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Publication Date

1982

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PSYCHOSOCIAL FACTORS AND SEX DIFFERENCES IN
MAINTAINING NON-SMOKING

by

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DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

PSYCHOLOGY

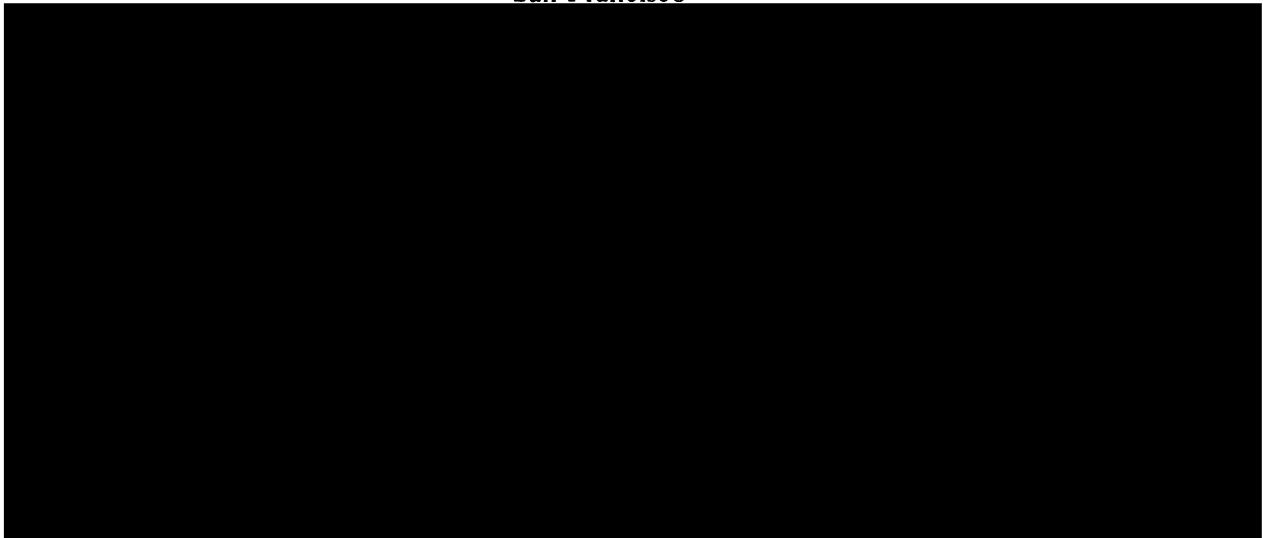
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GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA

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ACKNOWLEDGMENTS

I wish to express thanks to Dr. Sharon Hall and the Habit Abatement Clinic and Dr. Reese Jones and the Drug Dependence Research Center for providing the setting, the help, the facilities and the encouragement to conduct this study; and, in particular, I wish to acknowledge Dr. Hall's most helpful guidance as chairman of this dissertation.

I am also thankful to Chrystal Tunstall, M.A., for her faithful assistance in the collection of the data and thoughtful comments throughout the course of the study.

I especially appreciate the encouragement and excellent assistance of my husband, Robert Francis Fagan, during my data collection, analysis and write-up phases.

Drs. Dan Weiss and James Billings also provided excellent guidance and advice throughout the study; to them I am very grateful.

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PSYCHOSOCIAL FACTORS AND SEX DIFFERENCES
IN MAINTAINING NON-SMOKING

Abstract

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University of California, San Francisco, 1982

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Maintenance of smoking cessation for more than six months is very difficult for some individuals. Women appear to do less well than men in abstaining from smoking. Certain psychosocial characteristics may account for these individual and sex differences in long-term abstinence. In this predictive study, the amount of variance accounted for in long-term smoking abstinence by the following psychosocial variables was examined:

(1) Commitment to Quit Smoking; (2) Health Locus of Control; (3) Health Value; (4) State-Trait Anxiety; (5) Negative Mood States; and (6) Social Support. Sex of subject and smoking outcome was also examined.

Subjects were 149 smokers (65 (43%) men, 84 (57%) women), ages 22 to 55, who had volunteered to participate in a smoking cessation treatment study at the University of California, San Francisco.

Generally, subjects were well educated, middle class, caucasian, single, and had smoked an average of 26 cigarettes daily for the past 17 years. They began smoking at a mean age of 14 for men and 16 for women.

Subjects were given psychometric and physical tests before they began treatment. The psychosocial variables were independent variables. Subjects' six month smoking status served as the dependent variable. Self-report of smoking status was verified by both a smoking informant's report and breath carbon monoxide test.

Multiple regression analyses were performed to determine the relationship of the pretreatment measures and six month outcome.

Unlike other studies, there was no sex difference in abstinence outcome nor were there significant sex differences in any of the psychosocial variables. Furthermore, no significant associations were found between the psychosocial variables and six month smoking outcome.

Possible explanations for these lack of findings are given.

INTRODUCTION

Cigarette smoking is one of the most tenacious and insidious habits known to man. Its pleasures have been known for centuries, its health consequences for only a little over a decade (Surgeon General's Report, 1965). According to the most recent Surgeon General's Report (1980), cigarette smoking is "clearly the single most preventable cause of premature death in this country." It is believed to be the main factor contributing to lung cancer and coronary heart disease, the two major killers of our time. These extraordinarily serious consequences of cigarette smoking, however, have not deterred almost 30% of the adult female population and 40% of the adult male population from smoking regularly (Surgeon General's Report on Smoking and Women, 1980).

Furthermore, research documented in the 1980 Surgeon General's Report has shown that women are not immune to the health debilitating effects of smoking earlier documented for men (Surgeon General, 1965). Apparently, the lower incidence in women of smoking related diseases reflects the fact that women lagged a quarter century behind men in their widespread use of cigarettes. Also alarming are the recent findings on the effects of cigarette smoking by pregnant women on the outcome of pregnancy and the well being of the newborn baby. Women who smoke during pregnancy have

greater incidences of spontaneous abortion, premature births, and neonatal deaths. Children of mothers who smoked during pregnancy lag measurably in physical growth; and there may also be effects on behavioral and cognitive development (USDHEW, 1979). When smokers are asked about their opinion of these health damaging effects of smoking, 70-80 percent agree that cigarette smoking is harmful to their health, requires action, and causes diseases and premature death. Ninety-six percent of former smokers and non-smokers agree with these three points. It is interesting to note that there are no real gender differences in these opinions. However, gender or sex differences can be seen in the smoking cessation rates of men and women (Bierman & Gritz, 1980).

Current literature suggests that men have greater success at quitting smoking and maintaining non-smoking than women. If women have attitudes about the effects of cigarette smoking similar to men, as surveys suggest (Harris Poll, 1978; Surgeon General, 1979), then an important area of research is to determine what factors account for the differences in cessation and maintenance rates. That is the primary question under investigation in this study.

Psychosocial Factors Associated With Smoking Cessation and Maintenance

Smoking literature reviews (e.g. Gritz & Brunswick, 1980) seem to suggest four different factors

that are associated with smoking cessation and maintenance: (1) a strong commitment or motivation to quit smoking; (2) a high personal value placed on physical health; (3) a social environment that is conducive to or supportive of quitting smoking; and (4) an average level of anxiety and depressive mood states. The psychological literature suggests another factor that may be associated with health behavior changes such as smoking cessation is an internal health locus of control. This factor reflects the individual's perception of his/her control over what happens to their health. All five variables will be discussed below and examined in this study.

Commitment or Motivation to Quit

One factor that seems to consistently differentiate between those who can quit or reduce intake and those who cannot is the presence of a strong motivation and commitment to change (Hochbaum, 1965; Gutmann & Marston, 1967; Keutzer, 1967; Lawton, 1967; Roy, 1970; McFall & Hammen, 1971; Kanfer & Karoly, 1972; Marston & Feldman, 1972; Hildebrandt & Feldman, 1975). Perri, Richards and Schulthesis (1977), in a behavioral study of self-control and smoking reduction, found that those more committed to personal change were more likely to quit smoking. Eisenger (1971) found those committed to personal change and staying off cigarettes did better at long-term follow-ups. The

same holds true for people who go through treatment programs (Surgeon General's Report, 1980; Tamerin, 1972; Guilford, 1967). A common way to measure motivation to change is to assess the perceived costs and benefits of change. This approach draws heavily on the work of Becker and Maiman (1978) and the Health Belief Model that says if the costs of change are low and the benefits of change are high, then an individual will be motivated to change. If this is not the case, then no sustained change will occur.

Commitment is defined as a personal decision to change one's behavior (Hildebrandt & Feldman, 1975). In the smoking cessation literature, commitment to change and motivation to quit smoking are often used interchangeably, and such is the case here. Following treatment, the intensity or magnitude of commitment is a function of perceived costs and benefits of abstaining from a substance and perceived costs and benefits of the prescribed post-treatment strategy. Costs of abstention include withdrawal symptoms, loss of social reinforcement, and loss of positive effects of the substance itself. Benefits include better health, endurance, social reinforcement, absence of aversive social pressure, etc. Possible post-treatment strategy costs include time, money and social embarrassment; benefits include changes noted in behaviors related to relapse, avoidance of a particular

problem substance, and decreased discomfort due to withdrawal symptoms. According to Hall (1980), degree of commitment directly influences performance of coping skills. It is not constant, but fluctuates as a function of the client's evaluation of the cost-benefit ratios. Thus, it is viewed as a covert dynamic response rather than as a constant trait.

Commitment is strongest at the beginning of treatment (Hall, unpublished). The 'costs' which brought the client to treatment are still present or easily recalled, and the novelty of treatment encourages a high degree of commitment. Enhancement of commitment should come when commitment begins to wane; it is then that coping strategies are neglected and relapse is likely." For 55-75 percent of smokers, the relapse point is within five weeks after cessation (Hunt & Bospalec, 1973). Enhancement should emphasize the costs of smoking and the benefits of not smoking and minimize the cost of using coping skills and emphasize their benefits.

Perceived costs and benefits have shown promise as indicators of decreased smoking. High scores on a "benefits of non-smoking" scale predicted decreases in cigarette consumption in both college students (Mausner & Platt, 1971) and in adults (Mausner, 1973). Even completing a questionnaire on perceived utility produces some decreases in smoking (Mausner, 1973).

Hildebrandt and Feldman (1975) increased abstinence at one month by written, symbolic and imaginal exercises designed to increase the perceived costs of smoking, and minimize the costs of change.

A cost-benefit model implies that: (1) effective coping skills are needed to maintain change; (2) the enhancement of commitment will help maintain change; and (3) coping skills are most likely to be used if they rapidly produce perceptible improvement (e.g. an immediate decrease in unpleasant withdrawal symptoms); and are perceived as not costly to apply (are simple, socially invisible, and not time consuming). The model supports the use of targeted, as compared with "shot-gun" approaches; the latter may result in a good deal of increased "cost" as the client tries and discards strategies that do not work. While the need for coping skills is suggested by other behavioral models (e.g. Marlatt, 1978; Goldfried, 1973), enhancement of commitment and the delineation of types of skills most likely to be useful are unique contributions of a cost-benefit model (Hall, 1980).

Mechanisms behind continued commitment to change and compliance to strategies must be incorporated into thinking about maintenance and relapse in smoking behavior.

Continued commitment to abstinence may be affected by the initial reasons for wanting to quit. Four main

reasons for quitting were identified by Green (1977) in an analysis of data that had been gathered in a large survey of adults carried out by the National Clearinghouse for Smoking and Health in 1975 (1976). Health concerns weighed heavily as a reason for stopping. Subjects also expressed a desire to gain mastery of the habit which had been controlling their lives. Some smokers had come to believe that smoking was a messy, filthy, smelly habit and, therefore, aesthetic reasons had become prominent. Some smokers said that they were trying to quit because they felt that their smoking was setting a bad example for others who were under their influence, such as children or friends. Green tried to find out if economic concerns (the cost of cigarettes) were a major reason for stopping, but there was little evidence to support this in her study. Perhaps more substantial increases in cigarette cost would have larger effects on attempts at cessation. Horn (1968) and Russell (1973) argued that economic factors can have a major influence. Certainly among younger smokers the cost of smoking is often given for wanting to stop (Sheriff & Sheriff, 1964; Smith, 1979). Smith (1979) reported that young ex-smokers in grades 7 to 12 gave the following reasons for not smoking, beginning with the most common: (1) no enjoyment of or a dislike of cigarettes; (2) health; (3) the influence of others, e.g. a doctor or friend;

(4) aesthetic or moral objections to smoking; (5) the financial cost of smoking; and (6) the desire to have athletic abilities unimpaired (this was a more important reason among males than females).

Green (1977) speculates that the increasing social pressures against smoking may be creating some new reasons for not smoking. For example, smokers are being made to feel more and more that their smoking is an unwelcome nuisance to other people, and this may motivate some smokers to try to give up cigarettes.

Horn (1968) emphasized four aspects of the perception of the health threats of smoking that may be crucial to the decision to try to stop smoking: (1) becoming aware of the threat; (2) accepting that the threat is important; (3) accepting that the threat is personally relevant; and (4) becoming aware that something can be done about the threat. Eisinger (1972) found that, of those reporting an acquaintance whose health had been affected by smoking, 27.1 percent quit smoking; while only 9.7 percent of those reporting no such acquaintance quit smoking.

Many smokers come to realize that they are dependent on cigarettes; this realization can lead to low motivation to try to quit smoking or inspire a self-challenge and high motivation to quit. What determines the direction the smoker will go is unclear (Schneider & Van Mastri, 1974). Mausner (1973) has

studied the reasons that successful and unsuccessful abstainers give for stopping smoking. He concludes that, in general, people decide to stop because of an increased expectation of the benefits derived from stopping, rather than because of the fear of the consequences of continuing to smoke. Most smokers believe that smoking is bad. The people who continue to smoke tend to find not smoking more aversive than the prospect of continuing to smoke; those who stop tend to be more able to convince themselves that not smoking would be worth the effort.

Daniel Horn (1968) in his article "The Factors in Smoking and its Cessation" gives several examples of the costs and benefits of smoking that motivates smokers to change. The four main reasons that provide motivation for change are: (1) the desire to set an example for others, e.g., parents who want to set a good example for their children; (2) concern over the financial costs of smoking and financial costs of job disability and impaired health due to smoking; (3) concern over the unpleasant aesthetic aspects of smoking, such as yellow fingers and teeth and bad health; and (4) the desire to be in control over oneself and have mastery over the habit of smoking.

What is important to remember here is that it is not any one cost or benefit that will motivate a person to change their behavior, but rather the "costs vs.

benefits ratio" that the person perceives. Perception of the health costs of continued smoking seem to be fundamental to the motivation to quit for many smokers.

In their study of the impact of commitment to change on smoking behavior, Hildebrandt and Feldman (1975) comment that over the past few years there has been a growing awareness of the importance of covert factors such as expectancy and commitment in effecting behavior change. They studied 58 smokers from an introductory psychology class. The typical subject who completed their study was 20 years old, smoked for 2-8 years and, at the beginning of the smoking project, smoked 22.9 cigarettes per day. Subjects attended four weekly group meetings designed to enhance commitment and completed homework assignments in between sessions. A no treatment control group was also included. Subjects were given questionnaires prior to treatment including a measure of the "Costs and Benefits of Smoking" and the "Costs and Benefits of Change Attempts." They found a significant decrease ($p < .05$) in smoking among subjects in the groups receiving commitment training and additionally greater likelihood of success if the subject had come into treatment with an initially high level of "commitment" as measured by the above two questionnaires ($p < .05$).

Thus, based on this study and the findings reviewed above, the present investigation will examine

pretreatment level of commitment to quit smoking in an attempt to predict maintained non-smoking at a six-month follow-up.

Social Support

In a report of the Surgeon General on the Health Consequences of Smoking for Women (1980), it was concluded that women have "lower rates than men of successful cessation following organized cessation programs, a difference which is less apparent in those programs which include social support" (p. 398).

A social support hypothesis is frequently cited in the smoking treatment literature to explain sex differences in cessation and maintenance rates (Resnikoff, 1968; Hoffman & Janis, 1970; Schwartz & Dubitsky, 1968, 1977; Rugg & Billings, Unpublished). There is much evidence that suggests that women do better than men in programs which provide a maximum amount of social support, and tend to do worse in situations where program support is low. The literature shows that women do more poorly in treatments characterized by less individual attention, such as treatment where an educational strategy is the main approach (Guilford, 1967; Peterson et al., 1968; Berglund, 1969; Ochsner & Damrau, 1970; Delarue, 1973; Pyszka et al., 1973; Kanzler et al., 1976; Dubien, 1977; Danaher et al., 1978) or treatment using only pharmacotherapy (Turbe, 1958; Merry & Preston, 1963;

Whitehead & Davies, 1964; Golledge, 1965; Ross, 1967; Schauble et al., 1967; Wilhelmsen, 1968; Wellerquist, 1971, 1974; Arvidsson, 1971; West et al., 1977) as compared to behavior modification (Keutzer, 1968; Russell, 1970; Chapman et al., 1971; Berecz, 1972; Suedfeld & Ikard, 1973; Delahunt & Curran, 1976; Tongas et al., 1976; Russell et al., 1976) and psychotherapy (Moses, 1964; Mann & Janis, 1968; Steltzer & Kich, 1968; Lichtenstein et al., 1969; Bozetti, 1972; Tamerin, 1972) where contact is usually maximized in a small group or in an individual-to-therapist setting.

Social support seems to be of lesser consequence to men in quitting smoking although it is important (Schwartz & Dubitsky, 1968; Rugg & Billings, unpublished). Guilford (1972) found that when men and women participated in groups, success and failure rates were the same for both sexes. When subjects not involved in group treatment programs attempted smoking cessation on their own, men maintained the same success rates, but women achieved markedly lower success rates than men and than their female counterparts who attended groups.

There is also support for the suggestion that groups are particularly effective for women if they are sexually homogeneous (Guilford, 1967, 1972; Delarue, 1973). Apparently sexually homogeneous groups are not as important for men since they are less likely to

share their experience and express their feelings to others in a groups to begin with. Women tend to be more affectively expressive and show greater willingness to discuss personal issues relevant to themselves and smoking if the group is all female (Tamerin, 1972).

All participants in the current study were exposed to sexually heterogeneous groups led by female group leaders, with a strong element of group support and encouragement. It is expected that those women with additional outside social support will have greater success at cessation and maintaining non-smoking. It is hypothesized that the magnitude of the effect of outside social support on maintaining non-smoking will be greater for women than for men, although some level of outside social support is important for men also. In a recently completed study of the effect of social support on smoking cessation and maintenance (among other health behaviors such as weight loss, cholesterol reduction and adherence to anti-hypertension medications) in 129 middle-aged men at-risk for coronary heart disease, Rugg and Billings (Unpublished) found that high social support, in particular "spouse social support," in an interaction with health behavior motivation, was associated with risk reduction and smoking cessation ($p < .05$). The magnitude of this effect was $R^2 = .17$; that is, 17% of the variance in

outcome was accounted for by the interaction of spouse social support and health behavior motivation (defined as "readiness to perform a health-related behavior" such as smoking cessation). It should be noted that social support alone was not significantly associated with outcome in this sample of men. This suggests again that outside social support alone may not be as important for men in maintaining non-smoking as it is for women, but it is nonetheless one of several important predictors of outcome for men also.

Early investigations by Berglund (1969), and more recent studies by West et al. (1977) and Warnecke et al. (1978) have reported the importance of the influence of smoking behavior of significant others on smokers' success at maintaining non-smoking. It was found in all three studies that if women had a partner, parent, or close sibling who smoked, they were less likely to succeed at smoking cessation and those who did abstain were less likely to maintain their non-smoking. Other evidence on the importance of the role of "other smokers" in the environment has been reported by Kanzler (1976) who found a significant trend for women to give up smoking if no one in their daily environment was a regular smoker. This was true for men also, but to a lesser degree.

Many other studies document the importance and complex nature of social support in facilitating

smoking cessation and maintenance (e.g. Schwartz & Dubitsky, 1977; Hamilton & Bornstein, 1979). One concludes from reading this literature that "social support" can be defined and measured in a number of ways, yet it still seems to yield positive results. Kuzma and Phillips (1979) in a study of pregnant women cited "having a spouse who does not smoke" as one of the major predictors of smoking cessation. Eisenger's (1971) often cited study of psychosocial predictors of smoking recidivism reported that ex-smokers had a higher percentage of non-smoking friends, family and acquaintances than smokers who failed at their cessation attempts.

Marlatt and Gordon (1979) document the importance of "planning to use support from another person" in helping the ex-smoker prevent relapse. As Marlatt and Gordon (1979) conclude, it is important not only to measure the amount of social support a person has for quitting smoking but also his plans or inclinations to use that support. An early study by Resnikoff et al. (1968) also attempted to show this fact by measuring subjects' "sociability" level, i.e. degree of outgoing tendencies on the Social Introversion Scale of the MMPI. Women scoring high on this scale are shyer, more socially introverted, and less likely to use the support others may offer them in their attempts at smoking cessation. It was found that high scoring

women were less likely to quit than women low on this scale. No relationship was found for men.

Warnecke, Graham, Rosenthal and Manfredi (1978) conducted 696 personal interviews in a stratified sample of black females in inner-city Buffalo, New York. The purpose of their study was to analyze, in a series of cross-tabulations, the relationship between the behavioral variables predicted by their model to be associated with smoking behavior, and the observed smoking behavior patterns. No statistical tests were computed. The conceptual model on which their work was based integrated the emphasis on personal risk from the Health Belief Model (Kasl, 1974), and a formulation of the innovation-diffusion model described by Rogers and Shoemaker (1971) which suggests several stages over which cessation occurs. It allows for the possibility that the initial decision to quit or not may not be permanent and may depend on the subsequent reactions and social support of others who influence the smoker's behavior.

Based on this model, they hypothesized: (1) that interpersonal influences directly encouraging smoking cessation will be most often reported by those who have successfully quit; and (2) that successful abstainers will be more likely to have parents and siblings who are also non-smokers. The second hypothesis was supported by Warnecke et al.'s results. They found

that close relatives, especially spouses, influenced the decision to quit smoking and the ability to maintain non-smoking. They also report that these results from a sample of black female smokers did not differ substantially from white male samples who had been the subjects of earlier studies.

A recently completed study by Greene, Stevens and Guarnaccia (Unpublished) studied 138 ex-smokers and 141 smokers at a university medical center and reported several factors to be predictors of successful smoking cessation; among them were age, sex, marital status, and whether or not there was another smoker in the house ($R^2=.536$, $p=.01$).

To summarize, the smoking of significant others in the subject's environment and plans to use others in facilitating the subject's attempts at cessation and maintenance seem to be important predictors of maintenance and will be examined in this study.

State-Trait Anxiety and Negative Mood States

This section will be divided into two parts. The first examines anxiety and negative mood states that affect smoking cessation and maintenance that are temporary and fluctuating in nature. The second part focuses on the relationship between smoking cessation and maintenance and the more chronic anxiety factors such as trait anxiety and neuroticism scores. Sex

differences on these variables will be explored in both sections.

Much of the research in this area is characterized by attempts to develop personality "factors" that: (1) discriminate smokers from non-smokers; (2) predict who will be successful at smoking cessation; and (3) predict who will maintain long-term non-smoking. Some studies are confusing in that they use trait measures that were designed to discriminate state variables, and state measures to measure a trait variable; and it is still confusing and unclear as to whether efforts at discriminating smokers from non-smokers and defining "types of smokers" will ever have any bearing on short-term and long-term treatment outcome statistics, or if it was ever intended to.

Aside from theoretical concerns the studies in this area suffer from design and methodological problems. For example, many researchers do not verify the subjects' self-report of non-smoking. Furthermore, measures that are used repeatedly are only reported to account for 3 percent to 5 percent of the total variance in the smoking related outcome being measured. And statistically, some studies are so large, statistical significance is obtained whenever small differences are detected, while others are too small to adequately test the number of "factors" the studies propose to investigate. It seems only a few

investigators are familiar with the concept of power analysis, and there are a few cases where the appropriateness of the analyses chosen were in question. Nonetheless, conclusions have been drawn (as tenuous as they may be), frameworks have been applied (though controversially), and generalizations have been made about smokers, non-smokers and the prediction of smoking cessation and maintenance. I will attempt to organize this literature and extract from it the variables that have the most theoretical and empirical support for the prediction of smoking cessation and maintenance.

Smoking and Negative Mood or Affective States and State Anxiety

The literature suggests that individuals are more likely to smoke in situations of high anxiety than low anxiety and when experiencing "negative affect" (Frith, 1971; Ikard & Tomkins, 1973) and that women are more likely to score high on measures of state anxiety and negative affect and negative mood states (Frith, 1971; Ikard & Tomkins, 1973; McKennel, 1970; Coan, 1973; Shiffman, 1979; Horn, 1969). Negative affect and negative mood states are conceptually related, in that both are temporary negative states of being and for the purposes of this review are often used interchangeably. However, it should be kept in mind that "negative affect smoking" is usually referring to Tomkins'

"Smokers Typology" (1966) and negative mood states is a general state concept usually measured by the Profile of Mood States developed by McNair, Lorr and Droppleman (1971).

Since the effects of smoking are often perceived as tranquilizing or calming, it makes sense that smokers may come to rely on cigarettes as coping mechanisms to deal with acute anxiety, arousal or negative affect/mood states. This commonly held belief was examined by Frith (1971). He studied British male and female employees in a psychiatric institute; they ranged in age from 28 to 50. Subjects rated the strength of the desire to smoke in 22 hypothetical situations. The 12 high-arousal items involved either emotional strain and anxiety or demanding mental activity; the ten low-arousal items concerned boredom and relaxation or repetitive tasks and physical fatigue. A factor analysis of the entire questionnaire and t-tests performed on male versus female scores for the most extreme situations on the continuum led Frith to state that men had a greater desire to smoke in situations inducing boredom and tiredness and women had a greater desire to smoke in stress-inducing situations. However, men rated the desire to smoke significantly higher than did women on all three of the questions representing low-arousal situations, whereas women rated the desire to smoke significantly higher on

only one of the three questions representing the high-arousal extreme of the continuum.

Using Frith's questionnaire, Barnes and Fishlinsky were unable to replicate his findings in a sample of Canadian undergraduates (1976). Within the male sample, there was no significant relationship between desire to smoke and the arousal value of the situation in question, and female subjects indicated a greater desire to smoke in the low-arousal situations. The authors point out the possible importance of sampling differences.

Elgerot (1977) studied light, medium, and heavy smokers in an attempt to control potential differences in inhalation patterns between men and women (cited by Frith as a possible explanation for his results). Subjects were Swedish university students. The 42-item questionnaire was similar, but not identical to Frith's. There was no gender difference for low-arousal situations. There was no sex difference in the light and medium smoker subgroups, but women in the heavy smokers subgroup expressed a greater desire to smoke in stress-inducing circumstances.

Russell and his colleagues (1974) devised a 34-item questionnaire covering a wide variety of smoking motives. It was administered to 175 normal smokers and then subjected to factor analysis. Six factors, representing six types of smoking, were

identified. Women scored significantly lower on what was termed "sensorimotor" smoking, and significantly higher on "sedative" smoking. Thus, the sex difference on sedative smoking (reduction of arousal) was supported.

Ikard and Tomkins (1973) found evidence that women smoke in situations involving negative affect. Negative affect smoking is defined as smoking which serves to reduce unpleasant feelings. It includes smoking to reduce the dysphoric feelings accompanying rejection by a social group as well as smoking to satisfy a craving for a cigarette (i.e. a deprivation negative affect). Positive affect smoking involves the arousal of pleasant feelings. For example, smoking from curiosity would be classified this way because of the feelings of excitement and interest generated. Ikard and Tomkins showed two films, one intended to evoke positive affect (a slapstick comedy), and another to evoke negative affect (a documentary on Nazi atrocities) to college students who smoke. To be characterized as either positive or negative affect smokers, the subjects had to smoke during the appropriate film and indicate a congruent mood on an affect checklist. The major finding was that 73 percent of the female sample of 15 subjects exhibited solely negative affect smoking compared to only 36 percent of the sample of 39 males. While 80 percent of

the females indicated that they were likely to smoke in positive as well as negative affect conditions, their behavior did not match the self-report in this experiment. It is difficult to determine if the environment of the experiment altered normal behavior patterns or if perhaps, smokers are not accurate in describing the types of situations in which they smoke.

A nationwide household-interview survey conducted in 1964, 1966, and 1970 also suggested that a higher percentage of women than men are negative-affect smokers and that little or no difference exists between men and women in the percentage who are positive-affect smokers (USDHEW, 1969, 1973, "Smoking Health"). A greater percentage of women current smokers endorse the statement, "It relaxes me." This supports the hypothesis that reduction of negative affect is a more important factor for women smokers. The statements assessing positive-affect smoking did not show a clear gender difference. In 1964, slightly more men than women endorsed the statement "enjoys it" as a reason for smoking, but in 1966 there was no difference between sexes, and in 1970 slightly more female than male current smokers agreed that "cigarettes are pleasurable" (79.6 percent of women versus 77.0 percent of men).

In summary, it appears that high levels of state anxiety and high levels of negative mood/affect states

does affect smoking cessation and maintenance and that there is more evidence of these states in women than in men. This may simply reflect a sex difference in willingness to report negative affect and anxiety, and not necessarily more anxiety and negative affect in women.

Smoking and Trait Anxiety, Neuroticism and Extraversion

The factors covered here are: (1) state anxiety (e.g. Spielberger et al., 1970); (2) neuroticism scores (Eysenck, 1959; Cornell Medical Index); and (3) intraversion-extraversion scores (Eysenck, 1965).

This area has leaned toward a typology approach based on traits that smokers self report. Most known in the typology efforts is the work of Eysenck (1965), Tomkins (1973), Horn (1969) and McKennel (1970). Their efforts have led to interesting typologies, but have had little relevance for treatment in the past.

This section could also be called miscellaneous personality variables since each study seems to define traits differently or simply measure different traits. Chronic anxiety seems to be the underlying construct in what these studies attempt to examine.

Chronic or trait variables studied range from neuroticism (Waters, 1971; Burns, 1969; Cherry & Kiernan, 1976) to chronic tension and apprehension (Rode, 1971, 1972) to chronic depression and

psychological distress (Peterson et al., 1968; Russell, 1970). Some researchers discuss Eysenck's early introversion-extroversion work with smokers (1963). There is a paucity of current research evidence in this area. Apparently current investigators feel that this approach may have been useful initially in categorizing smokers from non-smokers but since personality traits are not easily modifiable, it is not a fruitful area for smoking intervention research. However, chronic or stable traits may be predictive of success and this may be useful for treatment selection procedures.

Neuroticism and extraversion are personality traits which have been thought to be related to smoking behavior (Eysenck, 1973; McArthur, Waldron & Dickinson, 1958) in some of the early smoking literature. Waters (1971) examined mail-out questionnaire data from 773 men and 945 women (total N=1,718) pertaining to their smoking habits and 9 questions measuring neuroticism. These 9 questions were derived from the Cornell Medical Index Health Questionnaire and had been adapted for community studies in South Wales. Waters reports that the questions "correlated with a psychiatrist's evaluation of neuroticism," and that he had validated them in a self-administered headache questionnaire (Waters & O'Connor, 1971). A "neurotic grade" of 0-9 was given to subjects in this study, with a higher

score equal to a higher level of neuroticism. He found that the neurotic grade was not related to age in either men or women. In men the mean neurotic grade was only slightly higher for smokers (1.65) than non-smokers (1.58) and was not significantly correlated with smoking (Spearman's rank correlation corrected for ties was $r_s = -.002$, $p > .05$). However, in women he reported a significant correlation between smoking and neurotic grade ($r_s = .127$, $p < .001$). Waters concludes that "since that relationship reported here was found in a cross-sectional survey, it gives no evidence whether neuroticism is cause or effect of smoking. It may be that the more neurotic women tend to smoke or that smoking makes them neurotic, or that smoking and neuroticism have a common etiology." I agree with this comment, but questions his measure of "neuroticism" and questions the generalizability of results from this South Wales sample. Measures of neuroticism often reflect a sex bias.

Furthermore, another study done by Eastwood and Trevelyan (1971) did not confirm Waters (1971) results. They also used a self-administered questionnaire, but did not find a significant correlation between neuroticism score and smoking. Additionally, in a longitudinal study of British men and women, Cherry and Kiernan (1976) found that high extraversion scores were related to a greater incidence of giving up smoking for

both men and women, but that neuroticism was not related to smoking cessation in women, as it was for men. More neurotic men were less likely to succeed at smoking cessation and maintenance.

Burns (1969) on the other hand, in a study of 68 males and 24 female smokers reported that female smokers had significantly higher neuroticism scores than did female non-smokers ($t=3.5$, $p<.001$) and that no such difference was found in men ($t=1.2$, $p>.05$). He measured neuroticism using the Maudsley Personality Inventory (Eysenck, 1959). Burns also reports that women were less likely to quit on their own than men in this study. He also measured Eysenck's intraversion-extraversion factor and found no difference in smokers versus non-smokers ($t=.90$, $p>.05$) or in sex on this dimension ($t=1.31$, $p>.05$). Guilford (1966) in her study of the factors related to successful abstinence from smoking, found that male quitters were less neurotic than those who were unsuccessful at quitting; this trend was not found in women smokers.

Straits (1967) found no relationship in extraversion and neuroticism, as measured by Eysenck's scales, and quitting. Straits and Ryan (1973) used Cattell's 16 PF questionnaire to assess the personality of successful quitters versus non-quitters. They report that "male quitters were less tense (that is,

low in neuroticism)" and that female quitters were also less tense; i.e. had lower "tension" and "apprehension" scores (that is, low neuroticism) than those who failed to quit.

These studies demonstrate the confusing and often conflicting nature of results regarding sex differences in traits like "neuroticism" and "extraversion" on smoking behavior. Thus, neuroticism per se, is not a variable measured in this study.

Additionally, Eysenck's work categorizing smokers on his intraversion-extraversion continuum has not continued to elicit much interest among current investigators concerned with predicting treatment outcomes and thus is not a variable measured in this study.

Miscellaneous Trait Variables

There are other psychological traits that have been studied, but to a limited extent. They will briefly be acknowledged here.

Frieze et al. (1978) in their book on Women and Sex Roles reported women face more life stress than men and have more symptoms of "psychological distress" than men. The presence of "psychological distress" has been shown to affect the success of women in smoking treatment. Peterson et al. (1968) found that, while 23 percent of the men who had participated in a smoking program cited nervousness as the principle reason for

resuming smoking, 43 percent of the women cited this reason. Russell (1970) reports that the presence of depression was related to dropping out of treatment, and that depression was more frequent and severe among the women in his sample. In a later study, Russell (1978) found that within the treatment group, women had worse psychiatric adjustment scores than did men (In Raw, 1978). Furthermore, although the degree of psychiatric adjustment did not differ between male treatment successes or failures, treatment successes among women were significantly more likely to have good adjustment scores. Rode (1972) found that success in a smoking withdrawal program was related to lack of tension and apprehension for women. That smoking might indeed act as a method of coping with psychological and social stress is illustrated by the fear reported by many women that they will engage in symptom substitution--such as overeating--if they stop smoking (Burns, 1969).

Fisher (1976) provides a psychoanalytic interpretation of sex differences in smoking cessation and maintaining non-smoking. He suggests that the female smoker has difficulty in smoking cessation due to her need for power, and that this probably "developed out of early envy of the male and a need to be more like him." Freud's concept of penis envy was

invoked, along with the view of a cigarette as an extension of the body.

Other efforts at predicting smoking cessation and maintenance from trait measures have discussed such concepts as "the Addictive Personality". Basically, Jacobs (1971) considered heavy male smokers to have addictive personalities. He reported that successfully abstaining males were less "impulsive, defiant and manifestly distressed" and also were less "constricted, guarded and isolated." These two sets of traits were positively correlated with each other ($r(102) = .24$, $p < .05$); it is not obvious how an "impulsive, defiant" person could at the same time be "constricted" and "guarded." Perhaps the last two components, "manifestly distressed" and "isolated," account for the greatest share of the variance in this association.

In summary, it is concluded that the most important and predictive variables of smoking outcomes are state and trait anxiety and negative mood states. Thus a pretreatment examination of these variables will be made and their relationship to six-month smoking outcome examined.

Locus of Control, Health Locus of Control and Health Values

Background on the Locus of Control Variable

Rotter (1966) developed from social learning theory a concept of internal-external control of

reinforcement. This concept describes the degree to which an individual believes that reinforcement is contingent upon one's own behavior. Internal control refers to the belief that reinforcements are contingent upon their own behavior, capacities, or attributes. External control refers to individuals who believe that reinforcements are not under their personal control but are under the control of powerful others, luck, chance, or fate. Thus, depending on his past reinforcement experiences, a person will have developed a consistent attitude tending toward either an internal or external locus as the source of reinforcement.

A comprehensive review of the work on the development, validity, and reliability of the scale which measures beliefs about internal-external control has been compiled in a monograph by Rotter (1966). Lefcourt's (1966) comprehensive review offers further support for the validity of Rotter's concept. Joe (1971) in his review of data on the concept found two interesting results relevant to this investigation: (1) contrary to Rotter's claim, Joe suggests that sex differences do influence an individual's belief regarding locus of control. He quotes Feather's studies (1967a, 1968) at the University of England that showed females to be higher on external scores than males. However, both Rotter (1966) and Maccoby and Jacklin (1974) conclude that such differences may be

due to cultural roles assigned to each sex, to social class, and to regional effects. However, most other investigations support the conclusions with evidence of no basic sex differences in the internal-external control construct (e.g. Crandall et al., 1965b; Pallak et al., 1967; Buck & Austrin, 1971; Zytoskee et al., 1971; Levy et al., 1972; and others). Thus no sex difference is expected in this study.

A second point in Joe's review (1971) of locus of control studies that is relevant is that locus of control has not been found to be significantly related to measures of anxiety--state anxiety or trait anxiety. These variables will be measured in this study and others have examined them (Watson, 1967; Ray & Katahn, 1968; Spielberger, Gorusch & Lushene, 1970; Manuck, Hinrichsen & Ross, 1975; Haditch, Gargan & Michael, 1975).

Locus of Control and Smoking Cessation

In her critical review, Strickland (1973) examines the relationship between internal control and health behaviors such as quitting smoking and concludes that several studies have shown that subjects high in internality (those who believe that reinforcement is contingent upon the individual's behavior) are more likely to control their smoking behavior. Early studies by James, Woodruff, and Werner (1965) replicated Straits' and Sechrest's (1963) original

findings that non-smokers were more likely to be internal than smokers. In addition, they found that males who believed the Surgeon General's Report (1964) of the hazardous effects of smoking on health, and consequently quit smoking, were more internal than those who believe the report but did not quit smoking. Another study by Platt (1969) found internals able to change smoking behavior to a greater extent than externals (those who believe reinforcement is controlled by outside forces such as fate, luck, chance or powerful others). Steffy, Meichenbaum and Best (1970) also found internals more likely to reduce their smoking. Additionally, Williams (1972), also summarized in Wallston and Wallston (1978), reports greater cigarette smoking among external students than internal students in the ninth grade. Studies by Lichtenstein and Keutzer (1967) and Best and Steffy (1971), however, have failed to corroborate the relationship between smoking and locus of control. Phares (1976) suggests that this is because of a lack of systematic evaluation of health values and other expectancies, which Rotter (1966) also considered important in predicting behavior.

More recently Best and Steffy (1975) investigated the efficacy of matching individuals to smoking reduction programs which complemented their locus of control orientations. They report a significant

($p < .05$) three way interaction among locus of control, treatment focus, and time, such that four months after treatment, individuals matched to the treatments had almost completely maintained changes, while most individuals not matched to the treatments had returned to baseline smoking levels. These results were replicated with similar treatments (Best, 1975). However, though matching subjects to treatment did improve outcome, their treatment groups did not perform significantly better than their no-treatment control group. Thus caution should be used in applying these results.

Health Locus of Control

Wallston, Wallston, Kaplan and Maides (1976) have developed and validated a measure called the Health Locus of Control Scale (HLC). The HLC is "an area-specific measure of expectancies regarding locus of control developed for prediction of health-related behavior." They hypothesize that a possible reason for the contradictory results found in locus of control research in health-related areas is the use of a generalized measure of expectancy to predict behavior in a specific (e.g. health) situation. Interest in a limited area like health (particularly if health-related behavior can further be specified, e.g. changing unhealthy behaviors, such as smoking) calls for a measure of specific expectancies.

Wallston et al. described the development of the HLC scale and demonstrated its differential functional utility over the I-E scale for describing the relationship between locus of control and health behavior.

The HLC scale is an 11-item Likert-type scale with a six point scale for each item. It does not reflect a social desirability bias. Correlation with the Marlowe-Crown Social Desirability Scale is low.

Within each of Wallston et al.'s scale development samples (e.g. college students, 17-49 years; non-college students, 17-26 years; local community residents, 17-66 years; and hypertensive outpatients, 26-70 years), there have been no significant differences in HLC scores between males and females. Thus, no sex differences in HLC will be expected in this study.

In a validation study, the HLC scale and a health value scale were variables, since it is also important to measure the level of reinforcement value the state or situation sought has for the person (Rotter, 1966). Results showed that when the HLC was used as the basis of comparison, high health value, high internal subjects sought more health information about the health condition in question (hypertension) than any other subjects.

In a second investigation, Wallston, Wallston and Maides (1976) further tested the hypothesis that health behavior is related to locus of control beliefs as measured by the HLC scale, and the value placed on health. This study replicated the result of the above validation study.

From the results of this study, the authors conclude that "given the opportunity to gather information about a health problem which may or may not affect him or her, the internal who values health highly will seek more information and make more effort at behavior change than one who does not value health or who holds external beliefs." The Health Value Measure will be discussed more in the following section on Health Value.

The Health Locus of Control measure seems to be a promising measure of locus of control as it relates to health behavior. Since this is a new scale, continued validation research is needed, in different situations and with different populations. (Footnote: Recently Wallston and Wallston have developed a "multidimensional" Health Locus of Control Scale, but as of yet no evidence is available on its relationship to smoking behavior; thus, only the original HLC scale will be reviewed here and examined in this investigation.)

Health Locus of Control and Smoking Cessation

Though all of the early studies of smoking and locus of control cited above have used Rotter's (1966) I-E scale to measure locus of control, current studies are relying more on the measurement of the health locus of control construct and Wallston et al.'s (1976) Health Locus of Control (HLC) Scale (e.g. Rugg & Billings, unpublished; Kaplan & Cowles, 1978).

As a result, two problems have emerged that cloud the interpretation of the usefulness of constructs such as locus of control in the prediction of smoking behavior change. One of these problems concerns the type of scale used to measure locus of control. Rotter (1966) developed a scale for assessing individuals' generalized expectancies for reinforcement, and this scale has been widely used in the smoking cessation literature. However, social learning theory (Rotter, 1954, 1975; Rotter, Chance & Phares, 1972) clearly states that in a given situation, behavior is primarily a function of specific expectancies relative to that situation rather than a function of generalized expectancies. Given the emphasis on the dangers of smoking to health, it would be reasonable to assume that changes in smoking behavior might be a function of beliefs concerning ability to influence one's state of health. A health-related locus of control scale,

therefore, should provide better predictions of smoking behavior change than Rotter's more general scale.

A second problem has been the failure of researchers to include value measures in their studies. Theoretically, expectancies above predict behavior only in situations where the values of the possible outcomes are high. Smokers probably do not universally place a high value on health. The failure to measure health value, and consequently its possible interaction with locus of control in the prediction of behavior has resulted in an unclear relationship between locus of control and smoking behavior change. As discussed above some researchers have found significant relationships (Straits and Seechrest, 1963; James et al., 1965; Platt, 1969; Steffy et al., 1970; Williams, 1972; Strickland, 1973; Best, 1975; Kaplan & Cowles, 1978), while others have not (Lichtenstein & Keuzter, 1967; Bernstein, 1970; Best & Steffy, 1971).

A well done recent study that improved on this situation by using the HLC scale and a measure of health value in predicting smoking reduction was done by Kaplan and Cowles (1978). They examined a sample of 13 male and 22 female smokers who volunteered to participate in a smoking treatment program at the University of Cincinnati. The mean age of these participants was 37 years (S.D.=13.4); they had been smokers for a mean of 17.7 years (S.D.=11.1); and their

mean smoking level was 23 cigarettes per day (S.D.=11.6) during the baseline monitoring period. Participants were given the HLC and a health value survey--a modified version of Rokeach's "Terminal Value Survey" (1973) prior to treatment and followed up five months after treatment to determine smoking status. As hypothesized, individuals who held internally-oriented health locus of control beliefs and who highly valued health were most successful in achieving and maintaining changes in their smoking behavior. High health value subjects (median splits were used) did significantly better than low health value subjects ($F(1,29)=10.27, p=.004$). Internal HLC subjects tended ($p=.14$) to have greater success than externals across all time periods. Analysis of covariance showed high internal and high health value subjects did significantly better at the follow-up periods than the other three groups combined ($p<.05$).

Health Value

Studies show that the value placed on physical health compared to other positive life goals is slightly lower for smokers than non-smokers, and highest for ex-smokers (Surgeon General, 1979). Williams (1979) reports that out of a range of health value factor scores from one to six, with six being maximum health value, current smokers averaged 4.66 (males = 4.55, females = 4.81). Non-smokers averaged

4.82 (males = 4.68, females = 4.90). Ex-smokers averaged 4.89, with male ex-smokers averaging 4.78 and female ex-smokers averaging the highest, 5.06. This suggests that people who are most likely to quit smoking and remain quit are likely to place a great deal of value on their physical health. Interestingly, Williams' study shows that women are more likely to have a higher health value than men in all groups. This is consistent with traditional notions that the women in our culture are more responsible for and concerned with the health of themselves and their families. One would expect this to facilitate their efforts in quitting smoking; however, since women are having less success in quitting, other factors must be involved and may be more important.

Summary

Smoking is a complex behavior. Individuals start to smoke and quit smoking for multiple reasons. Strong correlations between smoking and a number of demographic and psychosocial variables have been reported, but the set of "predisposing factors" to maintaining abstinence has seldom been subjected to multivariate analysis. It is rare that more than one or two variables have been tested simultaneously. What appear to be separate determinants of smoking behavior may actually be factors that reflect a more basic variable. This study is intended to fill the gap of

needed multivariate research on predisposing factors to maintaining non-smoking.

Hypotheses

None of the above variables alone is sufficient in predicting maintenance. Together, however, it is proposed that they will account for significant variance in abstinence and relapse at 6 months post treatment. The following are the specific hypotheses of this study, based on the literature reviewed above:

(1) It is hypothesized that men will be more likely to be abstinent at the six month follow-up than women.

(2) Several factors were hypothesized to be related to outcome for both sexes:

(a) Motivation to quit smoking will be positively associated with abstinence at six months;

(b) Internal health locus of control will be positively associated with abstinence at 6 months;

(c) Health value will be positively associated with abstinence at 6 months;

(d) High levels of anxiety and negative mood states will be negatively associated with abstinence for both sexes. A corollary hypothesis is that women will have higher levels of anxiety and negative mood states.

(3) Finally, it was hypothesized that one factor would be sex specific in terms of outcome: social support will be positively associated with abstinence for women, but unrelated to abstinence for men.

METHODS

Subjects

Subjects were 149 smokers (65 men, 84 women), ages 22 to 55, who volunteered to participate in a smoking cessation treatment study conducted by the Habit Abatement Clinic at the University of California, San Francisco, Langley Porter Psychiatric Institute. Subjects were obtained via announcements in the university newspaper and local newspaper and recruitment over local radio and television. The main source of referral, however, was word-of-mouth, i.e., either from people who had themselves already been through the program, or from health professionals who had heard about the program referring their clients. Tables 1 and 2 describe the sample, which includes 9 pilot subjects and subjects not completing treatment. Furthermore, married couples, sometimes treated as one subject in smoking studies because their outcome is highly correlated, were treated as two subjects in this study since it was the purpose of this study to explore sex differences in psychosocial factors and smoking outcome.

Subjects were not screened on initial smoking characteristics. A description of the subjects' initial smoking patterns can be seen in Table 3 which shows the mean smoking characteristics for this sample.

Table 1
SAMPLE DESCRIPTION

Variable	Total (%)	Female (%)	Male (%)
<u>Sex</u>	149	84 (57)	65 (43)
<u>Age</u>			
\bar{X} Age	36.65	37.36	35.72
S.D.	7.72	8.39	6.75
Range	22-55	22-55	25-55
Median	38.50	38.50	40.00
<u>Marital Status</u>			
1=Married	41 (27.52)	20 (23.80)	21 (32.31)
2=Separated	3 (2.01)	2 (2.38)	1 (1.54)
3=Divorced	27 (18.12)	19 (22.62)	8 (12.31)
4=Widowed	3 (2.01)	3 (3.57)	0
5=Single	75 (50.33)	40 (47.62)	35 (53.85)
Ever Married/ Never Married	(50/50)	(52/48)	(46/54)
<u>Ethnicity</u>			
1=Caucasian	140 (93.96)	79 (94.04)	61 (93.85)
2=Black	5 (3.35)	3 (3.57)	2 (3.08)
3=Asian	2 (1.34)	1 (1.19)	1 (1.54)
4=Latino	1 (.67)	0	1 (1.54)
5=Other	1 (.67)	1 (1.19)	0

Table 2

EDUCATION, OCCUPATION, SES

Variable	Total (%)	Female (%)	Male (%)
<u>Education</u>			
1=Grad/Prof.	41 (27.52)	20 (23.81)	21 (32.30)
2=College (4yr)	58 (38.93)	32 (38.10)	26 (40.00)
3=College (1-3yr)	40 (26.85)	24 (28.57)	16 (24.61)
4=Hi School (4yr)	8 (5.37)	6 (7.14)	2 (3.08)
5=Hi School (1-3yr)	2 (1.34)	2 (2.38)	0
6=Jr. Hi School	0	0	0
7=Elementary (<7yr)	0	0	0
<u>Occupation</u>			
(Category 1 = Professionals to Category 7 = Unskilled Labor)			
1=	15 (10.07)	4 (4.76)	11 (16.92)
2=	51 (34.23)	37 (44.05)	14 (21.54)
3=	38 (25.50)	19 (22.62)	19 (29.23)
4=	16 (10.74)	11 (13.10)	5 (7.70)
5=	12 (8.05)	3 (3.58)	9 (13.85)
6=	7 (4.70)	6 (7.14)	1 (1.54)
7=	10 (6.71)	4 (4.76)	6 (9.23)
<u>Social Class (SES)</u>			
1=Upper	15 (10.06)	5 (5.95)	10 (15.38)
2=Upper-middle	59 (39.60)	42 (50.00)	17 (26.15)
3=Middle	51 (34.23)	26 (30.95)	25 (38.46)
4=Lower-middle	23 (15.44)	10 (11.90)	13 (20.00)
5=Lower	1 (.67)	1 (1.19)	0

Table 3
SMOKING CHARACTERISTICS

Variable	Total	Female	Male
A. Daily number of cigarettes smoked pre-treatment	$\bar{X}=26.12$	$\bar{X}=28.45$	$\bar{X}=23.12$
Range	0-100	0-100	9-60
Median	50	50	34.5
B. Age of onset	$\bar{X}=15.6$	$\bar{X}=16.2$	$\bar{X}=14.8$
Range	6-26	6-26	8-26
Median	16	16	17
C. Mean Yrs Smoked	$\bar{X}=17.3$	$\bar{X}=18$	$\bar{X}=16.4$
Range	2-36	3-36	2-32
Median	19	19.5	17
D. Ever tried to quit:	90% tried 10% never tried		
E. Brands:	Ranged from lowest tar and nicotine varieties, like Cambridge and Barclays to some of the highest tar and nicotine varieties like English Durhams, Lucky Strikes, and Camel unfiltered.		

Selection Criteria

To become involved in the treatment study a potential subject had to meet the following criteria: (1) be between 21 and 55 years of age; (2) be free of serious cardiovascular or lung diseases; (3) not be pregnant or planning to get pregnant before treatment; (4) provide a physician's signature attesting to the fact that the person was healthy and could participate in rapid smoking treatment; (5) pay a refundable \$65.00 deposit before treatment began. (This deposit was given back to the subjects in portions as they completed the assessment aspects of the study.) The money was an incentive to return for assessments and not dependent on smoking status; (6) the person had to attend a one hour orientation meeting at least two weeks prior to starting treatment and sign a consent form to participate in the study.

Subjects were exposed to either a six second or a 30 second rapid smoking condition during which they smoked three cigarettes of their own brand at a rate faster than normal while being videotaped. The videotape was replayed after they had finished rapid smoking to aid in recall of the sensation of rapid smoking and to provide a visual image. Rapid smoking sessions were designed to result in smoking cessation. Such sessions were interspersed with "relapse prevention" sessions. In these sessions, subjects were

either assigned to a behavioral skills training condition where they learned cognitive relaxation and assertiveness skills or an insight-oriented discussion condition where they discussed their reasons for smoking and why they wanted to quit. Group support was provided in both conditions; all groups were five to six people with at least one member of the opposite sex in the group. Subjects were randomly assigned to conditions.

Fourteen treatment sessions were held over a six week period. Eight of these sessions were rapid smoking sessions and six sessions were devoted to relapse prevention. A trained smoking therapist graduate student (both female) was present at every treatment session. Sessions lasted for one hour and 15 minutes. Subjects met every day the first week of treatment (i.e., five times), four times the second week, three times the third week, once the fourth week, not at all the fifth week, and once again on the sixth week. Two groups of five to six people started treatment approximately every five to six weeks over the course of a year for a total of 149 subjects.

Follow-ups

The accuracy of self-reported smoking rates has been frequently questioned (e.g., Vogt, 1977). Thus in this study two additional confirmatory measures of smoking were used: (1) expired air carbon monoxide

(Vogt, 1977); and (2) subject's informant's report regarding S's smoking behavior. The informant's report was obtained by telephone.

Procedure--Questionnaire Data

Subjects attended an orientation meeting before being accepted into the program. At the orientation meeting they were given a packet of questionnaires to take home with them and complete before the start of treatment, and were given the details of the study and allowed to decide if they were interested. The questionnaire packet included measures of the psychosocial variables.

A. Commitment and Motivation to Quit Smoking

This variable was measured by: (1) A slightly modified version (by Hall & Rugg) of Hildebrandt and Feldman's (1975) Costs and Benefits of Smoking Scale and Costs and Benefits of Changing a Habit Scale; and (2) the first two items from Marlatt's (1979) Plans and Strategies for Maintaining Abstinence Questionnaire.

1. Costs and Benefits of Smoking/Costs and Benefits of Change

These two aspects of motivation to quit smoking were measured originally by a scale developed by Hildebrandt and Feldman (1975). This scale consisted of two subsets of items designed to measure "attitude toward smoking" and "attitude toward change." The initial pool of items was collected from a variety of sources and written

specifically for their smoking project. It was first administered to a group of college smokers (N=63). Among 114 items, generally phrased questions (e.g. "Smoking is relaxing.") and personalized questions (e.g. "My smoking will significantly shorten my life.") were intermixed. The instructions were similar to those used with the present scale (see Appendix A). S's rated the items on a five-point Likert scale. Two scoring systems were compared. The first was the usual assignment of appropriate weights to each alternative on the Likert scale with S's score being the sum of weights across all items. In the second method a "key" indicating responses in the extreme anti-smoking or pro-change direction was constructed, and the frequency of responses answered in the keyed direction was S's score; correlation between these two scoring methods was quite high ($r=.73$). Further the two types of questions general and personalized yielded very similar means (e.g. personal items, mean "keyed" score = 5.01 and general form, mean "keyed" score = 5.46). The Kuder-Richardson Coefficients of Internal Consistency (KR=20) were relatively high for both the personal ($r=.797$) and general ($r=.760$) forms. Those items that were not highly related to the total score were eliminated.

A second sample of smokers (N=30) and non-smokers (234) was administered the revised set of "general questions" (i.e. 43 questions). Using the "keyed" scoring method the average score for smokers was 5.30 and for non-smokers 1.98 (i.e. the higher score indicating a more pro-smoking attitude). The Kuder-Richardson Coefficients of Internal Consistency were .793 and .719 for smokers and non-smokers, respectively.

In addition, the revised set of "specific questions" (i.e. 45 questions) was administered to a third population participating in an anti-smoking clinic. The average ("keyed") score of the Ss was 5.20 prior to treatment and 2.14 at the end of the clinic. Again, the Kuder-Richardson Coefficients were relatively high (i.e. .794 and .802 pre and post clinic, respectively).

Scoring of the two subscales, "Costs and Benefits of Smoking" and "Costs and Benefits of Change," in the present study was done by using the appropriate weights to each alternative on a 5 point Likert scale with S's score being the sum of weights across all items. This is the first scoring method mentioned above and was used here since Hildebrandt and Feldman showed either scoring methods yielded similar results.

2. Plans for Maintaining Abstinence

The first two items from Marlatt's (1979) questionnaire on maintaining abstinence were chosen as an additional measure of commitment to quit smoking and thus were added to the set of questions measuring commitment and motivation. No reliability or validity statistics are available on these items, although they have face validity. The first item was scored by simply totalling the number of plans the S reported; this ranged from zero to eight. The second item was scored one if answered "yes" and zero if answered "no." Then, a total score was obtained by summing items one and two. Thus, this "plans" total score was the third measure in this commitment and motivation set.

B. Social Support

This variable was divided into two factors: (1) Close significant other people who smoked; and (2) plans to use or rely on someone outside of the treatment program for support in quitting and staying quit. The first aspect was measured by three items from the Tobacco and Drug Use Questionnaire (Jones and Bachman, 1979) (Nos. 53, 54, 55) asking about the smoking habits of parents, siblings, spouse, significant other and roommates. The second aspect was measured by the third item on Marlatt's Plans and Strategies for Maintaining Abstinence Questionnaire

referred to above. This item asked about the subject's plans to use or rely on someone else outside of the treatment group to help him or her quit smoking. Items answered "yes" were coded one, items answered "no" were coded zero, and number of outside support persons listed by the subject were tallied. Then all items were summed for a total social support score.

C. Health Value

The health value variable was assessed by the subject's response to the Health Value Question. This question was derived from Rokeach's (1973) Value Survey. The question asked the person to rate the importance of his or her physical health on a Likert type scale from one to six, with six being the highest rating of health value and one the lowest. Though there is reliability and validity data available on Rokeach's Value Survey, the single question developed for this study, has not been tested. Since the objective was simply to measure the self-reported importance of one's physical health, the statement derived seemed appropriate; "I value my physical health more than anything else," agree strongly = 6 to disagree strongly = 1, were possible answers.

D. Anxiety and Mood States

In this study, the anxiety variable was broken down into a state measure and a trait measure according

to Spielberger's State-Trait Anxiety Inventory (STAI) (1970).

The mood states were measured by the Profile of Mood States (POMS) questionnaire which provides a total mood disturbance score (McNair, Lorr & Droppleman, 1971). A review of the background information on the STAI and the POMS follows.

1. Profile of Mood States (POMS)

This measure was developed by McNair, Lorr and Droppleman (1971) to measure transient mood states.

A Total Mood Disturbance (TMD) score may be obtained from the POMS by simply summing the scores across all six factors (weighting Vigor negatively). The TMD score makes clinical sense, and it can be presumed to be highly reliable because of the intercorrelations among the six primary POMS factors. McNair et al. (1971) encourage the researcher to use the TMD score whenever a single global estimate of affective states is desired. Norms and validity data, however, are not presented for the TMD score. The TMD score was used in this study since a single global estimate of mood states was desired.

- a. Internal Consistency

Table 4 presents data on the homogeneity of the six replicated POMS factor scores.

The data are from patient normative samples. All the reliabilities are highly satisfactory. All these indices of the extent to which the individual items within the six mood scales measure the same factor are near .90 or above. These internal consistencies range from slightly to considerably higher than in the developmental forms of POMS (McNair & Lorr, 1964). It is likely that the increased reliability resulted from increasing the number of items in some factors and changing to the 5-point scale format.

Table 4
(taken from McNair, Lorr, Droppleman, 1971)
Internal Consistency Reliabilities (KR_{20})
of the POMS

Factor	Items	Study 5 ^a	Study 6 ^b
Tension-Anxiety (T)	9	.92	.90
Depression-Dejection (D)	15	.95	.95
Anger-Hostility (A)	12	.92	.93
Vigor (V)	8	.89	.87
Fatigue (F)	7	.94	.93
Confusion-Bewilderment (C)	7	.87	.84

^aN = 350 male psychiatric outpatients

^bN = 650 female psychiatric outpatients

b. Test-Retest Reliability

Approximately 60% of the 1,000 patients in the Studies 5 and 6 normative group (shown in Table 4) were accepted for treatment at a university medical center psychiatry clinic. Those who entered treatment were reassessed on the POMS immediately prior to their first therapy session and after six weeks of treatment. To estimate test-retest stability, the first 100 such patients who remained in treatment at least six weeks were selected. Product-moment correlations among their POMS scores were computed at the three time periods. The sample was approximately two-thirds female and one-third male.

Correlations between the POMS scores at intake and at pre-treatment (Table 5) provide a rough estimate of stability without the intervention of treatment.

c. Validity Studies

The six factor analytic replications in the development of the POMS may be taken as evidence of the factorial validity of the six mood factors. The results were remarkably congruent for the different patient and normal samples, for the different rating time periods, and for the 4-point and 5-point

scales. Lorr, Daston, and Smith (1967) also identified eight mood factors, five of which appear to confirm POMS factors. An examination of the individual items defining each mood scale supports the face or content validity of the factor scores (POMS Manual, 1971).

Table 5
(taken from McNair, Lorr, Droppleman, 1971)

Stability Coefficients (r_{tt})^a for
the Six POMS Factor Scores

Factor	Items	Intake to Pretherapy	Intake to Six Weeks
Tension-Anxiety (T)	9	.70	.51
Depression- Dejection (D)	15	.74	.47
Anger-Hostility (A)	12	.71	.53
Vigor (V)	8	.65	.43
Fatigue (F)	7	.66	.45
Confusion- Bewilderment (C)	7	.68	.52

^aN = 100 psychiatric outpatients

2. State-Trait Anxiety Inventory (STAI)

This inventory was developed by Spielberger, Gorsuch & Lushene (1970) to measure state anxiety ("A-state") and trait anxiety ("A-trait").

a. Reliability

Test-retest reliability data on STAI (Form X) are presented in Table 6 for subgroups of subjects who were included in the normative sample of undergraduate college students. The students retested after one hour were successively exposed during the test-retest interval to the following experimental conditions; a brief period of relaxation training; a difficult IQ test; and a film that depicted accidents resulting in serious injury or death.

Table 6
(taken from Spielberger, Gorsuch, Lushene, 1970)

Test-Retest Reliability for College Undergraduates

Time Lapse:	1 hour T/R		20 day T/R		104 day T/R	
	N	r	N	r	N	r
A-Trait						
Males	88	.84	38	.86	25	.73
Females	109	.76	75	.76	22	.77
A-State						
Males	88	.33	38	.54	25	.33
Females	109	.16	75	.27	22	.31

As may be noted, the test-retest correlations for the A-Trait scale were reasonably high, ranging from .73 to .86 while those for the A-State scale were relatively low, ranging from .16 to .54, with

a median r of only .32 for the six subgroups. The low r 's for the A-state scale were anticipated, of course, because a valid measure of A-State should reflect the influence of unique situational factors existing at the time of testing.

Given the transitory nature of anxiety states, measures of internal consistency such as the alpha coefficient would seem to provide a more meaningful index of the reliability of A-State scales than test-retest correlations. Alpha coefficients for the STAI scales were computed by formula K-R 20 as modified by Cronbach (1951) for the normative samples. These reliability coefficients, which ranged from .83 to .92 for A-State, were included in Table 4 along with those for A-Trait which were equally high. Thus, the internal consistency of both STAI subscales is reasonably good.

In summary, the test-retest reliability (stability) of the STAI A-Trait scale is relatively high, but stability coefficients for the STAI A-State scale tend to be low, as would be expected for a measure designed to be influenced by situational factors. Both

the A-Trait and A-State scales have a high degree of internal consistency.

b. Validity

The STAI provides operational measures of state and trait anxiety. In the construction of the STAI, individual items were required to meet prescribed A-State and A-Trait validity criteria at each stage of the test development process in order to be retained for further evaluation and validation. (See Spielberger and Gorsuch (1966) and Spielberger, et al. (1968)).

Evidence of the concurrent validity of the STAI A-Trait scale is presented in Table 7. Correlations with the IPAT Anxiety Scale (Cattell & Scheier, 1963), the Taylor (1953) Manifest Anxiety Scale (TMAS), and the Zuckerman (1960) Affect Adjective Checklist (AACL), General Form, are reported. It may be noted that the correlations between the STAI, the IPAT, and the TMAS are moderately high for both college students and patients. Since the intercorrelations among these scales approach the scale reliabilities, it is reasonable to conclude that the three scales can be considered as alternate measures of A-Trait. In contrast, the AACL,

General Form, is only moderately correlated with the other A-Trait measures.

Table 7
(taken from Spielberger, Gorsuch, Lushene, 1970)

Correlations Between the STAI A-Trait Scale and Other Measures of Trait Anxiety

Anxiety Scale	College Females (N=126)			College Males (N=80)			NP Patients (N=66)	
	STAI	IPAT	TMAS	STAI	IPAT	TMAS	STAI	IPAT
IPAT	.75			.76			.77*	
TMAS	.80	.85		.79	.73		.83	.84
AACL	.52	.57	.53	.58	.51	.41		

* N = 112 for the correlation between the STAI and the IPAT

E. Health Locus of Control Scale

Health locus of control will be measured in this study by Wallston et al.'s (1976) Health Locus of Control Scale.

Wallston and Wallston (1973) have discussed the difficulty of predicting behavior in a specific area such as health when using measures of generalized expectancies such as Rotter's (1966) I-E Scale. Their research was based on the assumption that a health related locus of control scale would provide for more sensitive predictions of the relationship between internality and health behaviors. This section describes the development of one such instrument, The

Health Locus of Control Scale (HLC). Data obtained on the HLC with several populations was reviewed in the Introduction.

1. Scale Development

Using a six-point, Likert-type format, an item pool consisting of 34 items written as face valid measures of generalized expectancies regarding locus of control related to health was administered to 98 college students in a small southern university. All subjects received psychology credit for their participation. Subjects also completed Rotter's I-E Scale (Rotter, 1966), the Marlowe-Crowne Social Desirability Scale (Crown & Marlowe, 1964) and provided demographic data.

An item analysis was run, and items were selected using the following criteria: (1) item mean close to 3.5, the midpoint; (2) wide distribution of response alternatives on the item; (3) significant item-to-scale correlation ($r > .20$); and (4) low correlation with the Marlowe-Crowne Social Desirability Scale. An attempt was made to maintain the balance between items worded in the internal and external direction. From the original pool, 11 items were chosen for the final scale.

2. Reliability

The 11-item scale devised has a potential range of 11 to 66. For the original sample, the mean was 35.57, standard deviation equal to 6.22. Alpha reliability of the 11 items chosen by the above criteria was .72. In addition, the HLC does not reflect a social desirability bias, as evidenced by a $-.01$ correlation with the Marlowe-Crowne Social Desirability Scale.

3. Validity

Concurrent validity of the HLC is evidenced by a $.33$ correlation ($p < .01$) with Rotter's I-E Scale for the original sample. The new scale, therefore, shares 10% common variance with the more established measure of locus of control. The overlap with the I-E Scale was kept purposefully low to enhance its discriminant validity, thus meeting the requirement that a new test not correlate too highly with measures from which it is supposed to differ (Campbell & Fiske, 1959).

Table 8

SUMMARY OF PSYCHOSOCIAL VARIABLES AND THEIR
MEASUREMENTS

<u>Variable</u>	<u>Measurement</u>
Commitment and Motivation to Quit	Plans and Strategies for Maintaining Abstinence (Marlatt, 1979), Costs and Benefits of Smoking and Costs and Benefits of Changing a Habit (Modified by Rugg & Hall, 1980 from Hilde- brandt & Feldman, 1975)
Health Locus of Control	Health Locus of Control Scale (Wallston, Wallston, Kaplan & Maides, 1976)
Health Value	Health Value Question (Modi- fied from Rokeach, 1973 by Rugg, 1980)
State and Trait Anxiety	State-Trait Anxiety Inventory (STAI) (Speilberger, Gorsuch & Lushene, 1970)
Negative Moods States	Profile of Mood States (POMS) (McNair, Lorr & Droppleman, 1971)
Social Support	Social Support Questions (Derived by Rugg, 1980 from Marlatt, 1979 and Bachman & Jones, 1980)

RESULTS

I. Data Analysis Procedures

A. Analyses Used

Data in this study were analyzed using the multiple regression approach discussed in Cohen and Cohen (1975). This approach was chosen since this was a multivariate analysis of several independent variables predicted to account for variance in one dependent variable. Two different ways of measuring the dependent variable were examined in this study, and thus required two slightly different forms of multiple regression analysis to be performed. In the first set of analyses, the dependent variable was coded as a dichotomous variable, i.e. "abstinent or not abstinent in the past twenty four hours at the six month follow up." This dichotomous outcome measure required a multiple logistic regression analysis be performed (Statistical Analysis System (SAS) Supplemental Library User's Guide, 1980), which accounts for the dichotomous nature of the dependent variable. The logistic regression approach is a slightly more conservative method of analysis than the general linear regression approach that was performed in the second set of analyses. The general linear regression model (SAS User's Guide, 1979) was used in the second set of analyses because here the dependent variable was coded

as a continuous measure, i.e. "time until relapse to daily smoking after treatment end." This variable was coded from "0" to "6" representing the month in which the subject relapsed, up to the six month follow up.

In both sets of analyses, the independent variables were entered into the regression equations in a setwise, hierarchical manner (See Cohen & Cohen, 1975 for details). Independent variables (IV's) were placed in sets based on their theoretical relationship with other IV's. The first set was the demographic variables--sex, age, and marital status. The second set was the motivational variables--plans to quit smoking, costs and benefits of smoking, and costs and benefits of changing a habit. The third set was the health locus of control variable which included The Health Locus of Control Scale and a measure of health value. The fourth set was the anxiety-negative moods variables--state anxiety, trait anxiety and negative mood states. The fifth set was the social support variable measured by The Social Support Score.

Sets were entered into the regression equation in a hierarchical order based on their predicted theoretical importance in predicting variance in outcome. Incremental variance accounted for after each step was assessed and significance levels determined based on the incremental "F" ratios and the chi-squares. The .05 level of confidence was used in

this study and set a priori, and Model II error term was used throughout to determine significance levels. The logistic regression analysis yields a chi-square, while the general linear regression analysis yields an F ratio.

In order to determine the effect the psychosocial variables alone had in accounting for variance in outcome, the logistic and linear regressions described above were repeated a second time with the demographic variable set (sex, age, marital status) entered last.

And finally, Wilcoxin 2-sample t-test, a non-parametric t-test which uses ranks, was performed on the time to relapse variable to determine if there were sex differences in when men and women relapsed. This statistic was used since the time until relapse variable was a non-normally distributed variable.

B. Missing Values

Only the social support variable had missing cases. This was due to the fact that twelve subjects did not answer items pertaining to the smoking habits of others in their environment. These three items had a mean score of two. Thus, 12 missing cases were assigned this mean score of two in computing their total social support score.

C. Power Analysis

The power analysis was done prior to study start and the sample size of $N = 149$ was determined to be

adequate to detect differences with $\alpha = .05$, power = .80 and effect size = .10 for six independent variables, i.e., $K_B = 6$.

II. The Dependent Variables

A. Abstinence at Six Months

This study was carried out on all 149 of the subjects who completed pretreatment assessment questionnaires and attended at least one treatment session. "Abstinence" data was obtained from all 149 subjects six months after study start by the following methods: (1) self-report; (2) informant's verification; and (3) breath carbon monoxide level. Abstinence rates tend to stabilize by the sixth month after treatment start and that is why this time period was chosen. Thirty-seven subjects did not return for the six month follow-up assessment. These subjects were contacted by phone for a self-report of their smoking behavior. All 37 subjects, as was expected, had returned to daily smoking. A phone call to their informants also verified this 100% of the time. The overall correlation between informants' and subjects' ($N = 149$) report of smoking behavior was a perfect $r=1.0$. For those 112 subjects who did return for their six month follow-up assessment, an on-the-spot breath carbon monoxide test consistently verified the subject's report, in addition to the informant's report. (The cutoff point for verifying abstinence was

10 ppm). Therefore, it was concluded that an acceptable level of reliability for abstinence reports had been obtained. Abstinence at the six month follow-up, coded "0" or "1", was the dichotomous outcome/dependent variable to be used in regression analyses. Abstinence statistics for the six month follow-up were 52% (78 of 149) not smoking.

B. Relapse to Daily Smoking

This dependent variable was a continuous measure of time to relapse to daily smoking. This outcome measure was also obtained on all 149 subjects entering treatment. It was coded on a scale of 0 to 6, with 0 = never quit smoking during treatment; 1 = relapsed to daily smoking in the first month after treatment's end; 2 = relapse in the second month; 3 = relapse in third month; 4 = relapse in fourth month; 5 = relapse in the fifth month; and 6 = still not relapsed at the six month follow-up assessment. This measure was obtained by asking the subject at the six month follow-up, if they were smoking, in what month they had relapsed to daily use of cigarettes. It was felt that, though this measure was obtained retrospectively, subjects could remember in what month during only the past five months they had relapsed to daily smoking. (It was felt that a more specific measure would not have been reliable). For subjects who did not return for their six month follow-up, a time to relapse question was mailed with

the six month follow-up questionnaire packet. If this was not returned, subjects were contacted by phone for this data. The "time to relapse" variable revealed the largest proportion of subjects (20%, n=30) relapsed within the first month after treatment end.

III. Independent Variables

Several independent variables were examined in this study. They are as follows: sex, marital status, age, motivation to quit smoking, health locus of control, health value, state-trait anxiety, negative mood states, and social support. Further, a two-way interaction between sex and social support was also examined.

IV. Results of Analyses

In general, there were no significant associations found in this study. The largest total R^2 was equal to .11. Source tables 1 through 4 present the following results:

A. Sex, Age and Marital Status

This set accounted for 3% of the variance and was not significant ($F=1.82$ (3,136), $p > .05$; $X^2=5.28$ (3), $p > .05$).

B. Motivation

This set accounted for 3% of the variance and was not significant ($F=1.18$ (3,136), $p > .05$; $X^2=4.33$ (3), $p > .05$).

C. Anxiety and Negative Moods

This set accounted for 3% of the variance was was not significant ($F=1.83$ (3,136), $p > .05$; $\chi^2=3.92$ (3), $p > .05$).

D. Health Locus of Control and Health Value

This set accounted for 2% of the variance and was not significant ($F=1.26$ (2,136), $p > .05$; $\chi^2=2.67$ (2), $p > .05$).

E. Social Support

This set accounted for less than .00% variance ($F=3$ (1,136), $p > .05$; $\chi^2=1.13$ (1), $p > .05$).

F. Sex by Social Support Interaction

The sex by social support interaction accounted for 2% of the variance. The main effects were not significant ($F=1.20$ (2,145), $p > .05$; $\chi^2=4.42$ (2), $p = .10$) nor was their interaction ($F=.00$ (1,145), $p > .05$; $\chi^2=.01$ (1), $p > .05$).

G. Sex and Anxiety Association

There was no sex difference in any of the anxiety measures, negative mood states ($F=3.37$ (1,148), $p > .05$) state anxiety ($F=.30$ (1,148), $p > .05$) or trait anxiety ($F=1.14$ (1,148), $p > .05$).

Source Table 1
Hierarchical Linear Regression Analysis

Dependent Variable: Time Until Relapse

<u>Source of Variation</u>	<u>R²</u>	Incremental <u>R²</u>	<u>F</u>	<u>df</u>	<u>Prob.</u>
Step 1. Sex Age Marital Status	.03	.03	1.82	3,136	N.S.
Step 2. Plans Costs & Benefits of Smoking Costs & Benefits of Change	.06	.03	1.18	3,136	N.S.
Step 3. State Anxiety Trait Anxiety Negative Mood States	.09	.03	1.83	3,136	N.S.
Step 4. Health Locus of Control Health Value	.11	.02	1.26	2,136	N.S.
Step 5. Social Support	.11	.00	.30	1,136	N.S.
Total R ² =	.11				

Note: Model II Error Term was used here to determine the significance level of each incremental F ratio.

Source Table 2
 Hierarchical Logistic Regression Analysis
 Dependent Variable: Abstinence at 6 Months

<u>Source of Variation</u>	<u>χ^2</u>	<u>df</u>	<u>Prob.</u>
Step 1. Sex Age Marital Status	5.28	3	N.S.
Step 2. Plans Costs & Benefits of Change Costs & Benefits of Smoking	4.33	3	N.S.
Step 3. State Anxiety Trait Anxiety Negative Mood States	3.92	3	N.S.
Step 4. Health Locus of Control Health Value	2.67	2	N.S.
Step 5. Social Support	1.13	1	N.S.

Source Table 3

Hierarchical Linear Regression Analysis of
Sex by Social Support Interaction

Dependent Variable: Time Until Relapse

<u>Source of Variation</u>	<u>R²</u>	Incremental <u>R²</u>	<u>F</u>	<u>df</u>	<u>Prob.</u>
Step 1. Sex Social Support	.02	.02	1.20	2,145	N.S.
Step 2. Sex Social Support Sex X Social Support	.02	.00	.00	1,145	N.S.
Total R ² =	.02				

Source Table 4

Hierarchical Logistic Regression Analysis of
Sex by Social Support Interaction

Dependent Variable: Abstinence at 6 Months

<u>Source of Variation</u>	<u>χ²</u>	<u>df</u>	<u>Prob.</u>
Step 1. Sex Social Support	4.42	2	.10
Step 2. Sex Social Support Sex X Social Support	.01	1	N.S.

DISCUSSION

None of the psychosocial variables examined accounted for significant variance in the dependent variable. There are several possible explanations for this lack of significant findings. Some are general reasons why these no differences findings might have occurred and some are reasons specific to each psychosocial variable:

I. Specific Variables

It is possible that the social support items should have been analyzed separately and not summed together into one social support score. These items were tapping different types of social support. For example, one item measured the subject's plans to use someone else in their environment to help quit smoking. Another item measured indirect support. This item tapped whether or not relatives (parents and/or siblings) smoked. The final item measured whether or not the person had a significant other person in their immediate household who was smoking. It is possible that if these items were analyzed alone they may have accounted for significant variance in the outcome, but when summed together their single item contribution to variance was washed out. Also some items could have been worded better to avoid problems in coding. For example, no option was offered for situations where a

person did not have siblings or the parents were dead, or they lived alone. Many other researchers (e.g. Janis & Hoffman, 1970) have reported the importance of social support in facilitating cessation and maintaining non-smoking. Also further investigation should be made on the effect of not having support persons (e.g. family, friends, roommates, spouses) physically present versus not having the support of persons despite physical presence. Social support has a complex relationship with smoking behavior and needs not only further empirical investigations, but also improved conceptualizations.

The Motivation to Quit Smoking set was not significant in accounting for variance in outcome. The Costs and Benefits of Smoking Scale had little variance initially. It may have washed out the effects of the Costs and Benefits of Change Scale, which was seen within the Motivation set, to account for a significant portion (almost all) of the variance that this set accounted for. Thus, if Costs and Benefits of Change were analyzed alone and not in a set with two other motivational variables, it is possible that it would have been significant. The fact that there was little variation in the Costs and Benefits of Smoking Scale scores is probably explained by the fact that everyone prior to the start of a smoking treatment program feels that their smoking is a costly habit and that is why

they are there. (If they did not feel it to be a costly habit, they probably would not be beginning an intensive smoking treatment program, and thus would not have been subjects in this study.) The Costs and Benefits of Changing a Habit variable should be assessed as a single variable in future studies. This variable taps a person's "openness to" or "readiness to change" and may have considerable variance prior to treatment start. This investigation suggested that this variable might account for variance in smoking outcome, if analyzed separately.

The Health Locus of Control Scale and Health Value score did not account for significant variance in the dependent variable, maintenance of non-smoking. In other studies I have also failed to find an association between Health Locus of Control and maintained non-smoking (Rugg & Billings, unpublished). It is not clear why Health Locus of Control often does not predict outcome in health behavior. Initially, it was suggested that a "Health" Locus of Control would be a better measure in predicting health behavior than the original general Locus of Control Scale proposed by Rotter (1966). But in this investigation and others by me, the Health Locus of Control Scale as developed by Wallston et al. (1976) and a measure of Health Value (as derived from Rokeach, 1973) have failed to be significant predictors of smoking cessation

maintenance. It is probable that what is needed is a more specific measure of beliefs about one's control over smoking behavior. However, I conclude that efforts might best be directed now toward developing a more specific measure of expectancies about control over smoking behaviors. This notion is consistent with Rotter's early comments that to predict behavior in a specific area, a measure of the specific expectancies about the behavior in question is needed. Also, the Health Value variable was of little value in this study because of a small variance, i.e., most subjects reported "valuing the physical health above other things." Thus, unless refinement of the measurement of this variable would help, it is concluded that when predicting smoking behavior, asking about a person's value of their physical health does not contribute much to predicting long-term smoking behavior.

The fact that there was no significant association between the State Anxiety, Trait Anxiety and Negative Mood States set, is very interesting since these variables were measured by long-used standardized tests that have been reported to be correlated with smoking outcome in past studies. It is possible that these earlier findings were only significant in the single-score correlational research designs of past studies and that when subjected to multivariate multiple regression techniques their relationship to

outcome does not hold up. These three variables were entered as a set in this study. It is possible that if entered alone they might have had a significant association with the outcome variable, if one of the other two variables in the set was washing out the variance of the third. This is always a problem when a setwise, hierarchical regression analysis is used. This leads to some more general comments about the way these data were analyzed as it relates to the lack of significant findings.

II. General Statistical and Methodological Comments

In general the multiple regression analysis approach is a more sophisticated statistical analysis. It controls for redundant association. Past research in this area used single variable study designs and did not measure more than one psychosocial variable at a time. This may indeed be why this first, more stringent multivariate test of these psychosocial variables did not find the significant relationships reported in the literature.

A final observation in this study that may have had some effect on the relationship between the psychosocial variables and smoking outcome was the reversed trend in sex differences and outcome, i.e., unlike what was reported in the literature women in this study tended to do better than men in maintaining non-smoking, although not significantly so. Thus, it

is possible that there were differences in this sample related to gender that affected the predicted psychosocial factors and smoking outcome relationship.

Although this sample was not generally different from the normal smoking study sample on age, sex, ethnicity, amount smoked, age of onset, years smoked, and times tried to quit, it is possible that there were sex-related differences in this sample that affected the unpredicted tendency for women to do better than men in maintaining non-smoking and the relationship between the psychosocial variables and smoking outcome.

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A P P E N D I X A

Questionnaires

NAME _____

DATE _____

 COSTS AND BENEFITS OF CHANGING A HABIT

Below you will find a list of ten items that describe people's feelings about changing a habit. Certain aspects of changing can be seen as beneficial while other aspects are costly. Please indicate how accurately the statement describes your feelings.

Not at all accurate	Somewhat accurate	Moderately accurate	Very accurate	Extremely accurate	
1	2	3	4	5	
1					1. Changing my long standing habit is very time consuming.
1	2	3	4	5	2. It is difficult for me to give up a long standing habit, because, it is like losing an old friend.
1	2	3	4	5	3. By controlling my habit, I can set an example for other people.
1	2	3	4	5	4. Sometimes its exciting just to try and change myself.
1	2	3	4	5	5. Changing a bad habit makes me feel proud.
1	2	3	4	5	6. It is almost impossible for me to change some habits.
1	2	3	4	5	7. Giving up an addicting drug, like tobacco, is a very complicated process for me.
1	2	3	4	5	8. By controlling my habit, I can learn a lot about myself.
1	2	3	4	5	9. I enjoy my self-improvement projects.
1	2	3	4	5	10. I enjoy group meetings where I get a chance to talk about myself.

NAME _____

DATE _____

COSTS AND BENEFITS OF SMOKING SCALE

Below are a list of statements that describe the costs and benefits of cigarette smoking. Please read each statement and indicate how accurately it describes your feelings about smoking. If you are not smoking now, tell us how you feel about your smoking habit now that you've quit.

Not at all accurate	Somewhat accurate	Moderately accurate	Very accurate	Extremely accurate	
1	2	3	4	5	
1	2	3	4	5	1. My smoking leads to shortness of breath.
1	2	3	4	5	2. My smoking is a messy and dirty habit.
1	2	3	4	5	3. Smoking is a good way to control my appetite.
1	2	3	4	5	4. Smoking relaxes me.
1	2	3	4	5	5. My smoking costs add up.
1	2	3	4	5	6. Smoking increases my chances of heart attack and other cardiovascular disease.
1	2	3	4	5	7. Smoking increases my chances of cancer of all sorts.
1	2	3	4	5	8. Smoking gives me bad breath.
1	2	3	4	5	9. Smoking makes my clothes and belongings smell bad.
1	2	3	4	5	10. Smoking helps me concentrate.
1	2	3	4	5	11. Smoking gives me energy.
1	2	3	4	5	12. I feel sophisticated holding a cigarette.
1	2	3	4	5	13. A cigarette makes a drink taste better to me.
1	2	3	4	5	14. I feel if others inhale my smoke, it may harm their health.
1	2	3	4	5	15. My smoking habit has become embarrassing in some social groups.
1	2	3	4	5	16. Smoking can harm the health of my children and/or future children. By setting a bad example, they will be more likely to take up smoking.
1	2	3	4	5	17. My smoking can directly harm the health of my children (or future children) when they inhale my smoke.

COSTS AND BENEFITS OF SMOKING SCALE

2.

Not at all	accurate	Somewhat	Moderately	Very	Extremely	
accurate		accurate	accurate	accurate	accurate	
1	2	3	4	5		
1	2	3	4	5		18. Smoking gives me wrinkles.
1	2	3	4	5		19. Smoking gives me yellow teeth.
1	2	3	4	5		20. Smoking gives me yellow fingers and finger nails.
1	2	3	4	5		21. Smoking helps me to cope with the stresses of everyday life.
1	2	3	4	5		22. Smoking gives me something to do with my hands when I'm nervous.
1	2	3	4	5		23. Smoking gives me something to do when I'm bored.
1	2	3	4	5		24. Smoking has become a part of my identity.
1	2	3	4	5		25. My smoking is what helps me make and keep new friends.

NAME _____

June 9, 1980

DATE _____

PLANS AND STRATEGIES FOR MAINTAINING ABSTINENCE

We are interested in the strategies ex-smokers use to stop smoking permanently. This questionnaire is designed to provide us with some information about this issue. Please take the time to fill out this questionnaire candidly, and try to be honest and open in your replies. The information you give us will be helpful in designing new and effective smoking cessation programs. Thank you for your time and attention to this important matter. (Note: If you need more space, feel free to use the back of the page.)

① Some people develop techniques, strategies, or attitudes that they plan to use to resist the temptation to go back to smoking after having quit. We would like to know if you have any ideas about how you will handle the urge to smoke again. In the space below, please list any strategies, beliefs or techniques that you plan to use to handle temptations or urges:

② Some people develop specific incentives to help them resist the temptation to resume smoking. For example, some individuals plan to offer themselves a reward or some positive consequence for maintaining abstinence, while others plan to punish themselves in some way if they resume smoking. (e.g., pay a fine or give up some rewarding activity if they go back to smoking). Have you developed an incentive (reward or punishment) for yourself to help you maintain abstinence? _____ Yes
_____ No.

Are there certain incidents or situations in your life when you almost always smoke? (For example: after meals, during an argument, when you first get to work, while talking on the phone, while taking an exam, while reading, etc.) Please list six or less in order of likelihood of smoking.

39. _____

40. _____

41. _____

42. _____

43. _____

44. _____

45) How many times have you tried to quit smoking? (circle answer)

0 1 2 3 4 5 6 or more

46) Did you experience any withdrawal symptoms when you stopped smoking?

Yes _____ No _____

If yes, please list six or less:

47. _____

48. _____

49. _____

50. _____

51. _____

52. _____

Do (did) your parents, brothers and/or sisters smoke tobacco?

→ 53) Parents _____

→ 54) Siblings _____

55) Does your roommate(s), spouse or "significant other" smoke tobacco? _____

If you answered yes, please briefly describe the incentive you have chosen to use:

3) Some people use other individuals in some way to help them resist the temptation to resume smoking. For example, perhaps you have told or are planning to tell important other people in your life that you are going to quit smoking (or already have quit). Or, perhaps you make a promise or a strong commitment to someone else that you would quit smoking. If you have done something like this, or something similar involving another person or persons in your plans to quit smoking, please briefly describe what you did or plan to do in the space below:

4. Imagine that after you have quit smoking, at a certain time in the future, you were to voluntarily smoke a cigarette again (the first one after having quit). In your own mind, how likely do you think this event would influence your tendency to go back to regular smoking again? Look over the list of possible reactions below, and check the one that most applies in your own case. Think carefully about this before you decide.

Check

Reaction

_____ If I had a single cigarette, I think it would be highly probable that I would go back to my old smoking pattern again. (On a scale from 1 to 100, with "1" indicating the least probability of going back to your old smoking pattern, and "100" indicating the highest probability of this reaction, give yourself a rating of how probable you think it would be that you would go back to your former smoking pattern if you had a single cigarette: _____).

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④



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SELF-EVALUATION QUESTIONNAIRE

STAI FORM X-2

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	①	②	③	④
22. I tire quickly	①	②	③	④
23. I feel like crying	①	②	③	④
24. I wish I could be as happy as others seem to be	①	②	③	④
25. I am losing out on things because I can't make up my mind soon enough	①	②	③	④
26. I feel rested	①	②	③	④
27. I am "calm, cool, and collected"	①	②	③	④
28. I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
29. I worry too much over something that really doesn't matter	①	②	③	④
30. I am happy	①	②	③	④
31. I am inclined to take things hard	①	②	③	④
32. I lack self-confidence	①	②	③	④
33. I feel secure	①	②	③	④
34. I try to avoid facing a crisis or difficulty	①	②	③	④
35. I feel blue	①	②	③	④
36. I am content	①	②	③	④
37. Some unimportant thought runs through my mind and bothers me	①	②	③	④
38. I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
39. I am a steady person	①	②	③	④
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	①	②	③	④

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REFERENCES

PLEASE LIST BELOW THE NAMES, ADDRESSES, AND PHONE NUMBERS OF TWO PEOPLE THAT WOULD KNOW ABOUT YOUR SMOKING HABIT:

NAME _____	NAME _____
ADDRESS _____	ADDRESS _____
_____	_____
PHONE _____	PHONE _____

ALSO LIST THE NAME OF SOMEONE WHO WOULD ALWAYS KNOW YOUR WHEREABOUTS IF YOU WERE TO MOVE:

NAME _____

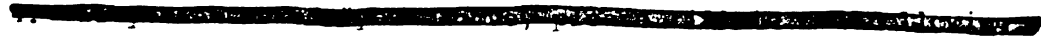
ADDRESS _____

PHONE _____

your answers to the following questions will assist us in developing a treatment plan suited especially to you. Please answer as accurately as you can.

1. What kind of and how much tobacco do you currently smoke? _____
2. If you ever tried to quit smoking before, what were the results?

3. Are you concerned about gaining weight after you stop smoking? YES NO



- a) current height = _____ weight = _____
- b) what is the most you have ever weighed? _____
- c) how old were you when you weighed this maximum amount _____
- d) how long did you stay at you maximum weight _____

5. Have you ever participated in a weight reduction program (e.g., Weight Watchers)?
 YES NO
 - a) if YES, which one(s): _____
 - b) for how long? _____

NAME _____

DATE _____

~~X~~ THE HEALTH LOCUS OF CONTROL SCALE

Below are a list of opinions people have about health in general and their own health in specific. Circle the number which you think most closely reflects your opinion of each statement. There are no right or wrong answers. We are interested in your point of view.

Strongly disagree	Disagree	Mildly disagree	Mildly agree	Agree	Strongly agree	
1	2	3	4	5	6	1. If I take care of myself, I can avoid illness.
1	2	3	4	5	6	2. Whenever I get sick it is because of something I've done or not done.
1	2	3	4	5	6	3. Good health is largely a matter of good fortune.
1	2	3	4	5	6	4. No matter what I do, if I am going to get sick I will get sick.
1	2	3	4	5	6	5. Most people do not realize the extent to which their illnesses are controlled by accidental happenings.
1	2	3	4	5	6	6. I can only do what my doctor tells me to do.
1	2	3	4	5	6	7. There are so many strange diseases around, that you can never know how or when you might pick one up.
1	2	3	4	5	6	8. When I feel ill, I know it is because I have not been getting the proper exercise or eating right.
1	2	3	4	5	6	9. People who never get sick are just plain lucky.
1	2	3	4	5	6	10. People's ill health results from their own carelessness.
1	2	3	4	5	6	11. I am directly responsible for my health.
1	2	3	4	5	6	12. I value my physical health more than anything else.

RELAPSE FOLLOW-UP QUESTIONNAIRE

Name _____

Date _____

← Relapse Question

HOW LONG AFTER TREATMENT UNTIL YOU RETURNED TO DAILY SMOKING? _____

- 1. Have you smoked at all since you quit this program? No _____ Yes _____
If no, stop here. If yes, please go on with the remaining sections.

SETTING FOR THE FIRST SMOKING OCCASION

- 2. Place (be specific; i.e., home, bar, friend's house, car, etc.)

- 3. Time of day _____

- 4. Alone _____. With others _____ (relationship) _____.
If with others, was anyone else smoking? No _____ Yes _____. If yes, how many others were smoking? _____

HOW DID YOU OBTAIN THAT FIRST CIGARETTE (or pipe, cigar, etc.)

- 5. _____ Someone offered you the cigarette without you asking for it.
_____ You bought it.
_____ You "bummed it".
_____ Other (Describe: _____)

- 6. Had you been thinking about smoking earlier that day? No _____ Yes _____

- 7. Prior to having the first cigarette, did you make a conscious decision to smoke? No _____ Yes _____

- 8. Describe any inner thoughts or emotional feelings (things within you as a person) which triggered off your need or desire to take that first cigarette:

- 9. Describe any particular circumstances or situations or events (things which happened to you in the outside world) which triggered off your need or desire to take that first cigarette:



