nonsmoking behavior is reinforced by providing a pleasant consequence of nonsmoking behavior; so at this time the incentive is more accurately called a reward. Both incentives and rewards can reinforce nonsmoking behavior.

Another definitional issue is whether an incentive and reward program, dispensed in a worksite, can be considered as an organizational intervention. To reiterate a point made earlier one program by itself is unlikely to reflect an enduring change in values on the part of a company or its employees. For this reason an incentive and reward program might be considered as one step towards an organizational intervention. Should more, similar steps be taken then the cumulative intervention could be considered as an organizational intervention.

Beyond definitional issues, there are strong reasons in

behavioral psychology to explain why incentives and rewards should promote nonsmoking behavior. For instance, the naturally occurring benefits for quitting smoking is increased health. This benefit is delayed in time. This benefit is uncertain: Individual smokers might think they would not have contracted a smoking-related disease. This benefit is vague: The removal of a risk never experienced is not a salient image.

Generally the consequences which are most effective in increasing desired behaviors are immediate, certain, and clear. The naturally occurring consequences of quitting smoking fails on all three dimensions. Yet incentives are certain, clear, and relatively immediate consequences for nonsmoking behavior. So incentives are more able to counteract the immediate, certain, and salient effects of relapsing back to smoking. Seen in this light, incentives represent a bridge between short term costs and long term benefits of quitting smoking (Fredericksen, 1985).

Incentives which are seen as "bribe" money might not be effective. The extrinsic motivation should not be large enough to entirely justify the response of not smoking (S. Geller, personal communication, June 5, 1986). If the incentive is the only factor influencing a person's decision to stop smoking, they might be likely to resume smoking again when the incentive is removed.

The intent of incentives is to get the desired habit started: to give a boost when the naturally occurring reinforcers

are not sufficiently strong to induce the behavior. As time passes, ideally the potency of the naturally occurring reinforcers increases (or the aversiveness of being a recent nonsmoker decreases). When the time period specified by the incentive expires, the naturally occurring benefits of not smoking might be sufficiently strong to maintain nonsmoking behavior, and the healthy behavior itself might become a habit.

This rationale for the incentive must be clearly communicated to employees. At first the incentive serves to arouse the attention of potential participants. As the group begins, the purpose of the incentive needs to be reiterated; to be a boost and a bridge, not a bribe. Participants might be congratulated when the incentives are dispensed, then encouraged to keep their objectives clearly set upon the naturally occurring benefits of not smoking.

Determining characteristics of incentives and rewards

A series of studies have investigated how incentives might affect the success of smoking cessation groups. In all but two of these studies, people were repaid their deposit monies contingent upon their not smoking. The studies do show that incentives can prevent some relapses, and the studies can generate ideas about the financial incentive's optimal parameters. However these speculations have limited value because of the equivocal results and limited replications. Also, incentive money was initially supplied by participants: clients

might be motivated by not wanting to lose money rather than by wanting to gain money. This difference might affect subsequent action. Third, only financial types of incentives were considered. Worksite interventions might offer more types of incentives. Even if financial incentives are used, the social consequences of the financial incentives can activate other types of reinforcers within the worksite.

The first study of using incentives with those quitting smoking was by Elliot and Tighe (1968). In a 12 to 16 week program, group participants deposited \$50 to \$65 (all dollar amounts must be adjusted for inflation according to the year the study was conducted). As time passed, the interval of reinforcement and amount of money given for abstaining from smoking were steadily increased. At the three month follow-up, 38% remain abstinent.

Winett (1973) used an experimental design and community subjects. In one condition a \$55 deposit was repaid in \$10 to \$15 installments weekly, contingent upon achieving the treatment goal for that week. Having deposit monies repaid contingent on not smoking resulted in a higher abstinence rate (50%) than was achieved in the noncontingent condition. This difference was significant even at the six month follow-up mark.

Lando (1976) lengthened the period for repaying the deposits. After subjects were administered an aversion procedure, some participants were assigned to a contingency

condition where contact with therapists were maintained. Others were assigned to a non-contingency contact condition or to a wait list group. In the contingency condition subjects deposited \$50. Ten and 15 dollar refunds were repaid as in the Winett (1973) study, only the last two refunds were dispensed six weeks and 16 weeks after quitting. This time, the significantly higher abstinence rate of the contingency group was reduced to insignificance by the third month. The next study by Lando (1977) used the repayment of deposit monies as one component of a multicomponent cessation program. At the six month follow-up 76% in the multicomponent group were nonsmokers as opposed to 35% in the control condition. Yet the research design allows no conclusions about the effect of the contingency contracting to be made.

Spring, Sispich, Trimble and Goeckner (1978) found a strong short-term effect. Unfortunately they did not report amount of deposit or time length of the contingency contract. A contingent deposit group resulted in 71% abstinent at the end of the smoking cessation group. This was in contrast to 14% and 23% not smoking in "pledge" and non-contract groups. These differences were reduced to insignificance at the one year follow-up.

Paxton (1980) also found that a deposit group did significantly better than a no-deposit group, at least for the first month after the group ended. This difference was no longer significance by the end of the second month, even though the

final installment of refunds was repaid at that two month mark.

Next Paxton (1981) examined if the frequency of repaying deposit money and the length of the repayment schedule affected quit rates. Roughly \$33 (20 English pounds) were collected and repaid to participants in weekly or fortnightly payments. Also, some participants deposited double the amount, \$66 instead of \$33, and then received twice as much money back when they did not smoke as did those who deposited \$33. Findings indicated that whether repayments were weekly or fortnightly did not make a significant difference. There was a significant difference in abstinence rates between those having the contingency of \$33 and those having the contingency of \$66. This difference lasted until the end of the second month, at which time the time period of the contingency contract was over.

Stitzer and Bigelow (1983, 1984) also found the amount of money dispensed affected the smoking habit. They gave money to smokers without first collecting a deposit, and they simply rewarded smokers for having lower carbon monoxide readings. They paid smokers to essentially reduce smoking for two to five hours before a daily, prescheduled assessment period. Participants smoked less when larger monetary rewards of \$10 were offered as opposed to \$2. This trend was seen between subjects (Stitzer and Bigelow, 1983) and across time for the same subjects (Stitzer and Bigelow, 1984).

Bower, Winett and Fredericksen (1987) examined the effects of repaying deposit money contingent on abstinence from smoking as opposed to a contingency of attendance at group meetings. Those in the

abstinence-contingency condition also met more often and were given more information. Deposit money amounts varied from \$50 to \$300 depending on income. Deposit money was repaid in the following manner: 30% post quit day, 20% one month later, 20% two months later, 20% three months later, and 10% six months later. Abstinence rates were significantly better for those in the abstinence-contingency condition (43% as opposed to 14% abstinent) even at the six month mark.

Several trends can be identified from these studies. First, reinforcing nonsmoking or reduced smoking with financial incentives significantly effects abstinence rates, at least for periods of six weeks and less. Second, higher amounts of financial incentive produced higher abstinence rates (Paxton, 1981) or reduction in smoking (Stitzer and Bigelow, 1984) for at least a short time period.

Third, the ability of these monies to maintain nonsmoking behavior over time is less clear. Winett (1973) did find that the contingency contracting had effects lasting for six months. Bower, Winett and Fredericksen (1987) also found that the contingency contracting had effects lasting for six months, although the study involved manipulating another condition along with the contingency contracting. In the other studies (Lando 1976, Paxton 1980, Paxton 1981, Spring et al. 1978), the effect of contracting faded into insignificance by the eighth week after the quit date.

Hunt and Baspalec (1974) see the majority of stop-smoking group participants as relapsing by the fifth week after the quit date. Perhaps the contingencies presented above helped those who might have

relapsed by the fifth week continue abstaining until the eighth week. Marlett and Gordon (1985) refer to this elongation of the inevitable when they say that all certain techniques "may do is project the cannonball a little bit further before it finally hits the ground" (p. 45).

On the other hand, perhaps a rearrangement in the reinforcement schedule would have permanently kept some people from smoking. The contingencies in the Paxton (1980, 1981) studies were, after all, only in effect until the eighth week past the quit date. Both Paxton (1981) and Spring et al. (1978) speculate that contracting for longer periods of time than was done might be more effective.

General rules of thumb can also guide development of the incentive system which promotes nonsmoking. O'Brien and Dickinson (1982), in a review of incentives to be used for various types of worksite programs, notes that incentives or reinforcers should be sufficiently potent to prompt performance of the desired behavior. What is considered to be sufficiently potent is likely to vary from one targeted behavior to another. For instance, in wearing safety belts the incentive need not be large; group discussions among coworkers about the value of seat belts might be just as effective as more costly lottery prizes to prompt the wearing of safety belts (Geller, 1983). Yet in reducing or quitting smoking the incentives of greater value might prompt more performances of the desired behavior, as indicated in the work of Stitzer and Bigelow (1983, 1984) and Paxton (1981).

Incentives must be meaningful to the affected parties. Suedfeld

(1982) notes that a sharp eye is needed to identify what incentives might work in a particular setting. Even items such as time off from work, or choice of job assignment or vacation time might be feasible and potent.

Money, of course, is an incentive that many people find meaningful. Certainly money is not a sufficiently strong motivator for everyone, and not everyone will quit smoking no matter how much money was offered to them. Yet money is widely valued and might appeal to a wide range of people.

Another advantage of using money as an incentive and reward is that its amounts can be delivered in units which are easily specified. This means that one motivator to quit smoking can be clearly operationalized. Moreover, incentive and reward programs which use money can be more exactly replicated in other settings than can more individualized reward systems.

Overall, many factors might affect the potency of an incentive. Suedfeld (1982) articulately summarizes this point when he notes effective incentives "are part of a very complex web of forces and other reinforcements not controlled by change agents.... A contingency may be ineffective not because the reinforcer is itself too small or insignificant, but rather because it is administered in such a manner as to fly in the face of more powerful reinforcers..."(p.165).

Example: Incentives and rewards in
worksite weight loss competitions

Research in worksite weight control has progressed faster than the

area of smoking cessation has in taking advantage of the structural features of the workplace. As with smoking cessation, monetary contingencies administered in group interventions were found to increase the desired behavior (e.g., Jeffery, Thompson, & Wing, 1978). Yet group interventions as a whole were not as effective when administered in worksite settings. Stunkard and Brownell (1980), for instance, conducted smoking cessation groups at a worksite. The high attrition was high (50%) and the weight losses were low (7.9 pounds), definitely inferior to the results of the same program in a clinic setting (Brownell, 1982; Jeffery et al., 1978). An unpublished study by Brownell, Stunkard and McKeon (1983; cited in Brownell et al., 1986) resulted in similarly disappointing attrition rates of 34% and weight losses among those completing the program of 9 pounds.

The first reported organizational intervention was by Abrams and Follick (1983). First a group intervention was conducted with disappointing results (48% dropped out, with program completers losing an average of 9.7 pounds). Then half of the participants were placed in an attention control group, and the other half in one of four groups. These four groups met fortnightly in groups, but they were also involved in an intergroup competition. Their weights were posted in a prominent place along with the weights of those in the competing groups. Each week the group losing the most weight (or gaining the least weight) was announced in a staff meeting. As a result these participants maintained significantly more of their initial weight loss than did those in the attention control condition.

Brownell, Cohen, Stunkard, Felix and Cooley (1984) expanded on the use of organizational support and intergroup competition. The presidents of three banks, each employing 200 to 300 people, challenged one another to a weight-loss competition in a formal announcement. Participants in each bank paid \$5. The pooled money was to be awarded to participants at the winning bank. A large board in the lobby of each bank plotted the weekly progress. The only formalized treatment involved weekly weigh-ins, and receiving a weekly installment of a treatment manual. The attrition rate was less than 5%. Men lost an average of 18.7 pounds and women lost an average of 11 pounds. The average participant maintained 80% of the weight loss at the six month follow-up.

Brownell et al. (1984) repeated these same procedures in two other situations, only this time the competitions were within companies. Participants were randomly assigned to teams within a Litton Industries manufacturing firm of 225 employees. In another manufacturing plant of 1,200 employees, participants within existing divisions formed the teams. These results were nearly as successful as the bank competition. The cost effectiveness of these interventions was far better than was achieved in university clinic settings. Finally, 71% of employees and 75% of managers reported improvements in morale after the intervention.

In a second outstanding study, Jeffery, Forster, and Snell (1985) examined the effect of withholding money from employee paychecks to encourage weight loss. In a six month program, 34 participants

selected their own weight-loss goals. Five dollars or more was withheld from semimonthly paychecks if weight-loss goals were not met. Participants were given self-help manuals, and weighed in and attended a seminar every payday.

As a result the attrition rate was 11.6%, and the mean weight loss after six months was 12.3 pounds, equal to standard group programs. Programmatic costs, largely borne by participants, were miniscule. Overall, this pilot study appears to have been quite successful.

These results indicate that intergroup competitions and financial incentives are extremely useful in promoting weight loss among employees. These organizational procedures might also be effective with smoking cessation.

Incentives and rewards in worksite smoking interventions

With smoking behavior, a number of uncontrolled studies of worksite smoking interventions suggest that incentives can be effective. Only one study to date utilizes intergroup competitions.

Rosen and Lichtenstein (1977) published the first account of giving monetary incentives to employees for stopping smoking. The owner of an ambulance company offered all employees \$5 per month if they did not smoke at work, including nonsmokers as well as then-current smokers. At Christmas time employee bonuses were determined by giving each employee the same amount as they received during the year for not smoking. Seventy five percent of all smokers participated, and 58% of them reported no longer smoking at work.

At Speedcall Corporation, all nonsmoking employees were offered \$7 a week for not smoking. In addition, the president quit smoking when the program began. Out of 36 total employees, the number of smokers decreased from 24 to 11 (Shephard & Pearlman, 1985).

Sorman (1979) reported on a very effective program which achieved a high participation rate. Out of 202 employees, 55 participated in a stop smoking program. The program also included some information on exercise and nutrition. Employees who quit smoking for one year received a \$200 reward as well as lottery chances for vacation trips. Thirty one percent of the participants quit cigarettes for the entire year.

Another very successful program was conducted by Dow Chemical Company, Texas Division. They let employees earn a chance in a raffle for each month they did not smoke, with a year-end prize of a \$3,600 fishing boat. In addition, employees who were nonsmokers before the program began could earn chances for the raffle of a second boat for every month the smokers they recruited into the program remained quit. In addition, \$50 was raffled four times during the yearlong program. Twenty four percent of the company's smokers enrolled in the program. One year later 76% of these were nonsmokers. Overall, eighteen percent of company employees who originally smoked quit smoking (Ellis, 1979).

At Intermatic Company employees could wager up to \$100 that he or she would not smoke for one year. Those who won their bets also had \$1,000 divided among them. In a similar program conducted the next year, those who won their bets had the chance to win an all expenses

paid trip to Las Vegas. About 120 smokers participated, with 46% remaining abstinent for one year (Shephard & Pearlman, 1985; Suedfeld, 1982).

Stacknik and Stoffelmayr (1983) evaluated a worksite smoking intervention where incentives and 20-session smoking cessation programs were implemented. The same conditions were applied in three worksites, and 47% to 70% of all smokers enrolled in the program. Eighty to ninety one percent of participants reported not smoking at the six month follow-up.

A far less impressive result, yet one that was biochemically verified, was presented by Rand, Stitzer, Bigelow & Mead (1984), where 18 hospital employees were paid to alter their smoking habit. After one week of baseline and a week-long "cutdown test," subjects could earn \$12.00 a day for 2 weeks if they totally abstained from smoking. Smoking statuses were checked daily with carbon monoxide readings. Three weeks after the program ended, 28% remained abstinent.

The investigator conducted an incentive program at a company. At the Roanoke Times, a company of 550 employees, 14 people signed up for a smoking cessation group. Any participant who remained smoke-free for a year received a week's vacation or a week's pay. Two months after the quit date 12 were still abstinent as verified by carbon monoxide readings. Six months and 12 months later only 36% of the participants were still abstinent as verified by carbon monoxide readings. Perhaps if incentives were offered more frequently the success rate would have been higher. Several relapsed participants

complained that after the group ended they never saw their fellow participants again, and they lost their motivation to remain smoke-free.

None of the above interventions were controlled studies. Shephard and Pearlman (1985) report on many additional uncontrolled studies, 15 in total. Many of these studies had previously been unreported. For instance, a savings and loan association in Alabama gives nonsmoking bonuses of \$20 per week. Cybetek Computer Products in California pays \$500 to smokers who quit for one year (25 of the 40 smokers abstained for one year). An office machines company in Illinois gave \$100 savings bond to those quitting smoking for one year. Analysis & Computer Systems gave increasing monthly bonuses of \$50 to \$300 to smokers who quit.

Overall, Shephard and Pearlman (1985) report that the average incentive program resulted in a one year abstinence rate of 52%. When total abstinence was the desired behavior, 63% of participants were abstinent at the one year follow-up. This is far superior to the results of group interventions. Moreover, available figures indicates that the participation rates were high. Fifty three percent of the employees at all 15 companies smoked before the incentive programs. Afterwards available data indicates that 27% smoked. Not only the quit rates, then, but also the participation rates appear to be quite high. Shephard concluded that these studies, admittedly uncontrolled, suggested that controlled studies investigate the potential of incentive systems.

One published controlled study

Thus far, that potential has not been realized. No well-controlled studies have yet shown that worksite smoking interventions are more effective than alternative programs. Only one controlled study has been published to date, and this controlled study is only the second one to use biochemical verification. Klesges, Vasey, and Glasgow (1986) recruited four banks to compete among one another, and a fifth bank to serve as a control group. These banks were similar in type of worksite, type of employee, and geographical location, although no measures were taken to assess equivalency of job stress or job commitment.

The bank presidents challenged one another at a press conference, and employees attended group sessions on company time. Participants were encouraged to wear buttons saying "I'm in the healthy competition" to increase social support. Feedback on how each worksite was doing was prominently displayed at each setting. Prizes to benefit both smokers and nonsmokers were awarded to the bank with the highest participation rate (\$100), and to the largest reductions in carbon monoxide levels at posttest (\$250). A final prize went to the bank with the greatest abstinence rate at the six month follow-up; a dinner catered by the employees of the losing bank!

Participation rates in the program were exceptionally high: 88% of all smokers at the competing banks entered the program. However, few people quit smoking. Only 14% of the 91 participants quit smoking at the six month follow-up mark. Overall this result is not encouraging.

yet it was significantly higher than the 7% (one out of 16 participants) who quit in the control condition. Because of the low quit rate, this study has been criticized as not increasing the total number of employees who quit smoking (Hessol, 1986).

A review of the work by Glasgow and associates (Glasgow, Klesges, Godding, & Geggelman, 1983; Glasgow, Klesges, Godding, Vasey & O'Neill, 1984; Klesges et al, 1986; Malott, Glasgow, O'Neill, & Klesges, 1984), however, reveals two differences from typical smoking cessation programs. First, their intent is to have participants either reduce their smoking or quit smoking. Both, participants are told, are worthy goals. Klesges et al. (1986) state the purpose of having dual goals is to increase participation rates. Yet this research team has not publically commented on how the goal of controlled smoking might affect eventual quit rates. Having reduced smoking praised as a desirable behavior might weaken the motivation of participants to totally abstain from smoking.

A second observation of these studies is the abstinence rates from this research team are uniformly low. In Glasgow et al. (1983), the abstinence rate was 9% after 6 months. In Glasgow et al. (1984), abstinence rates for three treatment conditions after 6 months was 0%, 33%, and 0%. In Malott et al. (1984) abstinence rates for both treatment groups was 17%. Thus, the study by Klesges et al. (1986) may have given disappointing results simply because they administered a smoking cessation program that has produced unimpressive results in clinics (Glasgow et al., 1983) as well as worksites (Glasgow et al.,

1984; Malott et al., 1984).

INVESTIGATOR'S PILOT STUDY

The investigator conducted a pilot study prior to obtaining a grant. In this pilot study a traditional worksite smoking intervention was compared to a worksite smoking intervention which used incentives. KDI Electro Tec and Federal Mogul, both of Blacksburg, Virginia sponsored these programs. KDI Electro Tec sponsored the traditional intervention and Federal Mogul sponsored the intervention which used incentives.

Comparability of the two worksites

Table 1 summarizes some characteristics of these companies. These characteristics include those identified by Glasgow and Klesges (1985) as important to consider when conducting this type of research. Overall these characteristics suggest the two worksites were similar.

Perception of the company by participants in the smoking interventions were also tapped. Questionnaires were completed which examined perceptions of the work environment and of work stress. Questionnaires which tap these perceptions are described and shown in Appendix A. Responses on these questionnaires are shown in Table 2, and generally indicate that workers perceive the worksite environment and work stress in similar manners.

Characteristics of employees participating in the smoking interventions were similar. Table 3 lists important characteristics of participants by worksite.

Treatment conditions were not randomly assigned. However, in a

Table 1. Comparison of Worksites

Indices	Company	
	Federal Mogul	KDI Electro Tec
Product produced	piece for combustion engine	piece for electrical engine
Number of employees	615	349
Percentage blue collar workers	81%	74%
Percentage white collar employees	18%	18%
Percentage clerical workers	2%	8%
Education level of new applicants	HS diploma	HS diploma
Average education of blue collar workers	10-12th grade	10-12th grade
Starting salary for blue collar	\$9.00/hour	\$7.00/hour
Race	4% black	3% black
Percentage female	31%	42%
Union shop	yes	no
Management support for smoking intervention	yes	somewhat
Annual turnover rate	3.2%	15.1%
Need for company product	strong	solid
Company morale	good	somewhat low
How much of plant has smoking restricted?	0%	10%
What other health promotion efforts have been done recently?	hypertension screening	wearing safety glasses

Table 2. Comparing Federal Mogul and
KDI Electro Tec participants on
questionnaire responses

A. The Work Environment Scale

Scale	Company				t-test
	Federal Mogul		KDI Electro Tec		
	mean	(standard deviation)	mean	(s.d.)	
Involvement	3.6	(2.36)	4.1	(2.03)	.67
Cohesion	4.0	(2.11)	4.2	(1.92)	.37
Supervisor support	4.5	(3.47)	3.5	(2.84)	1.27
Autonomy	4.7	(2.88)	4.7	(2.59)	.09
Task orientation	4.1	(3.10)	4.5	(2.36)	.74
Work pressure	4.6	(2.66)	6.8	(2.32)	3.48 *
Clarity	4.4	(2.26)	4.0	(2.69)	.69
Control	4.7	(3.04)	6.0	(2.57)	1.43
Innovation	4.7	(1.88)	3.8	(2.55)	1.19
Physical Comfort	4.4	(2.41)	4.5	(2.63)	.11

* $p < .005$

Table 2 (continued)

B. Answers to the Stress-Conflict Questionnaire,
listed by question number.

	Federal Mogul		KDI Electro Tec		t-test
	mean	standard deviation	mean	s.d.	
1.	1.68	.762	1.65	.822	.874
2.	1.81	.997	1.88	1.07	.209
3.	2.32	1.14	2.00	1.14	.939
4.	2.62	1.22	3.06	1.21	1.090
5.	3.23	1.18	3.65	1.29	1.035
6.	3.05	1.15	3.12	1.57	.215
7.	1.50	.72	2.12	1.08	2.081 *
8.	2.27	1.08	2.94	1.35	1.781
9.	1.32	.56	1.53	.78	.962
10.	2.68	1.54	2.44	1.41	.488
11.	1.86	.97	2.29	1.36	1.125
12.	1.86	1.06	2.42	1.20	1.084
13.	1.36	.71	1.82	.89	1.740
14.	2.32	.85	2.33	.89	.227
15.	1.50	.54	1.85	1.17	1.043
16.	2.55	1.13	3.07	1.33	1.155

p < .05

Table 2 (continued)

C. Responses to the Organizational Commitment Questionnaire, listed by question number.

	Federal Mogul		KDI Electro Tec		t-test
	mean	standard deviation	mean	s.d.	
17.	6.05	.64	6.47	.78	1.800
18.	5.28	1.54	4.94	1.62	.581
19.	5	1.38	1.65	.57	1.836
20.	5	1.45	4.82	1.96	.321
21.	4.24	.81	4.33	.97	.269
22.	5.77	.45	6.18	.89	1.603
23.	3.59	1.24	3.94	2.01	.886
24.	3.36	2.08	4.06	2.31	.968
25.	2.81	1.25	1.88	.38	2.335 *
26.	6.27	.38	6.18	1.10	.349
27.	3.41	1.48	2.81	1.42	1.244
28.	5.13	1.18	4.94	1.46	.438
29.	6.32	.69	6.18	.84	.295
30.	1.19	.38	1.47	.70	1.610
31.	5.54	1.45	5.53	1.45	.184

* $p < .05$. This question was, "It would take very little change in my present circumstances to cause me to leave this organization."

Table 3. Demographic Characteristics of Participants

Indices	Company	
	Federal Mogul	KDI Electro Tec
Number of participants	23	17
Number of males	14	3
Average age	38.2	40.1
Average years smoked	22.8	23.5
Daily amount	31.2	31.4
Nicotine content of each cigarette	1.0 mg	.8 mg
How many participants quit once	9	7
How many participants quit twice	3	1

practical sense, both worksites were willing and ready to run interventions which used incentives. KDI Electro Tec consented to run an incentive intervention. Yet due to conflict with another student's study, the investigator withdrew the offer to run an incentive intervention there.

Procedure of non-incentive intervention

The intervention at KDI Electro Tec was a traditional intervention. Recruitment procedures included many posters, an article in the company paper, and talk among the managers. Employees were given two weeks to sign up. Participants attended an orientation meeting, then joined a smoking cessation group lasting eight sessions. Participants received their \$25 deposit back when they quit smoking for six months but otherwise no incentives were offered. The group was led by the investigator, was held on company time, and was held in the Spring.

Procedure of incentive intervention

The intervention at Federal Mogul was an incentive program. Participants attended an orientation meeting and then joined a smoking cessation group by paying \$25. Content of the meetings, based on a manual developed by the investigator, was equivalent at each worksite. The groups were not held on company time and instead held right after or right before working hours. Three groups were run by the investigator, corresponding to what times the employees began or ended work. The intervention was held six months later than the KDI Electro Tec intervention.

In addition several incentive programs were held at Federal Mogul. Incentive programs included two incentives based on group performance, one incentive based on individual performance, and public recognition.

In the orientation meeting three groups were formed, and each group was encouraged to get additional members to join their group. The group getting the most additional members would win a prize worth \$40 during a group meeting. Eventually the winning group used this to buy pizza and Coke.

Another group competition was a quit rate contest. Six months after the quit date all ex-smokers in the most successful group would receive a prize. The participants chose the prize of a free dinner at a nice restaurant. Participants chose to come as a group, chose the day of the dinner and chose whether spouses would come.

Incentives were also offered for individual performance. All participants received \$10 if they did not smoke for three days, and another \$10 for not smoking for two additional weeks. In addition, participants either had to attend all groups or tell a personnel assistant that they could not attend an upcoming group.

After the groups ended, ex-smokers received \$10 at the end of the first, second, third, fourth and fifth months. Thus ex-smokers received a total of \$70 in individual-based incentives.

Public recognition was given throughout the program. Posters congratulated the ex-smokers on several occasions. Participants received a certificate after five weeks of not smoking and received a congratulatory letter from the plant manager after eight weeks of not

smoking. After six months of not smoking participants received a t-shirt which showed a cigarette, an international no sign and the words "I quit."

Assessing smoking status

At KDI Electro Tec self-report was mostly used to assess smoking status. Participants were aware that a means existed of assessing smoking status, through a carbon monoxide detector, and knew this machine would eventually be used to assess smoking status. Self-report of smoking status was obtained on a monthly basis through the six month mark. At the seven month mark the carbon monoxide detector was used. Self-report was obtained at the nine and 12 month mark.

At Federal Mogul the carbon monoxide detector was used whenever incentives were distributed. All participants claiming to be smoke-free were assessed at the three-day mark, the two-week mark, the three-month mark, the six-month mark and the 24-month mark. Half the non-smoking participants, randomly chosen, were assessed at the one, two, four and five month marks.

Results of Pilot Study

At KDI Electro Tec 18 people attended the orientation meeting and 17 paid \$25 to join the program. Figure 1 shows abstinence rates over time. Continuous abstinence is represented; all participants who had one cigarette returned to smoking. After six months three out of 17 participants, or 18% of the participants remained smoke-free.

At Federal Mogul 23 employees paid \$25 to join the program. Two additional employees had joined but were laid off, so they only

attended two meetings. Another employee who only attended three meetings due to a broken arm is included in the count of 23 employees. Figure 1 shows the results: 13 of the 23 participants were continually abstinent for six months after the quit date, representing 57% of the total participants. At 12 months 11 were continually*abstinent, representing 48% of the participants. At 24 months 10 were continually abstinent, representing 44% of the participants.

Using chi-squares, the quit rate of participants in the incentive condition was significantly greater than the quit rate of participants in the traditional smoking intervention at the six-month mark [$\chi^2(1)=6.156, p<.025$], and at the 12-month mark [$\chi^2(1)=3.910, p<.05$]. Differences between quit rates were non-significant at the 24-month mark.

Effect upon Worksites

The total number of smokers were assessed at both worksites, both before and after the intervention. At KDI Electro Tec supervisors counted 99 smoking employees out of 349 total employees. One year later the company conducted another company-wide survey; out of 357 employees 99 were found to be smokers. Inbetween this time 62 people joined and 54 left the company, and the smoking status of these people was indeterminable. Participants noted that 3 people tried to quit smoking on their own during the intervention but none succeeded. Thus the KDI Electro Tec employees do not appear to be quitting smoking on their own.

Before the intervention, at Federal Mogul 208 employees were

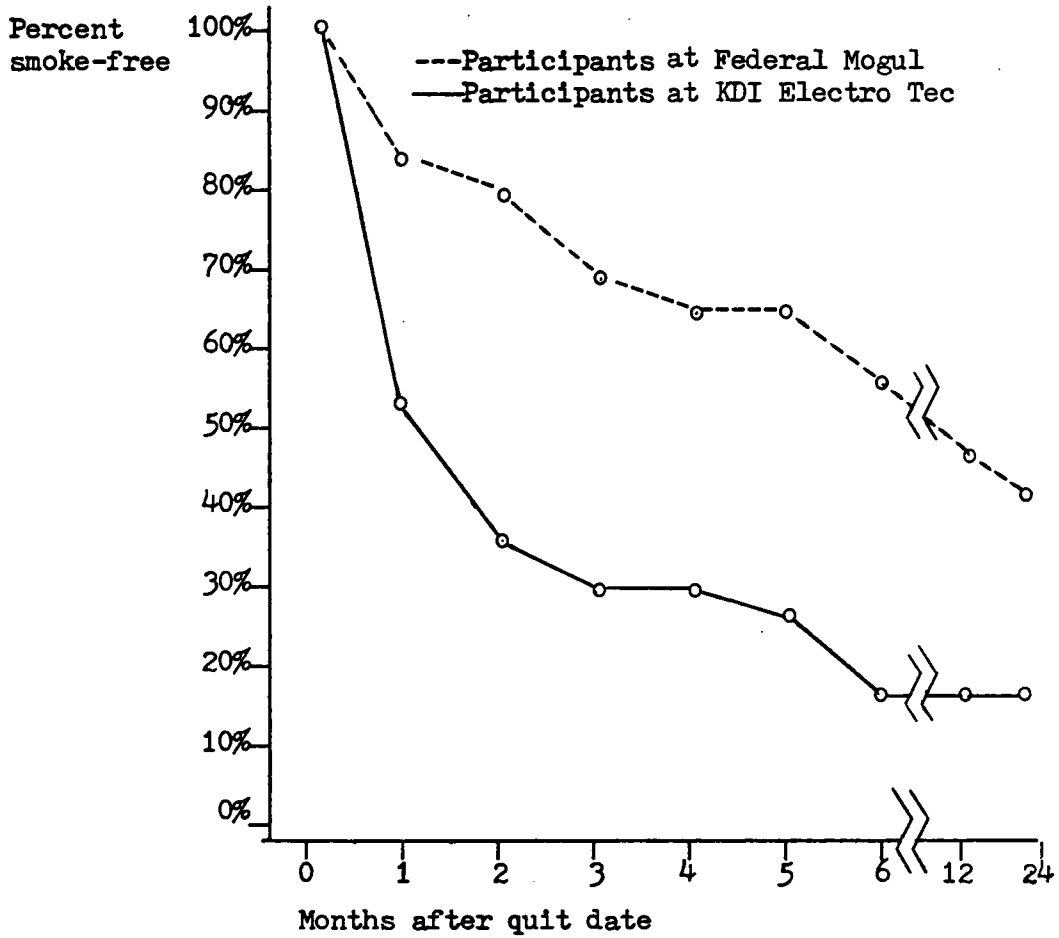


Figure 1. Percentage of Participants at KDI Electro Tec and Federal Mogul who Remained Smoke-free over Time.

assessed by department heads to be smokers, out of 618 total employees. Seven months after the intervention department heads reported 191 out of 614 employees were assessed to be smokers. In this time 20 people left and 16 joined the company. Six of those leaving were smokers and five of those joining were smokers. These numbers suggest several people quit smoking on their own. Participants reported that four people did quit smoking on their own during the intervention. These four people were contacted, and they self-reported being continuously smoke-free for three months or more. In addition, three people were found to quit smoking in the seven months preceding the intervention.

The McNemar test for significance of changes was used to determine if the total number of smokers significantly changed within KDI Electro Tec and within Federal Mogul. For each company the number of employees who quit was compared to the number who continued to smoke, minus those smokers who left the company in the next seven months. The results of this comparison was not significant at KDI Electro Tec ($\chi^2(1)=.00$, ns). However the reduction in smoking employees at Federal Mogul was significant ($\chi^2(1)=15.00$, $p=.001$).

Post-hoc analyses support the differential effects of the intervention on the two worksites. McNemar's Sign test was used to determine if the KDI Electro Tec intervention had a significant effect even upon the participants for seven months. Where only three participants quit smoking ($\chi^2(1)=3.00$, ns), this reduction of three smokers could simply be due to chance.

Other post-hoc analyses can be performed to compare

pre-intervention smoking rates to post-intervention smoking rates. At Federal Mogul the number of people who quit smoking in the seven months preceding the intervention represented a within-group control group. These people were contrasted to those who quit during the intervention. Measured against this control group, the intervention was again found to result in a significant reduction of smokers at Federal Mogul ($\chi^2(1)=12.528, p=.005$).

Subjective reports of participants and nonparticipants

Participants at KDI Electro Tec were overall quite discouraged about their attempts to quit smoking. They reported how nonparticipants knew most all the participants failed to quit smoking. Their personnel manager said he was disappointed in the low quit rate and had heard disparaging comments by middle management.

Participants at Federal Mogul were overall quite positive about quitting. Unlike the other intervention, people talked about those who remained quit rather than those who relapsed. The personnel manager was very pleased with the intervention.

Federal Mogul participants were asked about how the incentives affected them. Roanoke Times participants, who received a week's vacation or a week's pay for quitting smoking for one year were asked the same questions. Questions and responses are shown in Table 4.

Nonparticipants at Federal Mogul, 89 in total, were also surveyed. When nonparticipants were asked how they felt about management giving incentive money to people quitting smoking only one out of 89 had a less than favorable response. Only that one employee responded less than

Table 4. Questionnaire Regarding Incentives, Answered by Participants at Federal Mogul and Roanoke Times.

Scale: 1. yes 2. no 3. don't know
 1. agree 2. disagree 3. don't know
 1. big difference 2. little difference 3. don't know

At Federal Mogul, incentives were \$50 over initial fee, public recognition and a t-shirt. Also, some participants were given dinner at a fine restaurant, and others got pizza and cola in a group meeting.

At Federal Mogul, incentives were a week's vacation after one year of not smoking.

Company: Federal Mogul Roanoke Times
 n = 15 10

The incentive was a major reason why I joined this program.	1. 0	7
	2. 15	3
In my body I have really felt the health benefits of not smoking.	1. 7	8
	2. 3	1
	3. 5	0
The incentive has really made little difference in my staying quit.	1. 4	2
	2. 11	8
I can really visualize the fact that my risk of getting smoking-related diseases has gone down.	1. 12	6
	2. 1	2
	3. 2	2
Quitting smoking with others really helped me stay quit.	1. 14	10
	2. 1	0
For me, the group support was more important than the incentive was.	1. 12	8
	2. 2	2
	3. 1	0
I suspect some people at work resented my getting this incentive.	1. 2	6
	2. 13	2
	3. 0	2
The incentive has felt sorta wrong to me, like a bribe to get me to quit.	1. 3 *	1
	2. 12	8
	3. 0	0

Table 4 (cont.)

I'd think of the incentive often when I was tempted to smoke.	1.	3	7
	2.	11	3
	3.	1	0
I should have been asked to give suggestions on designing the incentive program. It sort of bothers me that I wasn't asked.	1.	0	0
	2.	15	8
	3.	0	0
I think we pulled together more as a group because of the incentive.	1.	2	7
	2.	13	2
	3.	0	1
When I'm tempted to smoke, I think of the incentive more than I do the health benefits of not smoking.	1.	2	7
	2.	13	2
	3.	0	1
It's okay to say that you don't, but do you feel better about your company for offering this program to you?	1.	15	9
	2.	0	0
	3.	0	1

Frequency count

If I were designing this incentive program, I would...		
..dispense incentives in the same way.	13	4
..give less money along the way and more at the end.	2	-
..change it to giving out funds on a monthly basis.	--	6

* These three said later that it felt like a bribe, but being bribed did not feel wrong. Their feeling was, "Whatever it takes to make you quit."

favorably to the second question, "How do you feel about some of your co-workers receiving money for quitting smoking?" This survey corroborated reports of participants: of all the participants, only two said they knew someone who expressed resentment about the program.

Use of counterbalanced design

A counterbalanced design was then employed. An incentive program was offered at KDI Electro Tec and a non-incentive program was offered at Federal Mogul. These were conducted at the same time. Thirteen months had passed since the KDI Electro Tec intervention and 7 months had passed since the Federal Mogul intervention.

At KDI Electro Tec participants chose to not have a participation rate competition. They chose not to have any public recognition for their accomplishments after they quit smoking. They did pay \$20 to join the program and received \$70 back in the same payment schedule that was used at Federal Mogul. All ex-smokers received a fine dinner at a local restaurant six months after the quit date.

At both sites only five employees joined each group, perhaps because a smoking cessation group had been conducted at each site within the last year. Six months and 18 months later, the quit rate was equal at both worksites; two of the five remain quit.

Discussion of pilot study

This pilot study examined the impact of offering incentives to employees who quit smoking. A smoking cessation group was offered at both worksites but one worksite additionally offered several incentive programs.

The success rate of individuals in the incentive program was significantly higher after one year than that of individuals in the non-incentive program. The incentive program made an impact on the smoking rates at Federal Mogul while the non-incentive program had no significant impact on smoking rates. The incentive program was favorably received. Participants liked it and they felt good about the company for offering it. Nonparticipants did not resent the rewards given to participants. Management was pleased with the program. In sum, the incentive program appears to have had a positive effect upon the smoking problem at one worksite.

Improving upon the pilot study

While these results are promising, various conditions posed strong threats to the internal validity of the study. First, the treatment was not randomly assigned to the companies. Second, the two companies could have been better matched; although they were similar in many respects, they constituted two separate corporations. Third, frequent carbon monoxide testing was employed within the incentive program but not within the non-incentive program. Perhaps the frequent testing, not the incentive, caused the quit rate in the incentive program to be so high. Finally, another aspect of this incentive program could be changed for the better. Multidimensional incentive programs can be difficult to replicate. For ease of dissemination to other companies, a singular type of incentive might be used. These issues will be addressed in the study described below.

HYPOTHESES

The first hypothesis is a between-group comparison. This hypothesis concerns the effects incentives and rewards might have on the success of a smoking cessation group. The first hypothesis is that significantly more people will quit smoking when financial incentives are offered along with a smoking cessation group than when just a smoking cessation group is offered.

The American Lung Association is sponsoring this research. They wish to see whether or not incentives and rewards can motivate more people to quit smoking and to remain smoke-free. Their smoking cessation program, the Freedom from Smoking program, will be used for the smoking cessation group.

Two worksites which are part of the same parent company will offer these two smoking interventions. At one worksite the Freedom from Smoking program will be offered to employees. At the other worksite the Freedom from Smoking program and financial incentives will be offered. Which plant receives which treatment will be randomly assigned.

The second hypothesis is more of a within-group comparison, and is a less powerful means of contrasting these two interventions. Initial smoking rates of participants will be compared to eventual smoking rates of participants. The second hypothesis is that after nine months, the incentive program plus the Freedom from Smoking program will have a significant effect upon the smoking rates of those participants. However the Freedom from Smoking program will not have a

significant effect on the smoking rates of participants after nine months.

The third hypothesis concerns the effect of the incentives upon participation rates. The third hypothesis is that significantly more smokers will participate in the Freedom from Smoking program when incentives are offered than when just the Freedom from Smoking program is offered. Due to unforeseen changes in procedures which are described below, this hypothesis could not be tested.

METHOD

Sample

The General Electric (GE) plants in Salem and Lynchburg participated in this study. Consenting executives were Mr. Alex Nuwmark, Personnel Director at GE Lynchburg and Mr. Roger Farley, Director of Employee Resources at GE Salem. In the presence of Ms. Shirley Lipscomb, Lynchburg Regional Director of the American Lung Association, GE Lynchburg was randomly chosen to offer the incentives. GE executives ask that when this study is published, which company offered the incentives is left unidentified.

Table 5 compares the two worksites. Some differences between the worksites can be noted. Overall the two worksites are quite similar, especially in having the same parent company.

The two worksites both offered American Lung Association smoking cessation groups on prior occasions. GE Salem had offered their program three years ago. Thirteen people participated and one remained smoke-free one year later. GE Lynchburg had offered their program only nine months before. Twelve people quit and four reported they were smoke-free one year later. Since the GE Lynchburg program had been conducted quite recently, it was expected that less people might participate than if the last smoking cessation program had been run several years ago.

To determine if the worksites were perceived in similar manners, participants anonymously completed a 90-question, true/false test known as the Worksite Environment Scale (Moos, 1985). This survey has easily

Table 5. Compared Characteristics of General Electric (GE) plants

Indice	GE Salem	GE Lynchburg
Type of electrical machine made	large (to power worksites)	small (car phones)
Number of blue collar workers	1000	1,200
Number of white collar workers	835	500
Number of clerical workers	165	200
Average blue collar education	H.S. graduate	H.S. graduate
Mean blue collar salary	\$410-600/week	\$380-400/week
Mean blue collar age / age range	45 / 40-60	50 / 40-55
Percent minority	10%	20%
Percent female	31%	40%
Turnover rate	8%	5%
How many came in last 6 months	0	50
How many left in last 6 months	50	25
Recent Layoffs	77 (2 months before clinic began)	103 (2 weeks before clinic began)
Need for company product	stable	growing somewhat
Company morale	somewhat low	pretty good
Union situation	calm	no union
How much of plant has smoking restricted?	10-12%	85%
Other health promotion efforts which were done recently?	Emphasis on safety; yearly physical for management.	Walking club; weight loss club; screenings for cholesterol, glaucoma, cancer and diabetes.

understood questions, takes little time to complete and is well-respected among industrial psychologists (J. Mishela, personal communication, April 1987; R. Sloan, personal communication, April 1987). The survey is shown in Appendix B and results of the survey are shown in Table 6. These results suggest the GE Lynchburg environment was seen by participants as more task oriented and more physically comfortable than the GE Salem environment was seen. However, considering the range of possible answers, the two worksites appear to be generally perceived in a rather similar fashion.

Table 7 compares the answers on the Smoking History Questionnaire given by participants at both worksites. Results indicate that participants in the incentive condition were less educated, and more of them were women. Both these variables have been associated with lower quit rates. In general, however, the participants in both worksites seemed similar.

Personnel

Ms. Deborah Newman, L.P.N. led the GE Lynchburg group. She had originally planned on running both groups but time conflicts prevented this intention from occurring. Ms. Pearl Jones, R.N. led the GE Salem group. Both women had been trained in a 12-hour seminar by Ms. Carol Wise of the American Lung Association of Virginia, and both women had previously run Freedom from Smoking groups.

Procedures

Unforeseen changes in procedures

Both worksites had layoffs just before the Freedom from Smoking

Table 6. Responses on Work Environment Scale *

	GE Salem		GE Lynchburg		t-test
	mean	standard deviation	mean	standard deviation	
Involvement	3.6	2.80	5.1	2.21	1.853
Cohesion	4.9	2.28	5.3	1.89	.513
Supervisor Support	3.4	3.73	5.3	2.05	1.656
Autonomy	4.8	2.57	5.3	2.12	.564
Task orientation	4.2	2.86	6.3	2.01	2.113 **
Work pressure	4.3	2.67	5.4	2.31	1.032
Clarity	3.4	1.71	4.2	2.01	1.493
Control	4.3	2.50	5.2	2.05	.999
Innovation	2.9	2.47	3.9	1.75	1.113
Physical Comfort	1.9	2.13	4.7	2.36	3.424 **

* Each scale consists of nine questions. A "0" score means respondents on nine questions indicated their not feeling any involvement, cohesion, etc., with the worksite. A "9" score means respondents answered affirmatively on nine questions to feeling involved, cohesive, etc., with the worksite. All questions are shown in Appendix A.

**p<.05

Table 7. Responses on Smoking History Questionnaire

Indice	GE Salem		GE Lynchburg	t-test
	mean (standard deviation)			
Age	44.4 (9.52)	46.8 (6.24)		.935
Grade completed*	14.5 (2.38)	12.3 (1.69)		3.375**
Age when begin smoking	17.1 (3.95)	18.4 (6.82)		.808
Nicotine content *** (lowest level = .1 mg, highest level = 1.4 mg)	.96 (.37)	.76 (.37)		1.776
Daily rate of cigarettes	32.4 (14.98)	24.4 (10.34)		1.928
Heaviest daily rate	40.7 (15.68)	33.2 (8.94)		1.787
Quit smoking how many times	2.6 (1.72)	2.4 (1.65)		.332
Longest period quit smoking				
1. 1 week or less				
2. 1 to 4 weeks				
3. 1 to 6 months				
4. 6 to 12 months				
5. More than 1 year	2.5 (1.58)	2.7 (1.46)		.437
"How sure are you that you are ready to stop smoking at this time?"				
1. Not too sure				
2. Fairly sure				
3. Quite sure				
4. Extremely sure	1.9 (.87)	2.4 (.89)		1.730

* Determined from responses on question, "What level of education have you completed?" One of seven could be checked: Some high school or less; High school graduate; Technical/vocational school; Some college; College graduate; Post college; Graduate degree

** $p < .05$

*** Determined from answers where brand and length of cigarettes were specified.

Table 7 (continued). Responses on Smoking History Questionnaire

Indice	GE Salem n=16	GE Lynchburg n=28	z value*
	frequency (% of total)		
Sex; males	15 (94%)	11 (39%)	3.534 **
Marital status			
married	12 (75%)	22 (79%)	.303
single	1 (6%)	0 (0%)	.218
separated	1 (6%)	2 (7%)	.126
divorced	3 (19%)	4 (14%)	.438
Who encouraged you to quit? (could check off more than one)			
spouse	11 (69%)	17 (61%)	.526
children	5 (31%)	15 (54%)	1.468
friends	7 (44%)	14 (50%)	.384
co-workers	5 (31%)	14 (50%)	1.223
Do family, friends or co-workers smoke?***			
none	5 (31%)	6 (21%)	.737
few	7 (44%)	13 (46%)	.128
many	3 (19%)	8 (29%)	.737
Job			
blue collar	10 (63%)	16 (57%)	.390
pink collar	1 (6%)	4 (14%)	.803
professional/technical	4 (25%)	6 (21%)	.402
spouse of employee	0 (0%)	1 (4%)	.218
Number of minorities	1 (6%)	0 (0%)	.218

* Tests concerning proportions were conducted.

** $p < .001$

*** Respondents could answer "none," "few" or "many" to each of these three questions. Respondents noted in category "none" answered "none" one or more times. Respondents noted in category "few" answered "few" on every answer. Respondents noted in category "many" answered "many" one or more times. Only one respondent, not noted above, answered both "none" and "many;" that respondent was at GE Salem.

clinics were announced. This can be seen as having detrimental effects at both worksites on getting employees to join the clinics.

Both plants consented to run the Freedom from Smoking clinic at lunchtime beginning in October 1987. Yet at GE Salem a senior vice-president died, and because of this GE Salem management decided to postpone the clinic.

Both plants consented to run the clinic during lunchtime. This meant labor participants who usually get 30 minutes off for lunch would be away from production areas for an extra 30 minutes as they attended the one-hour clinic meeting. But when the GE Salem clinic was offered in March 1988, senior management felt they could not have employees away from production areas for 30 minutes because of the recent lay-offs. So at GE Salem the clinic was held after the day shift ended.

This meant that participation rates among smokers at each worksite would be affected not only by the incentive monies but also by the time at which the clinic was held. Thus the third hypothesis of this study concerning participation rates could not be tested.

Because the GE Salem clinic was held at a late hour, the woman who had planned to lead the GE Salem group could not do so. Thus two different people led the two groups.

Recruitment and other initial procedures

Both plants disseminated the same information about the Freedom from Smoking clinic, and disseminated that information through posters and the company newspaper. The only difference in information was that

employees at the incentive worksite were told they could win \$200 for quitting smoking.

Management in both worksites were asked to minimize talk about the program offered by the other worksite.

Clinic procedures

Clinics were held at the worksites. Participants paid \$25 to join the group. At the first meeting participants signed a consent form to participate in the study, completed the Smoking History Questionnaire and completed the Worksite Environment Scale.

At the second group meeting, before the quit date, all participants breathed into a carbon monoxide detector. Nonsmokers generally register below 6 parts per million while smokers register over 18 parts per million. For this study the cut-off between smokers and nonsmokers was 10 parts per million. In the sixth meeting after the quit date participants again breathed into the carbon monoxide machine.

At both plants the company refunded the deposits of all successful participants. Even in the non-incentive condition this was done six months after the quit date, because this has become a standard practice in most worksite smoking interventions.

Reliability check on clinic meetings

To confirm that the groups were generally run in the same manner group leaders audio-taped most meetings. Ms. Laura Wimmer of the American Lung Association of Virginia identified six to ten important topics for each meeting. All tapes were reviewed to see if those

topics were covered. In Appendix C those topics are identified, as is whether or not each group leader covered these topics.

All tapes were listened to by the investigator. Two predoctoral interns in Clinical Psychology also listened to the tapes, each listening to half the tapes. On the tapes from GE Salem the two raters agreed on 76% of the categories and on the tapes from GE Lynchburg the two raters agreed on 75% of the categories. Then a third predoctoral intern listened to each tape where the raters disagreed in order to ascertain whether or not the topic was covered or not. These procedures showed that the GE Salem leader covered 87% of the topics, and the GE Lynchburg leader covered 74% of the topics. In addition, 77% of the topics were covered in both programs.

These results suggest that the non-incentive program was a slightly more accurate rendition of the American Lung Association's program. This appeared to give participants in the non-incentive condition a slight advantage over participants in the incentive condition.

The incentive condition

Participants in the incentive condition were told that the money by itself was not a good reason to quit smoking. Yet for those who truly wanted to quit smoking the incentive was a boost. This boost gave them something to look forward to, especially when they were tempted to smoke.

Participants received \$10 if they had not smoked after two, four, five, six, seven, eight and ten weeks. Participants received \$20 if

they had not smoked after three, four, five and six months. Successful participants received \$25 from the company after nine months, and another \$25 from the American Lung Association of Virginia after 12 months.

Participants were told that they could not use tobacco in any form or else they were no longer be eligible for the incentives. The reason for this is that recent ex-smokers are "a puff away from a pack a day." Because participants made a request, a change was made in this procedure; if someone smoked just one or two cigarettes and then quit again, they could be eligible for just the nine-month incentive of \$25. This exception allowed participants to exhibit some control over the program.

Participants were given a list of days on which they could see the plant nurse and receive their reward for being smoke-free. When dispensing incentives, each participant signed "honor sheets" shown in Appendix D. Initially only every other person was assessed on the carbon monoxide machine due to employees' limited time and the high number of people needing to be checked. After 10 weeks less participants were smoke-free so the nurse was able to check each participant each time.

The non-incentive condition

Smoking status of participants in the non-incentive condition was regularly checked as well; otherwise the higher quit rate in the incentive condition could be attributed to the frequent checking of smoking status. A nurse checked smoking status once a month for six

months. Participants were told they had to check in with the nurse once a month for at least five months in order to receive their \$25 rebate at the end of six months. Despite receiving this \$25 rebate, to differentiate between the two treatment conditions this condition will be known as the non-incentive condition. After receiving the \$25, participants were also checked at the nine-month mark and will be checked at the 12-month mark. Participants signed an "honor sheet" to attest to their not smoking.

Reliability checks on assessment procedures

When assessing participants on the carbon monoxide machine, nurses at both plants followed a specific procedure. Nurses were asked if several participants could report on the procedure used by the nurses, and the nurses consented to this. Several participants at each worksite recorded the procedure used by the nurse when checking carbon monoxide levels. These procedures were to: ask how the participant was doing without smoking; congratulate them or encourage them to keep it up; and have the participant sign the "honor sheet." In addition, in the incentive condition the nurse was to withhold money if the participant relapsed and encourage the participant to "get back on the wagon" for their own reasons.

Three participants in the incentive condition noted on a form shown in Appendix E that the nurse used correct procedures on each occasion. Two participants in the non-incentive condition noted that the nurse used correct procedures each time.

RESULTS

Means of defining results

Number of participants can be defined in two ways; first, by counting how many people paid the registration fee and attended at least one meeting. This definition, or a definition close to it, is commonly used in smoking cessation research. Some studies (e.g., Scott, Prue, Denier, & King, 1986) also define number of participants excluding drop-outs. Here, this second definition will include participants who attended six or all seven group meetings, with one of those meetings being the final meeting.

Quit rate can also be defined in two ways. First, those who smoked only one or two cigarettes but returned to not smoking can be categorized as smoke-free. This definition is commonly used. Second, quit rate has sometimes been additionally defined (e.g., Ossip-Klein et al., 1986) as excluding those who had one or two cigarettes, and including only those who were continuously abstinent.

The common definitions of number of participants and of quit rate are used in this study. The less common definitions of both outcome measures are also used.

Additional note on number of participants

Some employees are not included in either definition of number of participants. In the non-incentive condition four employees attended the orientation meeting but never came to a regular meeting. One of them even paid the \$25 entry fee. In the incentive condition five employees attended the orientation meeting but never paid nor came to a

regular meeting. Because none attended even one regular meeting, they are not considered as participants.

Additional notes on quit rate

In the non-incentive condition two participants were not assessed on the carbon monoxide machine at the nine-month mark. They were last assessed at the six-month mark. These two people had recently retired, unbeknownst to the investigator or plant nurse. They reported that they were smoke-free at the nine-month mark, so are considered in this study as being smoke-free. They agreed to be assessed on the carbon monoxide machines at the 12-month mark.

Also in the non-incentive condition, one other participant only verified his smoking status at the one-month mark and the nine-month mark. After not being assessed between the two-month mark and the six-month mark, it was assumed he had gone back to smoking; but he states he was smoke-free during this time. He is considered as smoke-free.

In the incentive condition one participant was seldom assessed on the carbon monoxide machine. He was frequently away on business trips, so he decided not to have his breath assessed regularly nor to receive monies. That person did verify his smoking status on the carbon monoxide machine at the one-year mark and also had his wife verify his continuous non-smoking status.

Number of participants and quit rates

using common standards

In the non-incentive condition 16 employees joined the Freedom

from Smoking clinic. In the incentive condition 28 employees participated in the Freedom from Smoking clinic. Table 8 and Figure 2 show how many from each condition remained smoke-free.

Number of participants and quit rates
using other standards

Number of participants can be defined as excluding drop-outs. Table 9 and Figure 3 show the results of the smoking cessation groups using this standard, along with a definition of quit rate as including a few slips.

Quit rate can be measured by requiring continual abstinence. At the incentive site all ex-smokers had been continually abstinent. At the non-incentive site three participants reported they had from two puffs to three cigarettes, then returned to total abstinence. Table 10 and Figure 4 shows results based on this quit rate, and based on number of participants who came to one or more meetings.

In Table 11 and Figure 5 quit rate is defined as continual abstinence. Number of participants is defined as excluding drop-outs.

First hypothesis

The first hypothesis is the major hypothesis. It compares the success of the incentive condition to that of the non-incentive condition. This comparison is made both by comparing groups and by comparing matched individuals from each group.

For comparing groups, chi-squares are used. Different definitions of quit rate and number of participants are used, resulting in different ways of analyzing the data. The comparison which uses the

Table 8. Frequency of Successful Participants over Time: Number of Participants includes Drop-outs, and Quit Rate includes Slips.

Months after quit date	GE Salem frequency (percentages)	GE Lynchburg
0	16 (100%)	28 (100%)
.5	10 (63%)	23 (82%)
1	9 (56%)	21 (75%)
1.5	9 (56%)	20 (71%)
2	8 (50%)	19 (68%)
2.5	7 (44%)	17 (61%)
3	7 (44%)	17 (61%)
4	7 (44%)	17 (61%)
5	7 (44%)	17 (61%)
6	7 (44%)	17 (61%)
9	7 (44%)	15 (54%)
12		14 (50%)

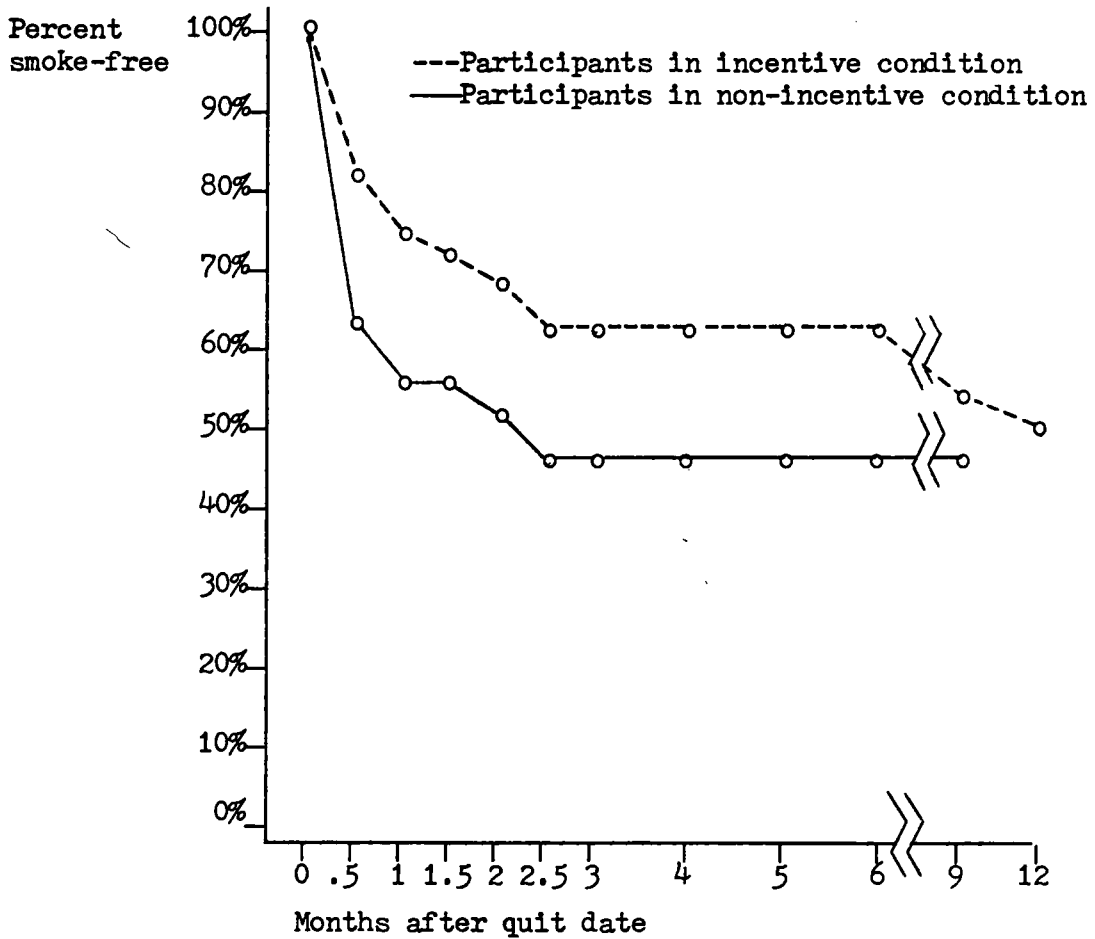


Figure 2. Graph of Successful Participants over Time: Number of Participants includes Drop-outs, and Quit Rate includes Slips.

Table 9. Frequency of Successful Participants over Time: Number of Participants excludes Drop-outs, and Quit Rate includes Slips.

Months after quit date	GE Salem frequency (percentages)	GE Lynchburg
0.5	8 (100%)	25 (100%)
1	7 (88%)	18 (72%)
1.5	6 (75%)	17 (68%)
2	5 (63%)	16 (64%)
2.5	5 (63%)	16 (64%)
3	5 (63%)	15 (60%)
4	5 (63%)	15 (60%)
5	5 (63%)	15 (60%)
6	5 (63%)	14 (56%)
9	5 (63%)	13 (52%)
12		12 (43%)

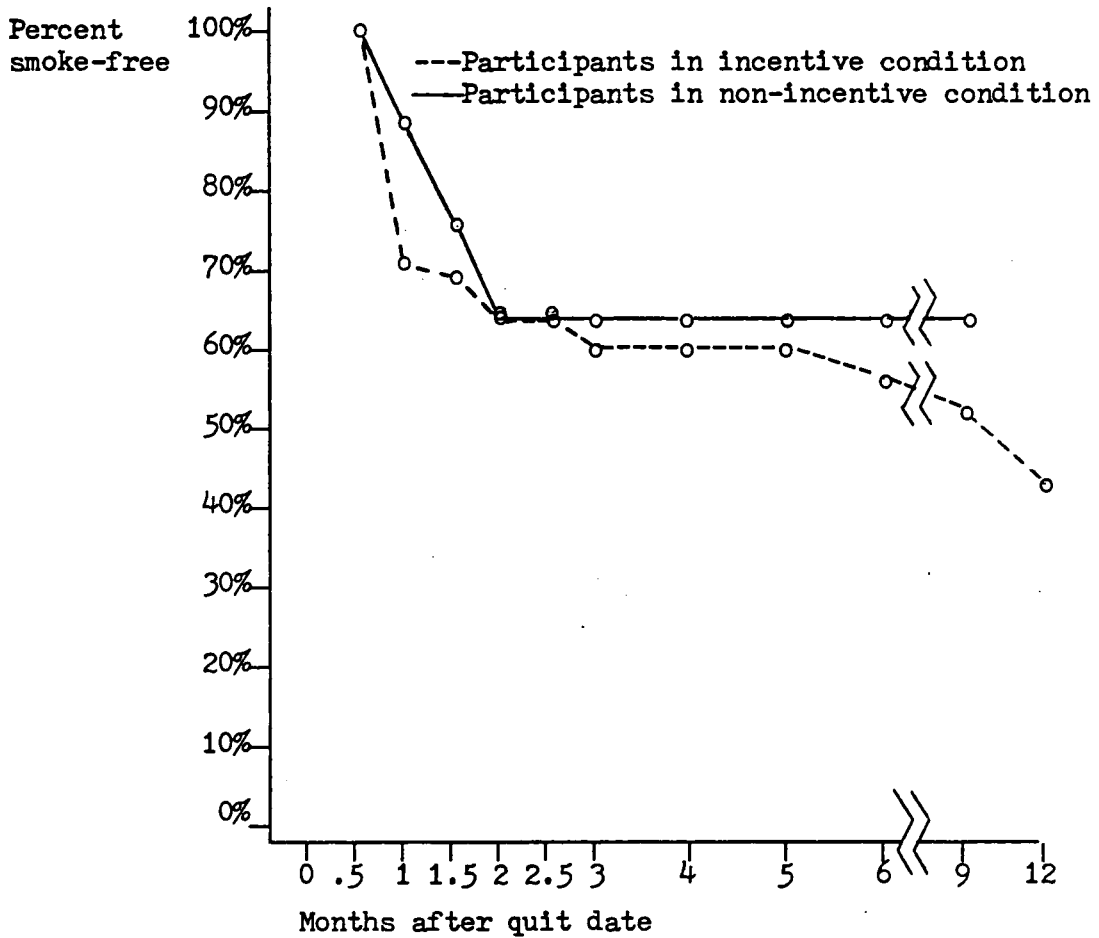


Figure 3. Graph of Successful Participants over Time: Number of Participants excludes Drop-outs, and Quit Rate includes Slips.

Table 10. Frequency of Successful Participants Over Time: Number of Participants includes Drop-outs, and Quit Rate is Continual Abstinence.

Months after quit date	GE Salem frequency (percentages)	GE Lynchburg
0	16 (100%)	28 (100%)
.5	10 (63%)	23 (82%)
1	8 (50%)	21 (75%)
1.5	7 (44%)	20 (71%)
2	6 (38%)	19 (68%)
2.5	5 (31%)	17 (61%)
3	5 (31%)	17 (61%)
4	4 (25%)	17 (61%)
5	4 (25%)	17 (61%)
6	4 (25%)	17 (61%)
9	4 (25%)	15 (54%)
12		14 (50%)

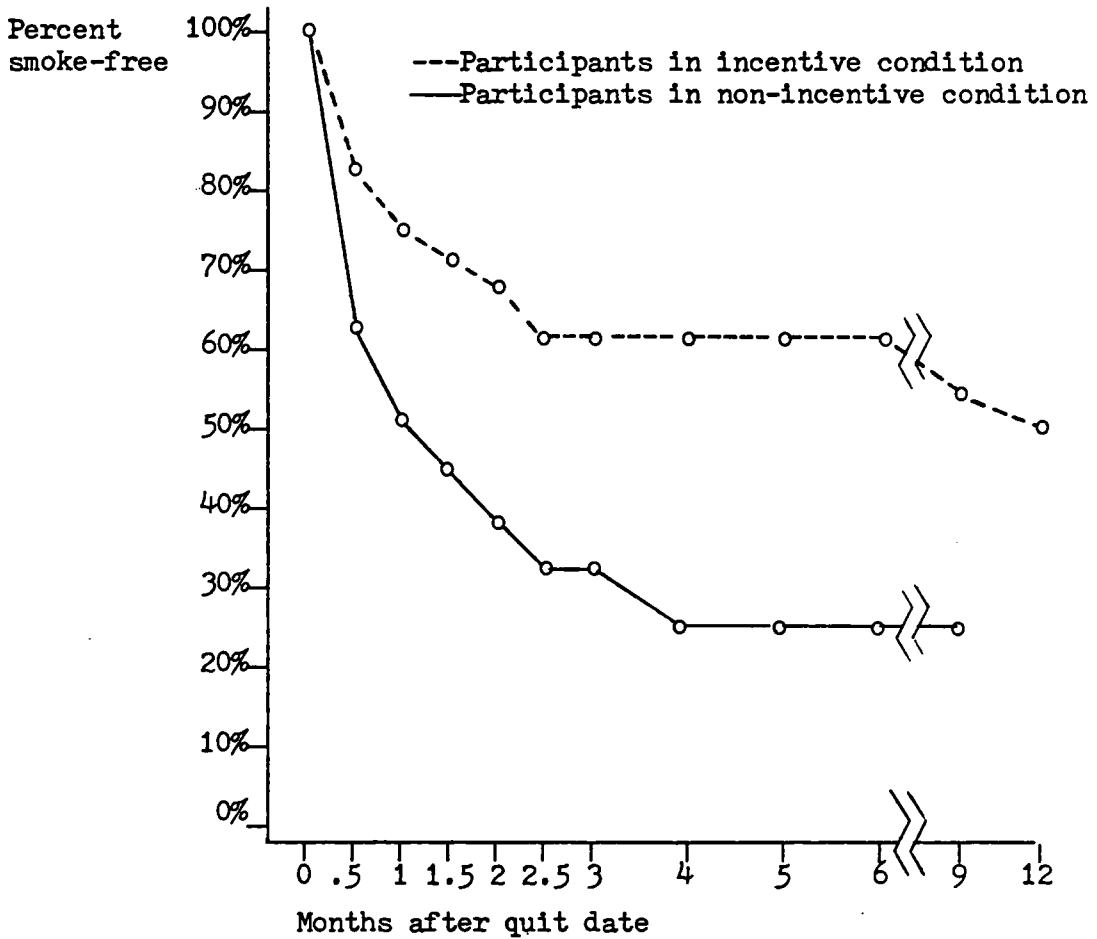


Figure 4. Graph of Successful Participants over Time: Number of Participants includes Drop-outs, and Quit Rate is Continual Abstinence.

Table 11. Frequency of Successful Participants over Time: Number of Participants excludes Drop-outs, and Quit Rate is Continual Abstinence.

Months after quit date	GE Salem frequency (percentages)	GE Lynchburg
0.5	8 (100%)	25 (100%)
1	5 (63%)	18 (72%)
1.5	4 (50%)	17 (68%)
2	3 (38%)	16 (64%)
2.5	3 (38%)	16 (64%)
3	3 (38%)	15 (60%)
4	3 (38%)	15 (60%)
5	3 (38%)	15 (60%)
6	3 (38%)	14 (56%)
9	3 (38%)	13 (52%)
12		12 (43%)

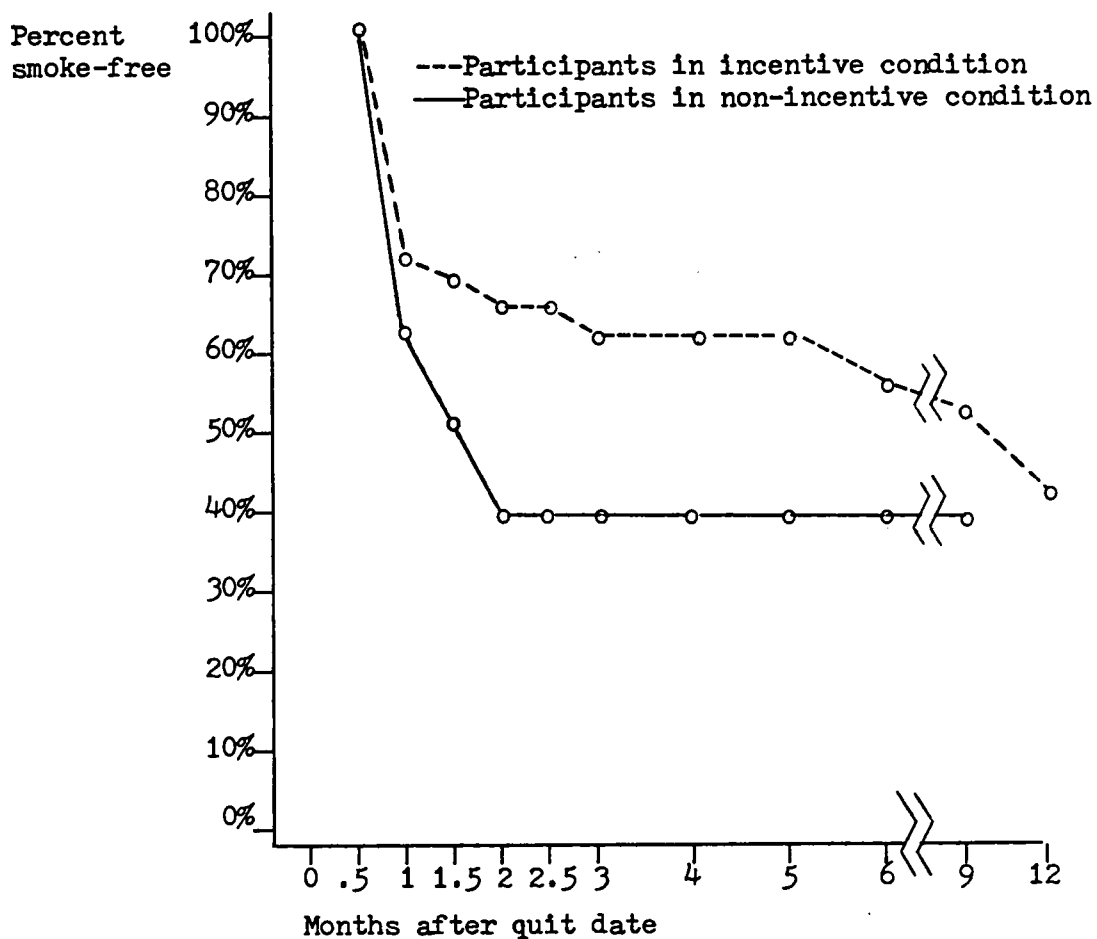


Figure 5. Graph of Successful Participants over Time: Number of Participants excludes Drop-outs, and Quit Rate is Continual Abstinence.

most common means of measuring number of participants and quit rates can be seen as the most important comparison. This difference is not significant [$\chi^2(1)=.09$, ns].

One year data is already available at the incentive site; one person there relapsed back to smoking between the nine-month and the 12-month mark. For a significant difference to exist between the two conditions at the 12-month mark, four people would need to relapse at the non-incentive site between the nine-month and the 12-month mark.

Other means of assessing the first hypothesis also show no significant difference. When the number of participants is defined as those coming to one or more meetings, and when quit rate is continual abstinence, no significant difference is found [$\chi^2(1)=3.39$, $p<.10$, ns]. When the number of participants excludes drop-outs and when quit rate includes one or two slips, no significant difference is found [$\chi^2(1)=.27$, ns]. When the number of participants excludes drop-outs, and when the quit rate is continual abstinence, the results are again non-significant [$\chi^2(1)=.51$, ns].

This hypothesis can also be assessed by comparing matched individuals from each group. First an independent blind rater matched participants by how many years they had smoked, age when they began smoking, amount of cigarettes they smoked daily, and type of position held at work. Most non-incentive participants were matched to two incentive participants due to unequal numbers in each condition. A sign test for matched pairs was used. The most common means of defining number of participants and quit rate was used. No significant

difference between the two conditions was found ($z=.603$, ns).

Thus, the first hypothesis was not corroborated.

Second and third hypotheses

The second hypothesis had two parts. In both parts the McNemar test for significance of changes was used (Walpole and Myers, 1978).

For the first part, as predicted, initial smoking rates of participants at the incentive site were significantly different from their eventual smoking rates. This difference was equally significant either way quit rate was defined. When number of participants was defined as anyone coming to one or more meetings, findings were significant [$\chi^2(1)=15.00$, $p<.001$]. When number of participants excluded drop-outs, findings were significant [$\chi^2(1)=13.00$, $p<.001$].

Yet the second part was not as predicted. At the non-incentive site, the difference between initial and eventual smoking rates were not expected to be significantly different, but they were significantly different. This is true no matter how terms are defined. The difference is significant when the most common definitions are used [$\chi^2(1)=7.00$, $p<.001$]. It is significant when number of participants is those coming to one or more meetings, and the quit rate is continual abstinence [$\chi^2(1)=4.00$, $p<.05$]. It is significant when number of participants excludes drop-outs and quit rate includes slips [$\chi^2(1)=4.00$, $p<.05$]. It is significant when number of participants excludes drop-outs and quit rate is continual abstinence [$\chi^2(1)=4.00$, $p<.05$]. For these equations to reflect non-significance, from one to four more people at the non-incentive site need to relapse back to

smoking (and thus support the second part of this hypothesis).

The second hypothesis is not half-supported by these results; it is not supported at all. The important point within the second hypothesis was the contrast between an effective and an ineffective intervention. Since both interventions were determined to be effective, this second hypothesis was falsified.

The third hypothesis, as previously mentioned, could not be assessed. This was because of unforeseen changes in procedures.

Fiscal analysis

A ledger of incentive costs is shown in Table 12. Table 13 shows that the actual cost of incentives was greater than originally estimated. This was because more people received incentives than anticipated. Twelve people had just joined a Freedom from Smoking program nine months prior to the incentive intervention, so the investigator predicted only 20 and not 28 employees would join. The fact that 28 employees participated in the incentive intervention raises the implication that incentives could have increased the participation rate.

Usefulness of incentive monies

Most of the incentive monies did go to people who eventually quit smoking. The cost of the incentives total \$2945 for the American Lung Association and \$350 for General Electric. The total cost of incentives equals \$3305. Out of \$3305 spent on incentives, only \$635 went to participants who relapsed. Thus, 78% of all incentive monies went to participants who quit smoking for one year.

Table 12. Costs of Incentives

Post-quit date	Funds sent by A.L.A. before this date	Number collecting funds *	Funds distributed at this time	Debits theoretically occurring at this time	Balance based on funds distributed
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2 weeks 11/10/87	\$265 **	22	\$265 **	\$265 **	\$ 0
4 weeks 11/24/87	350	20	200	200	150
5 weeks 12/2/87	880	20	190	200	840
6 weeks 12/9, 10/87	0	19	170	190	670
7 weeks 12/15, 16, 17/88	0	19	220	190	450
8 weeks 12/23/87	0	18	0	180	450
10 weeks 1/4, 5/88	0	16	340	160	110
3 months 1/25, 27; 2/1	210	16	320	320	0
4 months 2/22, 25/88	320	16	320	320	0
5 months 3/30/88	640	16	320	320	320
6 months 4/26/88	0	16	320	320	0
9 months 7/6/88	0	14	350	350	0
12 months 10/26/88	325	13	325	325	0

Total Costs of Incentives: \$ 3235

* One smoke-free participant refused incentives.

** \$265 includes one-time cost of \$45 to wire money.

Table 13. Costs Estimated in Proposal, verses Actual Costs

COSTS OF INCENTIVES

Post-quit date	Estimated smoke-free	Actual smoke-free *	Estimated Costs	Actual Costs
2 weeks	15	22	\$150	\$220
4 weeks	15	20	150	200
5 weeks	14	20	140	200
6 weeks	14	19	140	190
7 weeks	13	19	130	190
8 weeks	13	18	130	180
10 weeks	12	16	120	160
3 months	11	16	220	320
4 months	10	16	200	320
5 months	9	16	180	320
6 months	9	16	180	320
9 months **	8	14	200 **	350 **
12 months	7	13	<u>175</u>	<u>325</u>

Subtotal accrued to American Lung Asso. \$1915 \$2945

OTHER COSTS

	Estimated Costs	Actual Costs
1. Mileage for Lynchburg-based group leader to drive to Salem	\$297	\$ 0
2. Stipend for Salem group leader	300	250
3. Investigator's travel	151	137
4. Investigator's phone calls	100	157
5. Investigator's posters	30	22
6. Unexpected costs	<u>0</u>	<u>45 ***</u>

Subtotal for other costs \$878 \$611

Total costs \$2793 \$3556

Funds allotted \$4000

Funds not used \$444

* One participant, not included in numbers in this column, remained smoke-free but collected no incentives

** GE Lynchburg paid this cost.

*** One-time cost to wire funds to GE Lynchburg

Cost-effectiveness

Incentives cost \$3305 after 12 months, and cost \$2985 after nine months. The nine-month costs will be used here. Other than incentives, other costs were incurred by both incentive and non-incentive programs. At the nine-month mark 15 people quit smoking. Since the incentives cost \$2985 and 15 people quit smoking, \$199 was spent on incentives per quit smoker.

In the incentive site other costs include the stipend for the group leader and the estimated lost productivity of participants. The stipend was \$250. Lost productivity for blue-collar and pink-collar workers was \$490 (based on \$7.00 per hour pay rate, 20 blue-collar and pink-collar employees, and 3.5 hours of lost productivity per participant). Total cost of the incentive program was \$3725. Since 15 people quit smoking, \$248 was spent per quit smoker.

Costs in the non-incentive program were very low. The group leader cost \$250 and incentives cost \$150. Total costs were \$400. Seven people quit to date. Thus, \$57 was spent per quit smoker.

Process evaluations by management

Table 14 shows the comments made by the contact person at each plant. The comments show management's disappointment in the non-incentive intervention. In contrast, management at the incentive intervention were satisfied with the program, and the contact person thought the intervention helped morale.

These comments could be due to the initially higher success rates at the incentive site and the higher morale of those participants.

Table 14. Comments about the Intervention Made by Contact Person *

Question	Comments from Jean Stiff at non-incentive site	Comments from Alex Newmark at incentive site
Satisfied with the program?	Low interest. No one cared.	Sure. Feel fine about it. It's as effective as anything.
Was the quit rate worth the cost?	Lot of effort for nothing. Results very disappointing.	Absolutely. The only other credible way is using Nicarettes.
Think it made any difference on morale?	None.	Yes, to extent that there's pressure on them to quit; now we can say there's a program to help you.

* Comments obtained through short, structured interview over the phone.

Then again, the optimistic and pessimistic nature of these comments could be due to the styles of each executive.

Process evaluations by participants

Successful incentive participants

Participants in the incentive condition who were smoke-free at the nine-month mark were mailed a questionnaire, and 12 completed questionnaires were returned. Table 15 tabulates the answers to those questions, while the original questionnaire is in Appendix F.

A few answers had sufficiently small standard deviations to allow summary statements to be made. Participants did strongly feel that the group support helped them be smoke-free. They felt the group support was more important than the incentive. The incentive did not feel wrong, did not feel like a bribe, to them. They did not mind having little say in designing the incentive program. And they felt thankful to the American Lung Association and to GE for sponsoring the program.

Questions regarding the incentives generated a wider range of responses. Some felt the group pulled together more because of the incentives; others did not feel this way. Some felt the incentive was a major reason why they joined the program; others did not. Some felt the incentive made little difference in their staying quit; others did not. Some thought of the incentives when tempted to smoke; others did not. This range of attitudes was also seen in Table 16, where individual comments are listed on how participants perceived the incentives. These comments show some participants greatly valued the incentive and relied on the incentives to help them quit. Others did

Table 15. Responses on Questionnaire Regarding Incentive of \$200

1=Definitely Agree;2=Tend to Agree;4=Tend to Disagree;
5=Definitely Disagree

Mean (Standard
Deviation)

The incentive was a major reason why I joined this program.	3.3 (1.68)
The incentive has really made little difference in my staying quit.	2.7 (1.56)
In my body I have really felt the health benefits of not smoking.	1.5 (.82)
I can really visualize the fact that my risk of getting smoking-related diseases has gone down.	1.7 (1.27)
I think we pulled together more as a group because of the incentive.	3.2 (1.54)
For me, the group support was more important than the incentive was.	2.0 (1.10)
Quitting smoking with others really helped me stay quit.	1.3 (.65)
I'd think of the incentive often when I was tempted to smoke.	3.5 (1.97)
When I'm tempted to smoke, I think of the incentive more than I do the health benefits of not smoking.	3.7 (1.42)
I suspect some people at work resented my getting this incentive.	2.9 (1.45)
The incentive has felt sort of wrong to me, like a bribe to get me to quit.	4.0 (1.34)
I should have been asked to give suggestions on designing the incentive program. It sort of bothers me that I wasn't asked.	4.5 (.82)
I am thankful to the American Lung Association for funding this program.	1.0 (.00)
I am thankful to GE for sponsoring this program.	1.0 (.00)

If I were to change this program, I would...	Frequency
...give more money in the beginning & less at the end.	1
...give less money in the beginning & more at the end.	5
...give money out more often.	1
...give money out less often.	1

Table 16. Responses to the final question of the questionnaire:
"Please say, in your words, how the incentive money helped you."

"It didn't, I made up my mind to quit smoking and quit.

"Plan to give it back to ALA.

"When I was tempted to smoke I would think of the incentive money and try to hold off until I received the next payment.

"Maybe a group program such as AA may be used after the group is done.

"It was just a nice extra. I did not know when I signed up that I would receive incentive money.

"I have put my money away for the time being and am saving for another day.

"The money incentive (one cigarette and you're out) was a major factor in not having just one cigarette when tempted to do so. The 'fall-off-the-cliff' result of succumbing to the temptation keeps one from having the first one, which leads to the second, the third, etc. The actual amount didn't make the difference, but the symbolism did.

"The money was not the issue. It could have been any kind of gift to look forward to -- most of all the group, and knowing every one in the program. And I wanted to quit. I'm happy and thank you.

"The incentive was OK but the most important help I received was from the group support.

"It gave me the incentive to look forward to the next pay period.

"Every one needs and likes money. This I could hold in my hand and see and be proud.

"I like what money can buy.

not.

It is important to note that on a five-point scale, every participant gave the highest rating to show their thankfulness towards the American Lung Association and towards General Electric for sponsoring this program. This is another strong indicator of the incentive program's success; participants had gratitude towards the company for sponsoring this program.

Successful non-incentive participants

Participants in the non-incentive condition who were smoke-free were mailed a brief questionnaire. Six questionnaires were sent out; one ex-smoker had not yet been identified. Six questionnaires were returned. Table 17 shows these results. Responses indicate that two participants definitely felt the monthly carbon monoxide tests motivated them to remain smoke-free, and a third participant "sort of" felt the tests motivated him to stay smoke-free.

Other results show that all six felt the group support motivated them to stay smoke-free, and half felt the six-month incentive of \$25 motivated them to stay smoke-free. All were thankful to GE for sponsoring the program, and all were proud of themselves for quitting smoking. In addition, all were to some degree disappointed that so many fellow participants had relapsed.

Unsuccessful incentive participants

Questionnaires were mailed to the 12 unsuccessful incentive participants, and eight were returned. Table 18 details their responses to questions asked of them. Most were demoralized about

Table 17. Responses of Successful Participants
in the Non-incentive Condition

Possible responses:

1. definitely yes / 2. sort of yes / 3. don't know /
4. sort of no / 5. definitely no

	Mean
"Did the monthly checks on the carbon monoxide machine motivate you to stay smoke-free?"	3.0 **
"Did the six-month reward motivate you to stay smoke-free?"	3.4
"Did the group support motivate you to stay smoke-free?"	1.5
"Are you disappointed so many participants relapsed?"	1.5
"Are you thankful to GE for offering you this clinic?"	1.0
"Are you proud of yourself for quitting smoking?"	1.0
Additional question, not using rating method:	
"How many slips, how many cigarettes have you had since quit day?"	3 people said they had from 2 puffs to 2 cigarettes.

*Specifically, two people recorded 1; one person recorded 2; one person recorded 4; and two people recorded 5.

Attention Patron:

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quitting again and most had not tried to quit smoking again. The majority resented the incentive program's rule that one cigarette made them ineligible for any incentives. All were grateful that GE had offered the program to them.

Unsuccessful non-incentive participants

Questionnaires were mailed to the ten unsuccessful nonincentive participants, and five were returned. Table 19 details responses to questions asked of them. They were disappointed in not quitting smoking. When asked if they were demoralized about quitting smoking again, they offered a range of responses. When asked if they were thankful to GE for offering the program, they tended towards saying yes.

Table 19. Responses by Unsuccessful Participants
at Non-incentive Plant *

Question	Responses
"Were you disappointed in not quitting smoking?"	4 definitely yes 1 sort of yes
"Are you demoralized about trying to quit again?"	1 definitely yes 1 sort of yes 1 don't know 2 sort of no
"Are you thankful to GE for offering you this program?"	3 definitely yes 1 sort of yes 1 don't know

* Questionnaire sent to 10 participants; 5 returned (50% response rate). Possible responses: definitely yes---sort of yes---don't know---sort of no---definitely no.

DISCUSSION

This study investigated the effects of incentives on worksite smoking interventions. Two similar worksites offered the same smoking cessation group. One of those worksites offered major incentives as well for participants who quit smoking.

Incentive program

When incentives were offered along with the Freedom from Smoking clinic, 54% of all participants who came to one or more meetings remained smoke-free for nine months. To put this quit rate in context, Lichtenstein's (1982) comments might be restated; "more successful programs report abstinence rates of 30% to 40%; anything better than that is very good indeed (p. 806)." Evaluated from this standard, a 54% quit rate is extremely high.

In addition, the results of this incentive condition were biochemically verified. The verifications occurred not just on one occasion but on numerous occasions. These numerous verifications increase the likelihood that 54% of the participants did actually remain smoke-free.

When the population of participants in the incentive condition is reviewed, these results appear even more impressive. Lichtenstein's (1982) reports on the results of average participants in average smoking cessation groups. However some types of people are less able, and others more able, to quit smoking. A very recent review (Fiore, Novotny, Pierce, Hatziangreu, Patel, & Davis, 1989) notes that educational level is the demographic variable which is most predictive

of whether or not a person quits smoking. In the incentive condition, the average education was twelveth grade. Many participants were high school drop-outs. That such a poorly educated group were so successful at quitting smoking is noteworthy.

Until the recent review, gender was the strongest demographic variable which predicted success in smoking cessation groups. Men have higher quit rates than women (Fiore et al., 1989). In the incentive condition most of the participants were women. Again, considering the population in the incentive condition, it is all the more noteworthy that the incentive condition's success rate was so high.

It should be noted that this same plant had a smoking intervention nine months prior to the current intervention. The prior intervention was held at the same time, followed the same manual, and was led by the same person. No incentives were offered. One year later, four of the 13 participants in that intervention reported they were smoke-free. Because this prior intervention occurred prior to the current study, it does not stand as a comparison to the incentive intervention. It does point out, however, that all smoking interventions are not equally successful at the worksite where the incentive program was offered.

When the incentive intervention is considered by itself without any reference to other interventions, it does stand out. The success rate is very high; and smoking status was biochemically verified. These verified results lend credence to the success of other incentive programs (reported by Shephard and Pearlman, 1985) where biochemical verifications was not conducted.

Non-incentive program

The major surprise of this study is that participants in the non-incentive condition were also very successful. Here, 44% of the participants consider themselves as non-smokers nine months after the quit date. This is the percentage of total participants who are ex-smokers, and includes those who had a few lapses and then returned to not smoking.

When more stringent criteria for being smoke-free are considered, the quit rate in the non-incentive condition is lower. Only 25% of all non-incentive participants succeeded in never smoking once after the quit date.

Which criteria of smoking status is most useful

For two reasons the 44% quit rate is preferable to use over the 25% quit rate as an overall rating of the non-incentive program's success. To review, the 44% quit rate is based upon a definition that some ex-smokers might have a few lapses. This definition for calculating ex-smokers is the most commonly used definition among smoking cessation researchers (Ossip-Klein et al., 1986). The definition primarily used by smoking cessation researchers should be primary in this study as well.

In addition, participants in the incentive condition may have had one or two cigarettes, then returned to nonsmoking without telling anyone about those slips. They might have said nothing about their slips, because admitting a slip meant they were ineligible for more incentive monies. Participants in the non-incentive condition had less

negative consequences if they admitted to having one or two cigarettes, so these participants were more likely to report slips. Reporting errors are more likely to arise, then, when assessing continuous abstinence and less likely to arise when assessing abstinence which includes a few slips.

The most useful definition of being smoke-free, then, is one which includes having one or two cigarettes and then returning to not smoking. Adopting this definition means that in the non-incentive condition, 44% of the participants are seen as ex-smokers.

Cost-outcome Analysis

Before examining possible reasons for this study's results, cost-outcome data might first be reviewed. In terms of cost-effectiveness, creating ex-smokers for \$57 is definitely preferable to creating them for \$248. The incentive program may be preferable if some employees joined the incentive program who would not have joined a non-incentive program. If these additional employees quit smoking, then the choice is between creating ex-smokers for \$248 or not creating ex-smokers at all. Creating ex-smokers for \$248 through the use of incentives is preferable. However, the hypothesis that more people join incentive programs was not tested in this study. Without that information this comparison cannot be made. The only conclusion that can be made is that the non-incentive program was more cost-effective.

Another analysis of costs can be made. This would be a cost-benefit analysis. The costs of enabling an employee to quit

smoking can be compared to the costs of doing nothing and having an employee continue smoking. The annual costs of smoking per employee, from the perspective of a company, have been estimated in 1980 dollars at \$336 to \$601 (Kristein, 1983). Adding 5% annually to these amounts (to account for inflation) results in 1987 dollars of \$473 to \$846. When an employee quits smoking, then, by Kristein's estimations they save their company from \$473 to \$846 per year.

If this estimation is accepted as valid and useful, then the costs of this study's two interventions can be contrasted to the costs of not quitting smoking. The incentive program cost \$248 per person, and by quitting \$473 to \$846 was saved. The non-incentive program cost \$57 per person, and by quitting \$473 to \$846 was saved. In both cases the costs of the program are below the most conservative estimate of savings.

Thus, it may be cost-beneficial to offer either smoking cessation program. This justifies the use of an incentive program; not over the use of a non-incentive program, but over the alternative action of doing nothing.

Overall, cost analyses does not make the incentive program look attractive. When the cost analysis is not done, the non-incentive program appears about as effective as does the incentive program. When the cost analysis is done, the non-incentive program appears more attractive than the incentive program. This is because the non-incentive program is about as effective, and also less costly than the incentive program.

Understanding these results:

Why non-incentive participants did so well

Why were the quit rates in the two conditions not significantly different? Since the high quit rate was expected in the incentive program yet unexpected in the non-incentive condition, the question can be more specifically phrased; "Why did participants in the non-incentive condition do so well?" A combination of factors might account for this. The importance of each factor is largely a matter of opinion. Since each factor could have had at least a minor impact upon the non-incentive condition, their cumulative effect could have had a strong impact upon the results.

Effects of frequent verification

The frequent assessments on the carbon monoxide machine could very well have increased the ability of participants to remain smoke-free. This impression is bolstered by the relapse curve at the non-incentive site; at first participants were relapsing at a typically high rate, but after 2 months few or no participants relapsed. During the time that few or no participants were relapsing, participants were being regularly assessed on the carbon monoxide machine. Participant report also bolsters this impression; three of the seven successful participants in the non-incentive condition felt the carbon monoxide readings motivated them to stay smoke-free. For them the readings were seen as a potent influence upon behavior.

One mechanism of behavior change is providing feedback to clients (Goldfried, 1980). The carbon monoxide machine provided feedback for

people who were trying to remain smoke-free. Participants saw the low carbon monoxide readings as indicating the detrimental effects of smoking on their body were decreasing. Since high carbon monoxide levels in the lungs have a detrimental effect upon the heart, this perception was accurate. This feedback reinforced smoke-free behavior; both the results of the prior biochemical verification and the anticipation of the upcoming biochemical verification reinforced smoke-free behavior.

Another reason can be posited for the effectiveness of the carbon monoxide assessments; namely, people were publically demonstrating they had resisted all temptations to smoke. At the incentive site, all participants checked in during lunchtime, and virtually all showed up at the beginning of lunchtime. When they blew into the carbon monoxide machine, others in the line knew whether or not they passed the test. At the non-incentive site, participants were given a two-hour period to check in, and since only six people were checking in they seldom ran into one another. Still, they could look at the piece of paper where the nurse recorded the results and see if others who had come before them had passed the test; and they could see if others passed the test on the previous months.

This social aspect of assessing participants created strong demand characteristics where participants felt pressured to stay smoke-free. Participants made a public commitment to stop smoking, and they showed in front of their fellow group members whether or not they kept their commitment.

In fact, this study's results does not rule out the possibility that the biochemical verification, not the incentive, was mostly responsible for the high quit rates. The incentive may be important only because it gives a reason to be regularly assessed on the carbon monoxide machine.

Education and sex

Another reason why the non-incentive site may have done so well is that significantly more males joined the intervention. Also, the education level was significantly higher at the non-incentive site. Other than these two variables, populations at the two worksites were equivalent. Unfortunately, these are the two most important variables upon which to match populations in smoking cessation research. For years being male was the most predictive variable for success at quitting smoking. Recently the variable of having more years of education has been seen as having edged out gender as the demographic variable most predictive of quitting smoking (Fiore et al., 1989). Thus, the type of people who joined the non-incentive program were the type most likely to quit smoking.

Time when groups were held

One reason the non-incentive program was highly successful may derive from when the groups were held. The smoking cessation group at the incentive site was held during working hours, while the group at the non-incentive site was held after working hours. People who are willing to stay after working hours for the group may be more motivated to quit smoking than are people who attend the group during working

hours.

It should be noted that originally, executives at both companies agreed to conduct the groups on company time and to start them at the same time. Yet after recruitment procedures had begun executives at the non-incentive site changed their minds. The investigator tried to impress upon them the need to hold conditions at both worksites constant, but executives at the the non-incentive site referred to the consent form and said they were free to drop out of the study at any time. Given this inequity in procedures, the investigator had to decide whether or not to stop the project.

For three reasons the project was continued. First, at this time executives simply asked for a delay in starting the group; only later did they say the group had to be run at a different time. So the change in procedures did not appear at first glance to be as strong of a confounding variable as those changes eventually became. Second, no other worksites were available for conducting this study. No other options for conducting the study were available. Third, no one study is perfect, and these complications weakened the study; but if significant results were obtained, those results would have some meaning.

The Hawthorne effect

Being involved in a study may have motivated more participants in the non-incentive condition to be smoke-free. This has been called the Hawthorne effect (Kazdin, 1984). In this study, participants seemed to appreciate being contacted by an investigator who lived out of town or

out of state when arrangements for carbon monoxide testing were being made.

Unclear operationalization of one condition

within the independent variable

Both the frequent verifications and the Hawthorne effect made the non-incentive intervention somewhat different from other traditional smoking interventions. Because of these differences, it may be argued that in this study a traditional smoking intervention was not used. Instead these two modifications made the non-incentive intervention somewhat unique. Perhaps this half of the independent variable could have been designed better.

This critique of the independent variable does not extend to the operationalization of the incentive condition. The incentive program was operationalized as intended.

Societal influences

News about smoking is constantly in the media. Smokers are increasingly seen as pariahs in society. Perhaps all smoking interventions are becoming more effective now.

This societal influence could possibly impact upon success rates in smoking groups. However, since the nature of societal influences are so broad and distal, it is impossible to say for sure that the anti-smoking sentiment in the U.S. today could account for a high success rate in the non-incentive condition. In the same breath, one might hypothesize that only hard-core smokers are now left to try and quit smoking; and because their habits are so ingrained, they might be

quite unsuccessful when quitting smoking.

Research strategy

Research strategy also may account for the lack of significant results. A comparative research design was used; and in general, this research strategy has often not revealed significant differences between conditions in smoking cessation research (e.g., Paxton, 1980). This may be because the differences between treatment programs are often not substantially different (Kazdin, 1984). When this research strategy has yielded significant differences between conditions, a wait-list control has typically been one condition; this shows a difference between taking some action and taking no action (e.g., Skidmore, Malone, Riley and Fredericksen, 1986). For a comparative research strategy to show a significant difference between two interventions, one of those interventions must be a major improvement over the other intervention.

Inadequate number of subjects

Another issue is the lack of power in the study. In two different ways this study utilized an inadequate number of subjects. First, only two worksites were used. Due to having such a small number of worksites, random fluctuations in numbers could have affected the study results quite strongly. The same can be said for having so few subjects within each condition, and especially within the non-incentive condition. If more subjects had been in each condition, then perhaps the quit rate in the non-incentive condition would not be so unusual; the quit rate might have been lower.

Understanding these results:

Why incentive participants did so well

Participants in the incentive condition may have had a high quit rate for a number of reasons. Several reasons have been reviewed and apply to participants in the incentive condition as well. Biochemical verifications, the Hawthorne effect, and inadequate numbers of subjects which skew results may be responsible for this study's results.

Perhaps the incentive monies did help some participants who otherwise would have relapsed stay smoke-free. Table 16 reviews how the incentive participants perceived the incentive monies. Some participants apparently felt the incentives were critical to their efforts. For some participants, the incentive appears to have helped them stay smoke-free.

Understanding these results:

Waiting for more data

Another interpretation is possible; namely, that in another three months the non-incentive participants will relapse back to smoking. Three successful participants in the non-incentive condition state they have had a little contact with cigarettes. Perhaps by the 12-month mark they will have relapsed. If those three, and another currently successful participant relapse, then a significant difference would emerge between the two conditions.

Internal validity

If significant results had been obtained, this study's internal validity would need to be reviewed. Two areas within this study pose a

threat to the study's internal validity.

History

The manner in which the interventions were presented was not ideally controlled. First, as already mentioned, one intervention was held on company time and the other held off company time.

Second, the non-incentive program was offered six months later than the incentive program. This discrepancy would appear to favor the non-incentive program, since it was offered in the Spring when people are more active. In contrast, participants in the incentive program had to go through the Christmas holiday season as recent ex-smokers. No studies have specifically studied the effect of the holiday season on relapse rates, but some researchers suspect relapses are higher during the holiday season because of the excessive drinking and exposure to smokers while drinking. Shiffman (1986) sees many lapses as precipitated by social situations and by relaxing; and the holiday season is a time for both. Ossip-Klein et al. (1986) note that "Holiday seasons...may present high-risk times that could become apparent if the hazard or probability density functions shift with treatments that end at different times during the year (p.11)."

A third area to note is that different teachers led each program. To ensure equal group content, group sessions were tape-recorded and checked to see that important topics were covered. Still, different teachers may have affected quit rates to some degree.

Selection

Many threats to internal validity can potentially occur. Only one

other threat will be reviewed here; that is because this threat is vital to evaluating this study, and because the other threats are minor in comparison. This one potential threat entails differences between the worksites. The two worksites were not perfectly matched, and this lack of matching could have affected the results.

This lack of perfect matching would not be an issue if numerous subjects were in each treatment group. When numerous subjects are in each treatment group then random assignment of treatment conditions negates individual differences between the treatment groups (Kazdin, 1984). This is because the numerous subjects allow individual differences to be equally distributed across both conditions. Yet in this study, with only one subject per condition, individual differences strongly affect differences between conditions.

The lack of perfect matching is a weakness in this study. Of course, it was beyond the investigator's resources to include numerous worksites in the study; so either this weak study would be conducted, or no study of its kind would be conducted by the investigator. Given this state of affairs, it may be useful to review how similar and how different the worksites really were.

Some differences between the worksites are important. One worksite has high outputs of small electronic equipment while the other worksite has low outputs of large electronic equipment. The non-incentive worksite is union while the other worksite is non-union. Blue-collar employees at the non-incentive worksite get paid more. Employees at the non-incentive site perceived the physical comfort and

the task orientation of their worksite as lower than employees at the incentive site.

Other differences could also affect how each intervention was received. For instance, the incentive worksite has had more health programs for employees than non-incentive worksite has had. Perhaps this meant nonparticipating employees were accustomed to encouraging participants in health programs such as those receiving incentives.

Still, many similarities do exist between the worksites. The most important similarity is that both worksites are part of the same company. In this way they are more similar than almost any other two companies. In addition, both have large work forces. Both suffered lay-offs. Both are fighting for market share with their products against tough competitors. Both worksites are located in smaller-sized cities in the Commonwealth of Virginia.

Moreover, the degree of similarity between these worksite is substantially higher than that similarities obtained in other studies in this area. The only other controlled study in this area (Klesges et al., 1986) equated conditions only for type of worksite, type of employee and geographic location. Whatever the faults in matching subjects in the current study, the amount of control used in this study appears to be a major improvement over other work in this area.

Finally, it is important to recall that no one study reduces all threats to validity. Only replication and a series of studies eliminates doubts about a study's validity. Even if the study had shown the predicted results, then the major recommendation would be

that additional studies are needed.

External Validity

While the internal validity of this study may be weak, the external validity is somewhat stronger. This study can be easily replicated, particularly because no aspect of the intervention was unusual. The American Lung Association's smoking cessation program, or another quality program which values total abstinence as a goal, could be run at another worksite. Group leaders in this study were adequately trained, but not highly specialized as psychologists might be; so similar leaders could readily be found when replicating the study. In both worksites company employees did the carbon monoxide assessments, and again similar personnel could be found when replicating the study. Moreover, it would be easy to replicate the incentive schedule once someone decides to finance the intervention.

Another aspect of this study makes it easy to replicate; namely, neither worksite was very enthusiastic about the intervention. At the incentive site the group leader was heard on a recording of a group session saying she did not think the incentive money would help people quit smoking. At the non-incentive site, management had little respect for research; several times they threatened to end their involvement in the program. They were angry that so few employees signed up, and they were angry that setting up the intervention took time. Because of their lack of enthusiasm for the intervention, these worksites cannot be seen as promoting successful results simply by their organizational support for the program. This nonenthusiastic stance may be more

representative of future companies which sponsor incentive smoking interventions than if the General Electric worksites had been enthusiastic about the intervention.

A researcher could have a degree of confidence that the results of this incentive program is replicable as well. On two occasions the incentive program has resulted in high quit rates. There is reason to believe that a similar incentive program would have a similar effect the next time one is conducted.

Changes to be Made

If this study were to be repeated, several weaknesses which lie in the current study could be redressed. First, it is unclear whether or not the regular biochemical verifications conducted in the non-incentive site affected that condition's quit rate. A study is needed to determine the effects of regular carbon monoxide testing on success rates. Regular biochemical verification might be done over a nine or 12 month period in one smoking intervention. Such verification might be required to receive a small deposit of \$25 back. This would be contrasted to one or two other programs where participants did not submit to regular biochemical verifications to receive a \$25 deposit back. In one condition all participants might receive \$25 back, and in another condition all successful participants receive \$25 back. In both cases minimal or no biochemical verifications would be conducted. This design might isolate the effect of frequent biochemical verification.

If repeated carbon monoxide assessments were not found to

significantly affect success rates, then the next step is to ascertain the impact of incentives and rewards upon worksite smoking interventions. Given the limited resources generally available in dissertation studies, the optimal way of examining this impact appears to be within one large worksite. A smoking intervention would be promoted within the worksite, and participants would be randomly assigned to a condition where incentives and rewards are given, or to one where no major incentives and rewards are given.

There are two weaknesses with this approach. First, few companies would sponsor this research; several companies were queried about this and none warmed to the idea. However, other companies could have been contacted. While most companies would not allow this to occur, all that is needed is one company to consent to this procedure. Second, this could create tensions between groups of participants. The social support engendered by the incentives would most likely be weakened. This weakness, however, is more than compensated for by the strength of this approach. By using this procedure all the issues about selection and history can be circumvented. Thus, this procedure would result in a study with strong internal validity. In retrospect, this approach should have been pursued more vigorously.

A second approach is to increase the number of subjects. This, of course, is probably beyond the capabilities of a dissertation study.

No matter which approach is taken, administration procedures must be uniform. All programs would begin in the same month and would be run at the same hour. Also, two people would run two groups at one

worksite, and those same two people would run two groups at another worksite. Each person would run at least one incentive condition and one non-incentive condition.

CONCLUSION

Case studies suggest that when incentives and rewards are offered to employees who quit smoking, more people quit smoking. The pilot study described here builds support for the hypothesis that incentives and rewards result in high success rates for participants.

This experiment was overall not very successful. The research design was not one of the stronger designs, and unforeseen circumstances confounded the study. Despite these shortcomings, the incentive program did achieve impressive results as expected. An unexpected result emerged when the traditional smoking intervention was far more successful at the nine-month mark than are typical smoking interventions.

The hypotheses were falsified not because the interventions had too little impact, but because both interventions had a relatively major impact. The problem in this study was too much success; everything was successful. This is different from the research of prominent smoking cessation researchers. Glasgow, for instance, typically has disappointing results in both treatment and control conditions (e.g., Glasgow et al., 1983, Glasgow et al., 1984). He has repeatedly shown results where nothing appears to have much effect. This is typical of the entire field; smoking interventions generally have disappointing results (Lichtenstein, 1982). At least the current study showed that quit rates can be relatively high. Moreover, the current study showed this in a reliable fashion; biochemical verification was used to document smoking status.

Many reasons can be posited for why the non-incentive program was so successful. These factors include the education and sex of the participants, the time when the group was held, the frequent verifications of smoking status, and several other factors.

The unexpectedly good results of the non-incentive condition does not weaken the success of the incentive condition. The incentive program was successful; a high percentage of participants quit smoking. This study showed, with frequent biochemical verification, that for some reason an incentive program was associated with a high quit rate. And contrary to what some people might suspect, participants did not resent the incentives. Participants did not feel "bribed" to quit. Instead they were thankful to the company for sponsoring the incentive program and smoking cessation program.

These results indicate that a large-scale, well-controlled study needs to be conducted on the effects of incentives upon participation rates and quit rates. Because offering incentives and rewards is a good idea, other studies will be hopefully conducted to corroborate this hypothesis.

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APPENDIX A. Questionnaires used in Pilot Study,
Shown and Described.

Conflict-Stress Questionnaire

There frequently are day to day conditions at work which we find stressful. Please write down the following code so that you can rate the sentences I'm about to read to you.

1. never
2. rarely
3. sometimes
4. often
5. always

Others I work with seem unclear about what my job is
Others' demands for my time at work are in conflict with each other
I'm expected to interrupt my work for new priorities
There is conflict between my unit and others it must work with
I only get feedback when my performance is unsatisfactory
Decisions or changes which affect me are made "above" without my
knowledge or involvement
I have too much to do and too little time to do it
I have unsettled conflicts with people in my department
I have unsettled conflicts with other departments
I get little personal support from the people I work with
I spend my time "fighting fires" rather than working to a plan
I have difficulty dealing with aggressive people
I have difficulty dealing with passive people
Overlapping responsibilities cause me problems
Allocation of resources generates conflict in my organization
My personal needs are in conflict with the organization

Worksite Environment Scale

1. The work is really challenging.
2. People go out of their way to help a new employee feel comfortable.
3. Supervisors tend to talk down to employees.
4. Few employees have any important responsibilities.
5. People pay a lot of attention to getting work done.
6. There is constant pressure to keep working.
7. Things are sometimes pretty disorganized.
8. There's a strict emphasis on following policies and regulations.
9. Doing things in a different way is valued.
10. It sometimes gets too hot.
11. There's not much group spirit.
12. The atmosphere is somewhat impersonal.
13. Supervisors usually compliment an employee who does something well.
14. Employees have a great deal of freedom to do as they like.
15. There's a lot of time wasted because of inefficiencies.
16. There always seems to be an urgency about everything.
17. Activities are well-planned.
18. People can wear wild looking clothing while on the job if they want.
19. New and different ideas are always being tried out.
20. The lighting is extremely good.
21. A lot of people seem to be just putting in time.
22. People take a personal interest in each other.
23. Supervisors tend to discourage criticisms from employees.
24. Employees are encouraged to make their own decisions.
25. Things rarely get "put off till tomorrow."
26. People cannot afford to relax.
27. Rules and regulations are somewhat vague and ambiguous.
28. People are expected to follow set rules in doing their work.
29. This place would be one of the first to try out a new idea.
30. Work space is awfully crowded.
31. People seem to take pride in the organization.
32. Employees rarely do things together after work.
33. Supervisors usually give full credit to ideas contributed by employees.
34. People can use their own initiative to do things.
35. This is a highly efficient, work-oriented place.
36. Nobody works too hard.
37. The responsibilities of supervisors are clearly defined.
38. Supervisors keep a rather close watch on employees.
39. Variety and change are not particularly important.
40. This place has a stylish and modern appearance.
41. People put quite a lot of effort into what they do.
42. People are generally frank about how they feel.
43. Supervisors often criticize employees over minor things.
44. Supervisors encourage employees to rely on themselves when a problem arises.
45. Getting a lot of work done is important to people.
46. There is no time pressure.
47. The details of assigned jobs are generally explained to employees.
48. Rules and regulations are pretty well enforced.
49. The same methods have been used for quite a long time.
50. The place could stand some new interior decorations.
51. Few people ever volunteer.
52. Employees often eat lunch together.
53. Employees generally feel free to ask for a raise.
54. Employees generally do not try to be unique and different.
55. There's an emphasis on "work before play."
56. It is very hard to keep up with your work load.
57. Employees are often confused about exactly what they are supposed to do.
58. Supervisors are always checking on employees and supervise them very closely.
59. New approaches to things are rarely tried.
60. The colors and decorations make the place warm and cheerful to work in.
61. It is quite a lively place.
62. Employees who differ greatly from the others in the organization don't get on well.
63. Supervisors expect far too much from employees.
64. Employees are encouraged to learn things even if they are not directly related to the job.
65. Employees work very hard.
66. You can take it easy and still get your work done.
67. Fringe benefits are fully explained to employees.
68. Supervisors do not often give in to employee pressure.
69. Things tend to stay just about the same.
70. It is rather drafty at times.
71. It's hard to get people to do any extra work.
72. Employees often talk to each other about their personal problems.
73. Employees discuss their personal problems with supervisors.
74. Employees function fairly independently of supervisors.
75. People seem to be quite inefficient.
76. There are always deadlines to be met.
77. Rules and policies are constantly changing.
78. Employees are expected to conform rather strictly to the rules and customs.
79. There is a fresh, novel atmosphere about the place.
80. The furniture is usually well-arranged.
81. The work is usually very interesting.

82. Often people make trouble by talking behind others' backs.
83. Supervisors really stand up for their people.
84. Supervisors meet with employees regularly to discuss their future work goals.
85. There's a tendency for people to come to work late.
86. People often have to work overtime to get their work done.
87. Supervisors encourage employees to be neat and orderly.
88. If an employee comes in late, he can make it up by staying late.
89. Things always seem to be changing.
90. The rooms are well ventilated.

ORGANIZATIONAL COMMITMENT QUESTIONNAIRE

Please rate the following statements which represent possible feelings that people might have about their company. Use the following 7-point scale when rating:

1. strongly disagree
2. moderately disagree
3. slightly disagree
4. neither disagree nor agree
5. slightly agree
6. moderately agree
7. strongly agree

I'm willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful.

I talk up this organization to my friends as a great organization to work for.

I feel very little loyalty to this organization.

I would accept almost any type of job assignment in order to keep working for this organization.

I find that my values and the organization's values are very similar.

I am proud to tell others I am a part of this organization.

I could just as well be working for a different organization as long as the type of work was similar.

This organization really inspires the very best of me in the way of job performance.

It would take very little change in my present circumstances to cause me to leave this organization.

I am extremely glad that I chose this organization to work for over others I was considering at the time I joined.

There's not too much to be gained by sticking with this organization indefinitely.

Often I find it difficult to agree with this organization's policies on important matters relating to its employees.

I really care about the fate of this organization.

Deciding to work for this organization was a definite mistake on my part.

For me this is the best of all possible organizations for which to work.

Conflict-Stress Questionnaire

The Conflict-Stress Questionnaire has been developed by Steinmetz, Kaplan, and Miller (1982). It delineates stressful working conditions into types of stressors: physical, social, organizational, and unreasonable self-expectations. To measure organizational stress, an illustrative statement is "Others I work with seem unclear about what my job is." The subject rates agreement with the statement on a 5-point Likert scale.

To validate the measure, Steinmetz et al. (1982) performed a factor analysis and identified three factors. One factor represented an organizational cluster, a second an internal construct. Some convergent and discriminant validity was shown in the relation of these two factors to complaints of fatigue, worry, agitation, impatience, and anger. Moreover, subjects showed major changes on the first two factors after completion of a stress management course.

In an independent study, King (1982) did not find that subjects completing a time-management course (one specific aspect of stress) made major shifts in answering the Conflict-Stress Questionnaire. However, scores did correlate in the expected manners with supervisor support and support from family or friends. Moreover, this social support was found in a multiple regression equation to significantly explain the variance of the stress.

The Worksite Environment Scale

The Worksite Environment Scale is a 90-question, true/false test (Moos, 1986). It contains ten subscales which address the areas of relationships, personal growth and system maintenance and change. The relationship subscales are involvement, peer cohesion and supervisor support. The personal growth subscales are autonomy, task orientation and work pressure. The system maintenance and change subscales are clarity, control, innovation and physical comfort. Each subscale is tapped through ten true-false questions.

Buros (1985) assesses the reliability of the Work Environment Scale, based on a sample of 1,045 employees, to be quite satisfactory. This judgement follows the examination of the internal consistency reliability estimates (between .69 and .86), the one month test-retest reliability (.69 to .83), the 12 month test-retest reliability (.51 to .63), and the mean stability coefficient calculated over 90 people ($r=.61$).

The Buros (1985) review did note that the scale's manual conveyed little information on the scale's construct and criterion-related validity. In the second edition of the 1986 manual, published after the Buros review was written, studies were published which tended to strengthen its construct and criterion validity.

Buros (1985) summarized the Work Environment Scale as being a "convenient, easy and quick way of assessing different types of work environment. It has multiple usage in clinical, research, and ordinary organizational settings (p. 1398)." Two organizational psychologists

with whom the author spoke said this scale was well-respected, and they recommended the use of this instrument (J. Michela, personal communication, April 1987; R. Sloan, personal communication, April 1987).

Organizational Commitment Questionnaire

The Organizational Commitment Questionnaire (Mowday et al., 1979) was used to assess whether employee commitment to their company was roughly equivalent across worksites. The questionnaire involves 15 statements, and subjects rate each statement on a 7-point Likert scale indicating their level of agreement with the statement. These ratings are summed to provide a summary indicator of employee commitment.

For this assessment tool, organizational commitment was defined as the strength of an employee's identification with and involvement in a particular organization. As an attitude, this commitment is intended to be an active relationship with the organization. The questionnaire taps behaviors which reflect one's commitment to one's organization. In addition, questions tap motivation to exert high levels of energy on behalf of the organization.

The questionnaire test-retest reliabilities and internal consistency reliabilities were judged to be adequate from a series of studies among 2,563 employees in nine divergent organizations. As opposed to many measures of organizational commitment which have little more than face validity, the Organizational Commitment Questionnaire has cross-validated evidence of acceptable levels of predictive validity, convergent validity, and discriminant validity (Mowday et al., 1979).

APPENDIX B. Worksite Environment Scale

1. The work is really challenging.
2. People go out of their way to help a new employee feel comfortable.
3. Supervisors tend to talk down to employees.
4. Few employees have any important responsibilities.
5. People pay a lot of attention to getting work done.
6. There is constant pressure to keep working.
7. Things are sometimes pretty disorganized.
8. There's a strict emphasis on following policies and regulations.
9. Doing things in a different way is valued.
10. It sometimes gets too hot.
11. There's not much group spirit.
12. The atmosphere is somewhat impersonal.
13. Supervisors usually compliment an employee who does something well.
14. Employees have a great deal of freedom to do as they like.
15. There's a lot of time wasted because of inefficiencies.
16. There always seems to be an urgency about everything.
17. Activities are well-planned.
18. People can wear wild looking clothing while on the job if they want.
19. New and different ideas are always being tried out.
20. The lighting is extremely good.
21. A lot of people seem to be just putting in time.
22. People take a personal interest in each other.
23. Supervisors tend to discourage criticisms from employees.
24. Employees are encouraged to make their own decisions.
25. Things rarely get "put off till tomorrow."
26. People cannot afford to relax.
27. Rules and regulations are somewhat vague and ambiguous.
28. People are expected to follow set rules in doing their work.
29. This place would be one of the first to try out a new idea.
30. Work space is awfully crowded.
31. People seem to take pride in the organization.
32. Employees rarely do things together after work.
33. Supervisors usually give full credit to ideas contributed by employees.
34. People can use their own initiative to do things.
35. This is a highly efficient, work-oriented place.
36. Nobody works too hard.
37. The responsibilities of supervisors are clearly defined.
38. Supervisors keep a rather close watch on employees.
39. Variety and change are not particularly important.
40. This place has a stylish and modern appearance.
41. People put quite a lot of effort into what they do.
42. People are generally frank about how they feel.
43. Supervisors often criticize employees over minor things.
44. Supervisors encourage employees to rely on themselves when a problem arises.
45. Getting a lot of work done is important to people.
46. There is no time pressure.
47. The details of assigned jobs are generally explained to employees.
48. Rules and regulations are pretty well enforced.
49. The same methods have been used for quite a long time.
50. The place could stand some new interior decorations.
51. Few people ever volunteer.
52. Employees often eat lunch together.
53. Employees generally feel free to ask for a raise.
54. Employees generally do not try to be unique and different.
55. There's an emphasis on "work before play."
56. It is very hard to keep up with your work load.
57. Employees are often confused about exactly what they are supposed to do.
58. Supervisors are always checking on employees and supervise them very closely.
59. New approaches to things are rarely tried.
60. The colors and decorations make the place warm and cheerful to work in.
61. It is quite a lively place.
62. Employees who differ greatly from the others in the organization don't get on well.
63. Supervisors expect far too much from employees.
64. Employees are encouraged to learn things even if they are not directly related to the job.
65. Employees work very hard.
66. You can take it easy and still get your work done.
67. Fringe benefits are fully explained to employees.
68. Supervisors do not often give in to employee pressure.
69. Things tend to stay just about the same.
70. It is rather drafty at times.
71. It's hard to get people to do any extra work.
72. Employees often talk to each other about their personal problems.
73. Employees discuss their personal problems with supervisors.
74. Employees function fairly independently of supervisors.
75. People seem to be quite inefficient.
76. There are always deadlines to be met.
77. Rules and policies are constantly changing.
78. Employees are expected to conform rather strictly to the rules and customs.
79. There is a fresh, novel atmosphere about the place.
80. The furniture is usually well-arranged.
81. The work is usually very interesting.
82. Often people make trouble by talking behind others' backs.
83. Supervisors really stand up for their people.
84. Supervisors meet with employees regularly to discuss their future work goals.
85. There's a tendency for people to come to work late.
86. People often have to work overtime to get their work done.
87. Supervisors encourage employees to be neat and orderly.
88. If an employee comes in late, he can make it up by staying late.
89. Things always seem to be changing.
90. The rooms are well ventilated.

APPENDIX C. Topics covered in smoking cessation group.

"x" denotes that topic was covered.

	GE Salem	GE Lynch- burg
Session 2		
1. Review "reasons to stop" assignment	x	
2. My most important reasons	x	
3. Buddy system	x	
4. Review recording and rating system	x	x
5. Review "Why do you smoke" test	x	x
6. Recording triggers, coping strategies	x	x
7. Preparation for quitting	x	x
8. Relaxation tape		x
Session 3		
1. Quitting ceremony	x	x
2. Review alternative coping concept	x	x
3. Relaxation, exercise #2	x	x
4. Comment on recovery process	x	x
5. Panel of ex-smokers	x	x
6. Contracts and rewards	x	x
7. Using your buddy effectively	x	x
8. Calendar scorecard	x	x
9. What to do when craving comes	x	x
Session 5		
1. Progress review	x	x
2. Lifestyle	x	
3. Exercise	x	x
4. Weight control	x	x
5. Relaxation, Exercise #4	x	x
6. Coping with social situations	x	
7. Coping with strong urges	x	x
8. Change your thinking	x	x
9. Concept of maintenance; Maintenance manual		
10. Special help	x	x
Session 6		
1. From short-term to long-term coping	x	x
2. Stress management guidelines	x	x
3. Coping with urges	x	x
4. Coping with feelings		x
5. Nonsmoking self-image	x	x
6. Self visualization	(recording	x
7. Planning celebration	stopped)	x

APPENDIX C. (cont.).

Session 7

1. Review of smoking status	x	(recording
2. Recap on long-term coping	x	not made)
3. Your progress as a nonsmoker	x	
4. Nonsmoker and clean air	x	
5. Second-hand smoke		
6. Cigarette advertising		
7. Evaluation; questionnaire	x	
8. Graduation	x	

GE Salem sessions included 34 topics out of a possible 39 topics (87%).

GE Lynchburg sessions included 25 out of a possible 34 topics (74%).

In the four sessions where tapes of both groups are available, 24 topics are covered in both groups and 7 topics are covered in just one group.

APPENDIX D. Honor Sheets.

I verify that I have not used tobacco. I realize I could have 1 or 2 smokes and no one would know, but I am being upfront and honest about this.

Signed, <u>1</u>	<u>1/10</u>	<u>8/31/88</u>
<u>1</u>	<u>1</u>	<u>8/31/88</u>
name		date
<u>1</u>	<u>1</u>	<u>9-23-88</u>
name		date
<u>1</u>	<u>1</u>	<u>9-23-88</u>
name		date
<u>Bry</u>	<u>-</u>	<u>9-23-88</u>
name		date
<u>1</u>	<u>1</u>	<u>7-13-88</u>
name		date
<u>1</u>	<u>1</u>	<u>10/6/88</u>
name		date
<u>1</u>	<u>1</u>	<u>10-21-88</u>
name		date
<u>1</u>	<u>1</u>	<u>10/21/88</u>
name		date
<u>1</u>	<u>1</u>	<u>10/21/88</u>
name		date
<u>Bry</u>	<u>1</u>	<u>10/21/88</u>
name		date
<u>Ral</u>	<u>1</u>	<u>10-21-88</u>
name		date
<u>1</u>	<u>1</u>	<u>10-21-88</u>
name		date

APPENDIX E. Form for Checking Reliability of Nurses' Procedures.

Name _____

Please do not tell Ann Mitchell or Catharine Lichtenstein you are doing this. They know someone is doing this, and they know what procedure to follow.

Put a check in the dated box if the person did it.

1. Ann or Catharine gave me an opening to say how I'm doing without smoking.

--	--	--	--	--	--

May June July August Sept Oct

2. Ann or Catharine congratulated me or encouraged me to keep it up.

--	--	--	--	--	--

May June July August Sept Oct

3. I signed the honor sheet in front of Ann or Catharine.

--	--	--	--	--	--

May June July August Sept Oct

After October or after you have relapsed (don't do that!), please mail this form to: Steve Malone, 209 Jefferson St., Blacksburg, VA 24060. Thanks again for doing this.

Appendix F. Questionnaire Regarding Incentive of \$200

Please put one of the following codes next to the statements below.

DA= Definitely Agree
 TA= Tend to Agree
 DK= Don't Know
 TD= Tend to Disagree
 DD= Definitely Disagree

The incentive was a major reason why I joined this program.

In my body I have really felt the health benefits of not smoking.

The incentive has really made little difference in my staying quit.

I can really visualize the fact that my risk of getting smoking-related diseases has gone down.

Quitting smoking with others really helped me stay quit.

For me, the group support was more important than the incentive was.

I suspect some people at work resented my getting this incentive.

If I were to change this program, I would...

...give more money in the beginning & less at the end.

...give less money in the beginning & more at the end.

...give money out more often.

...give money out less often.

The incentive has felt sorta wrong to me, like a bribe to get me to quit.

I'd think of the incentive often when I was tempted to smoke.

I should have been asked to give suggestions on designing the incentive program. It sort of bothers me that I wasn't asked.

I think we pulled together more as a group because of the incentive.

When I'm tempted to smoke, I think of the incentive more than I do the health benefits of not smoking.

I am thankful to the American Lung Association for funding this program.

I am thankful to GE for sponsoring this program.

Please say, in your words, how the incentive money helped you. _____

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