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SMOKING

BEHAVIOR CHANGE

AND ITS CORRELATES IN A SELECTED

GROUP OF MIDDLE AGED MEN: A BRIEF SMOKING

COUNSELING PROGRAM ADAPTABLE TO VARIOUS HEALTH SETTINGS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Tyzz-Lang Chen, B.Ed., M.A.

* * * * *

The Ohio State University
1970

Approved by

[Signature]
Adviser
School of Health, Physical Education and Recreation

[Signature]
Adviser
Department of Preventive Medicine
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February 12, 1939 . . . . . Born - Taipei, Taiwan.

1962 . . . . . . . . . B.Ed. National Taiwan Normal University, Taipei, Taiwan.


1963 - 1964 . . . . . Medical Officer, Medical Service Corps, Chinese Air Force.


1966 - 1967 . . . . . Associate Director, Wilmington Central Branch Y.M.C.A., Wilmington, Delaware.

1967 - 1969 . . . . . Teaching Assistant, The Ohio State University, Columbus, Ohio.

1969 - 1970 . . . . . Teaching Associate, The Ohio State University, Columbus, Ohio.

FIELDS OF STUDY

Major Field: Health Education
Advisor: Professor Wesley P. Cushman
The Ohio State University

Minor Field: Educational Psychology
Advisor: Professor William L. Libby, Jr.
The Ohio State University
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CHAPTER I

INTRODUCTION

The association between cigarette smoking and coronary heart disease was reviewed in the Surgeon General's 1964 Report. This report concluded that male cigarette smokers have a higher death rate from coronary heart disease than non-smoking males.

Since the publication of that report, an unprecedented amount of pertinent research has been completed. These studies have extended in some important respects knowledge of the health consequences of smoking. The current state of knowledge in regard to the association between cigarette smoking and coronary heart disease is summarized below.

The mortality of coronary heart disease is higher among cigarette smokers than non-smokers. Evidence of this has been reported in a number of epidemiological

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studies. Hammond, in a study of more than 800,000 men and women between the age of 40 and 79, found that coronary heart disease death rates and mortality ratios increased with increased cigarette smoking for men in all age groups. For men aged 45 to 54, the mortality ratio was three times as great for smokers as compared with non-smokers. Similar results were reported by Jenkins et al. in a prospective study of over 3,000 men. The incidence of coronary heart disease in men aged 39 to 49 was three times higher among the cigarette smokers than among the non-smokers. The incidence of coronary heart disease increased with increased daily cigarette consumption.

The fact that cigarette smoking is an important risk factor in the development of coronary heart disease, both by itself and in the presence of other significant risk factors, has been demonstrated in numerous studies.

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Jenkins et al.\textsuperscript{4} reported that after controlling other risk factors such as blood lipid level, diastolic blood pressure, and body build, the association between cigarette smoking and coronary heart disease remained. Recently, the dependence of the twelve year probability of developing coronary heart disease in Framingham on seven risk factors was investigated by the use of discriminant analysis.\textsuperscript{5} The study concluded that for men aged 40 to 49, the most important risk factor in the development of coronary heart disease, aside from age itself, was cigarette smoking. A recent review published by the U.S. Public Health Service concludes the effect of cigarette smoking persists and is appreciable, even when these other factors are carefully evaluated.\textsuperscript{6}

That cessation of cigarette smoking is followed by a reduction in the risk of coronary heart disease was shown in a study of U.S. veterans.\textsuperscript{7} Those who had quit smoking by

\textsuperscript{4}Jenkins et al. pp. 1140-1155.


1954, for reasons other than doctor's orders, had lower coronary heart disease mortality rates over the next eight years than men smoking cigarettes in 1954. Hammond et al. also indicated that the death rates from coronary heart disease were lower among the ex-smokers than among the smokers. Differences were largest for those men who had ceased smoking the longest period of time.

Both Hammond and Jenkins studies concluded that the incidence of coronary heart disease for pipe and cigar smokers is no higher than that for non-smokers. Findings from a study by Shapiro et al., however, show that pipe and cigar smokers do, indeed, run a significantly higher risk of developing coronary disease than non-smokers. Of course, this finding may be questioned. It may be atypical,

8 Hammond et al., pp. 167-182.


10 Jenkins et al., pp. 511-524.

or it may result from a sampling of former cigarette smokers who switch to pipe and cigars after they had smoked cigarettes long enough to be predisposed to the disease.

The increasing convergence of evidence suggests that "cigarette smoking can contribute to the development of cardiovascular disease and particularly to death from coronary heart disease." ¹² Furthermore, the Advisory committee to the U.S. Surgeon General concluded that "Cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action." ¹³

In summary, the literature reviewed presents evidence that (a) coronary heart disease mortality is higher among smokers than non-smokers; (b) cigarette smoking is an important risk factor in the development of coronary heart disease, both in itself and in the presence of other significant risk factors; (c) cessation of the smoking habit is followed by a reduction in the risk of coronary heart disease; and (d) pipe and cigar smoking is not an important risk factor.


In addition to cigarette smoking, other risk factors have been associated with coronary heart disease. These factors have been thoroughly reviewed by Epstein\(^{14}\) and by Simborg.\(^{15}\) Among the implicated factors are elevated serum cholesterol, elevated blood pressure, obesity, physical inactivity, family history of coronary heart disease, abnormal carbohydrate metabolism, and possibly certain social and psychological adaptation patterns. Of these, elevated serum cholesterol and elevated blood pressure have emerged as the most consistently related risk factors. To reduce this risk, a person apparently must stop smoking in addition to controlling the other factors. Since no smoking modification program has been specially designed for the person in such a high-risk situation, a program of this design is urgently needed.

Statement of the Problem

The purpose of this study is to develop a smoking counseling program for a group of high-risk subjects in a


coronary prevention program and to investigate factors associated with changes in smoking behavior. More specifically, this study investigates the following general hypotheses:

1. The Coronary Prevention Program will bring about changes in smoking behavior.
   1.a. The Smoking Counseling Group will show the highest proportion of success of all groups in changing their smoking behavior.
   1.b. The Risk Reduction Group will show a higher proportion of success than the control groups.

2. Demographic characteristics are predictors of smoking cessation.
   2.a. There will be a positive relationship between age and cessation.
   2.b. There will be a positive relationship between education and cessation.

3. Personality measures are predictors of smoking cessation.
   3.a. There will be a positive relationship between the need for approval and cessation.
   3.b. There will be a positive relationship between internal control and cessation.
   3.c. There will be a negative relationship between conflict and cessation.
4. Smoking history are predictors of smoking cessation.
   4.a. There will be a positive relationship between age at which a smoker starts smoking and cessation.
   4.b. There will be a negative relationship between amount smoked and cessation.

5. The Horn smoking model (National Smokers Test) is a predictor of smoking cessation.
   5.a. There will be a difference in the "reasons for quitting" profile between quitters and non-quitters.
   5.b. There will be a difference in the "knowledge and attitudes" profiles between quitters and non-quitters.
   5.c. There will be a difference in the "psychological utility" profile between quitters and non-quitters.
   5.d. There will be a difference in the "support" profile between quitters and non-quitters.

**Terminology**

**Coronary Prevention Program**: A research program sponsored by the Department of Preventive Medicine at The Ohio State University. The purpose of this program is to investigate the effects of a primary prevention program among men who have a high risk for developing coronary heart disease, i.e., elevated blood pressure and elevated serum cholesterol. The primary prevention program attempts to assist the high risk individual in the modification of his diet, weight, physical activity pattern and blood pressure.
**High Risk Subjects:** Subjects who have a high risk for developing coronary heart disease. They are identified as having a combination of elevated serum cholesterol (> 250 mg.%) and elevated blood pressure (> 160 systolic and/or 95 diastolic).

**Smoking Counseling Program:** An experimental, single-treatment program for encouraging high-risk subjects to modify cigarette smoking. Activities included in this program are an introduction, a film viewing, a group discussion, and individual counseling in the group setting.

**Internal versus External Control:** The extent to which an individual believes that his rewards (or punishments) are a consequence of his own actions; or, alternatively, a consequence of chance, fate, luck, or powerful others. The Rotter I-E scale is used for measuring this construct.

**Conflict:** The degree of conflict the individual expresses with reference to his general life situation. The Rotter Incomplete Sentence Blank is used for measuring this construct. Low conflict is equivalent to high adjustment.

**Need for Approval:** An individual's tendency to acquiesce, dissimulate, or respond in a socially desirable manner. The Marlowe-Crowne Social Desirability scale is used to measure this construct.

**Horn Smoking Model:** A behavioral model concerned with smoking among adult cigarette smokers. The National Smokers
Test is based on this model. This test is comprised of four subtests which measure a smoker's (a) reasons for wanting to stop smoking, (b) knowledge and attitudes relative to the needs and expectancy of success in quitting, (c) psychological reasons for smoking cigarettes, and (d) environmental support for or barrier to quitting.

"Reasons for Quitting" Profile: A profile based on the smoker's response to Test One of the National Smokers Test: "Do you want to change your smoking habit?" It measures the strength of the smoker's value of following four common reasons for quitting: (a) concern over the effects of cigarettes on health, (b) desire to set an example for others, (c) recognition of the unpleasant aspects (the esthetics) of smoking, and (d) desire to exercise self-control.

"Knowledge and Attitudes" Profile: A profile based on the smoker's response to Test Two of the National Smokers Test: "What do you think the effects of smoking are?" It shows the strength of smokers personal recognition and attitudes about the fact that (a) cigarette smoking is an important health problem, (b) the smoker is personally susceptible to the hazards of smoking, (c) there is a value to be gained from stopping, and (d) people are capable of stopping.

"Psychological Utility" Profile: A profile based on the smoker's response to Test Three of the National Smokers
Test: "Why do you smoke?" It lists factors that describe the uses of smoking and the kinds of satisfactions gained from it. These factors are: (a) stimulation, (b) handling, (c) pleasure relaxation, (d) tension reduction, (e) addiction, and (f) habit.

"Support" Profile: A profile based on the smoker's response to Test Four of the National Smokers Test: "Does the world around you make it easier or harder to change your smoking habit?" It identifies factors which may be of important in providing support of the smoker's efforts to quit smoking. These factors are: (a) doctors attitudes about the smoking problem, (b) congeniality of the living environment in support of quitting, (c) advertising influence on the use of cigarettes, and (d) the attitudes of key groups such as the federal government and schools on anti-smoking programs.
CHAPTER II

REVIEW OF THE LITERATURE

For the purpose of this study, the literature reviewed is divided into two parts: (1) smoking-modification methods, and (2) behavioral correlates of ex-smokers.

Smoking-Modification Methods

The literature related to smoking-modification studies has been reviewed by several authors.\(^1\)^2,\(^3\)

Without exception, these authors utilized modification methods as the bases for grouping and classifying studies for reviewing. This practice enables one to compare the effects of a single method in treating various smoking population. The comparison of various methods within


a homogeneous smoking population, however, has never been attempted. In an effort to more sensitively examine the data, smoking-modification methods within population groups will be employed as the basis for review.

Three general types of subjects or groups have been employed in previous research. These types are (a) students, (b) patients, and (c) the general public. The following is a review of these smoking modification studies.

A. **Student Studies**

Studies reviewed here are those in which students, aged 17 to 25, were exclusively employed as subjects. They were most often recruited by teachers on campuses, through various media such as campus newspapers, campus radio stations, classroom announcements, and bulletin notices. To encourage students to volunteer for the treatment, a few researchers have used money as rewards. In order to press students to stay in treatment, they were sometimes required to deposit money prior to the smoking program which was refunded to them upon its completion.

The effectiveness of group discussion and non-directive group therapy was investigated in two studies. In one study, Michelson\(^4\) used 35 students who voluntarily signed and

attended the first of six weekly discussion sessions as subjects. The attendance decreased regularly, with only two attending the six sessions. At the end of treatment, only one stopped smoking.

Mausner reported the other study in which 35 college girls were recruited, 19 of whom served as experimental subjects and 16 as control subjects. Subjects in the experimental group were provided with seven sessions of discussion meetings and nondirective group therapy. As with Michelson's study, high dropout and low success rates were reported. Only five experimental subjects attended the last four sessions, and only two stopped smoking.

Two studies used desensitization therapy in treating the smoking behavior of college students. Desensitization technique, based on stimulus-response learning theory, proposes that if a response other than smoking is conditioned to stimuli which have been linked to the smoking response and the link between these stimuli and the smoking response is weakened, then the smoker will have at his disposal a stronger alternative response.

Based on this theory, Pyke et al.\textsuperscript{6} designed a study to investigate the effects of desensitization training. They hired 52, volunteer college students and divided them into three groups: (a) an experimental group which received desensitization therapy over a ten-week span, (b) a comparison group which kept daily records of smoking volume for the eight weeks of the experiment, and (c) a second comparison group which kept records only for the first and eighth weeks. The investigators reported a significant reduction in smoking among desensitization subjects; however, no specific data accompanied this report. A four-month follow-up indicated that all groups were nearly back to pre-treatment levels.

In another desensitization study, Koenig and Masters\textsuperscript{7} divided 42 college students into three groups: (a) a systematic desensitization group, (b) an aversion therapy group, and (c) a counseling group. The treatment consisted of ten sessions covering a six-week span. No differences


between the three treatment groups resulted, either at the end of the experiment or six months later. The overall decrease in smoking was 19 percent immediately following treatment and 9.5 percent six months later.

The effects of various behavior-modification techniques were investigated by Keutzer. She divided 195 subjects into six groups: (a) a breath holding group, (b) a "cover-ant" therapy group, (c) a negative practice group, (d) an attention placebo group, (e) a combined treatment group, and (f) a control group. Treatment lasted for five weeks and subjects were required to post a twenty dollar deposit. While there were significant differences in smoking decrement between the treated groups and the control group, there were no significant differences among the various behavior treatments. The average cessation rate among all treatments was 23 percent at the end of the study and 10.3 percent at the six-months' follow-up period.

B. Patient Studies

Studies reviewed in this section were those in which subjects treated were exclusively patients. While some of these patients might be seen by their physicians for diseases

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associated with smoking such as cancer, coronary heart disease, chronic bronchitis, pulmonary emphysema, peptic ulcer, and cirrhosis of the liver, others were seen for ailments that were not linked to smoking. All of these patients had been advised by their physicians to give up cigarette smoking and had expressed their desire to do so.

A "one-shot treatment" that included 121 patients was conducted by Mausner et al. After administering a smoking questionnaire in his office, the physician conducting the experiment advised each of 121 patient to quit smoking. He offered a Nicoban pastille and a pamphlet to those patients who indicated any interest. A control physician said nothing to his 36 patients. Two telephone follow-ups, one after seven days and the second after six months, were made. Her results were not stated in terms of cessation. Experimental subjects were reported to have done better than control subjects in changing their smoking behavior. On the initial follow-up, 44 percent of the experimental patients and 25 percent of the control patients had changed their smoking behavior. At the six-months' follow-up, 33 percent and 10 percent, respectively, maintained a changed smoking behavior.

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Utilizing a method patterned after Alcoholics Anonymous, Bachman\(^{10}\) reported results of a smoking study involving 110 volunteers, most of whom were chronically ill. The treatment consisted of medical lectures, group discussion, instruction in habit change, and for 13 subjects, lobeline pastilles. Of 68 patients who attended at least six of the eight weekly sessions, 70 percent stopped smoking by the end of treatment. Of 43 patients who attended less than six sessions, 19 percent stopped smoking. The investigator reported comparable results for those who were easily contacted two to twelve months later.

A hospital-based smoking project conducted among adult smokers who were admitted during a single month was reported by Reed.\(^{11}\) They were advised by hospital physicians to attend small, smoking-cessation discussion groups. About 40 percent of the patients attended one or more group sessions. The cessation rate for these patients was 27 percent. For the remaining patients the cessation rate was 26 percent. Follow-ups on those patients who were easily contacted two weeks, one month, and two months later showed

\(^{10}\)David S. Bachman, "Group Smoking Deterrent Therapy," \textit{General Practioner}, XXX (September, 1964), 86-89.

no differences between the two groups.

Ball\(^{12}\) reported results of an established smoking withdrawal clinic in England in which conventional therapeutic programs, including films, talks, specimen demonstrations, and group discussions were used. Subjects were 109 patients referred by physicians or chest clinics. Seven, weekly, ninety-minute sessions were administered by two physicians. Of the 92 patients completing treatment, 67 percent stopped smoking. Follow-up quitting rates based on 88 subjects contacted after three months was 51 percent, on 82 subjects contacted after six months was 45 percent, and on 75 subjects contacted after one year was 33 percent.

In an experimental group clinic designed to help patients with early symptoms of chronic bronchitis, attempts were made by Wood and Meadows\(^{13}\) to persuade 121 smokers to stop smoking. Among the programs provided by the clinic to prevent chronic bronchitis, an unspecified number of short sessions were devoted to encouraging patients to stop smoking. The known facts about smoking and bronchitis,

\(^{12}\)Keith P. Ball and Miller Mair, "Results of An Anti-smoking Clinic (London: Central Middlesex Hospital, 1967), (Mimeographed.)

lung cancer, and other diseases were explained by means of talks, films, and demonstrations of pathological specimens. Ex-smokers were invited to talk to the group. Of 77 smokers completing the program, 28 (36 percent) stopped smoking.

C. General Public Studies

Studies reviewed in this section are those in which subjects used were recruited from the general public. They were most often volunteers responding to newspaper, radio, and television advertisements.

The smoking-modification methods employed varied, but generally can be categorized under these headings: 1. individual or group counseling, 2. medication, and 3. five-day plan. The following is a review of these studies.

1. Individual or group counseling

Most of the studies reported in the literature are those in which group counseling methods were used to modify smoking behavior. Only a few studies employed individual counseling methods.

Lawton\textsuperscript{14} reported a study in which group psychotherapy was used as the sole form of treatment. A group of 19 volunteers met for nine sessions over a six-week period.

\textsuperscript{14}M. Powell Lawton, "Psychological Processes in the Cessation of Smoking," (paper presented at the American Psychological Association Meeting, September 1964, Los Angeles, California).
Twelve subjects stopped smoking immediately after smoking treatment, eight were still not smoking three months later, and all but three resumed smoking within eighteen months.

In another study, Lawton\textsuperscript{15} divided 73 volunteers into four groups: (a) educational therapy, (b) group therapy, (c) a combination of educational and group therapy, and (d) five-day therapy. Another 41 subjects were used as controls. Except for those in the five-day therapy group, subjects were seen for eight weekly sessions. The overall quitting rates of 51 subjects completing the programs was 26 percent at one week after treatment, 18 percent at seven months, and 18 percent at fifteen months. The comparable success rate of the control group was a negligible 2 percent after one week. There were no differences among the four treatment groups.

In an attempt to evaluate the relative value of four anti-smoking therapy methods, Graff et al.\textsuperscript{16} assigned 37 volunteers into one of four therapeutic groups: (a) group therapy, (b) hypnotherapy, (c) lobeline drug therapy, and

\textsuperscript{15}M. Powell Lawton, "Group Methods in Smoking Withdrawal," \textit{Archives of Environmental Health}, XIV (1967), 258-265.

(d) librium drug therapy. Twenty-eight smokers who came to the clinic but did not sign up for treatment were used as the control group. Subjects in the hypnosis and group-discussion sections attended ten weekly sessions, and drug subjects received ten weekly treatments. Only 24 subjects completed treatment, and 12 stopped smoking. Follow-up in three months showed 9 experimental and 3 controls were not smoking. Statistical significance between the experimental methods were not available; however, hypnotherapy appeared to be the most effective, with group-therapy less effective, and drug therapies the least effective. That (a) controls were not selected from the volunteer group, (b) only 24 subjects completed treatment, and (c) these small groups precluded statistical inferences making evaluation of this research difficult.

Allen and Fackler\(^{17}\) utilized educational methods and small-group interaction to modify smoking behavior. Subjects met for ten, two-hour sessions within a five-week period. Of 150 registered for the clinic, 43 percent quit smoking at the end of the program. Telephone follow-up of those participants who could be contacted showed 35 percent after six months and 26 percent after eighteen months were not

smoking. An eighteen months' follow-up of the control group, 107 smokers who attended the opening session of the smoking clinic but did not register for group sessions, showed an 18 percent quitting rate which was slightly lower than that of the treatment group.

A large scale, smoking-withdrawal clinic was conducted by Fredrickson\(^\text{18}\) in the New York City Department of Health. Over 1,200 smokers attended the opening lecture. Those registered (350) were assigned to twenty-eight groups. The treatment methods were constantly modified, but generally consisted of twenty-four sessions of group counseling over a seven to nine-month span. Of 200 subjects completing treatment and upon whom data was available, 65 percent quit smoking while 15 percent reduced their smoking levels by one-fourth or less.

The effects of a community, smoking-cessation clinic were investigated by Hepper et al.\(^\text{19}\) Subjects were 150 volunteers who attended a recruitment meeting. The program consisted of eight weekly sessions of group counseling,

\(^{18}\) Donald T. Fredrickson, "New York City Smoking Withdrawal Clinic" (paper presented at the American Cancer Society Conference on Ways to Help People Stop Smoking, December, 1967, New York City, New York.)

\(^{19}\) Norman G. Hepper, David \(\_\_\_\_\_\_\text{rr}, Howard A. Anderson, Robert S. Fontana, and Caroline Hanson, "S.O.S. Rochester, Minnesota - A Community Cessation Clinic" (paper presented at the American Cancer Society Conference on Ways to Help People Stop Smoking, December, 1967, New York City, N. Y.)
followed by weekly discussion meetings for a five-month period. Of 101 completing treatment, 23 (22.7 percent) stopped smoking.

In an attempt to help subjects change their smoking behavior without necessarily quitting, Horn gave 165 adult volunteers seven sessions of insightful educational instructions in a five-week period. Three months later, thirteen of 144 subjects reported that they had quit smoking and another 67 subjects reduced their average daily consumption by at least 10 percent.

In a well-designed study, Schwartz et al. evaluated the relative efficacy of three, smoking-cessation methods: prescription, individual counseling, and group counseling. The subjects were men between the ages of 25 and 40. They were randomly assigned to seven treatment groups and two control groups, with 36 subjects in each group. Using an 85 percent reduction from pre-treatment smoking as the criterion, 32.9 percent of all experimental subjects and


11 percent of the control subjects changed their smoking behavior. Placebos were found to be more effective than tranquilizers. The most effective treatment combination were individual and group counseling with placebos - both produced a success rate of one-half - followed by the counseling-tranquilizer group with a one-third success rate. Overall success rates at the four-months' follow-up were 20.6 percent, with group subjects on tranquilizers showing the greatest attrition in rate of success. At the end of one year, no significant difference in success rates were found between control groups and experimental groups.

A method of individual counseling was reported in Cruickshank's study in which 32 staff members of the British Ministry of Health were seen individually during lunch hours by two medical officials. During seven weekly sessions, five to ten minute personal interviews were offered. Seventy-eight percent of the subjects reduced their smoking to one-third or less, and 33 percent stopped completely. No controls were used.

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2. Medication

Some investigators believe that the physiological withdrawal symptoms of smoking such as constipation, sweating, tremor, and irritation of the mucous membranes of the respiratory tract are to some extent related to the nicotine in tobacco. In order to neutralize or decrease these symptoms, lobeline and related drugs or tranquilizers such as meprobamate have been prescribed.

Lobeline can be taken either orally or injected subcutaneously. When taken orally, lobeline comes in the form of tablets or pastilles under the names of Nikoban, Lobidan, or Smokurb. When injected subcutaneously, it is sometimes used in combination with other drugs such as meprobamate, anticholinergics, and amphetamine.

The effectiveness of lobeline in the treatment of the smoking behavior of subjects who were attempting to give up smoking was investigated in a double-blind trial conducted by Perlstein. Lobeline was given to 45 subjects and placebos were given to 32 subjects. After four weeks of treatment, 11 subjects receiving lobeline preparations discontinued smoking, while none of the subjects receiving the placebo stopped smoking. One limitation of this study

is that a complete description of the trial was not presented.

Similar results were obtained by London. In a double-blind trial among subjects who expressed a desire to curb their smoking habits, lobeline pastilles were given to 42 subjects and placebos were given to 32 subjects. After four weeks of therapy, 6 subjects in the lobeline-treated group but none of the placebo group stopped smoking.

Two British studies, on the other hand, reported that lobeline was no better than placebo in the treatment of smoking behavior. In a double-blind trial, Merry and Preston prescribed for 90 subjects either lobeline sulfate or placebos for four weeks. Of the 23 subjects who stopped smoking, lobeline was not more effective than placebos. Edward treated 50 females with either lobeline or placebos for four weeks. While 10 women stopped smoking, no differences were reported between the two groups either at the end of treatment or four months later.


26 Edwards, G., "Hypnosis and Lobeline in An Anti-Smoking Clinic," Medical Officer, CXI (April, 1964), 239.
Lobeline injections were introduced by Ejrup. His program consisted of ten days of daily interviews and daily injections. In addition, smoking control pamphlets were distributed among his subjects. Of 1,012 volunteer patients treated in 1958 in three different smoking clinics in Stockholm, 76 percent of the subjects stopped smoking and 22 percent reduced smoking to one-fourth.

In an attempt to evaluate the Ejrup's ten-day lobeline treatment, Rosenberg divided 250 Danish subjects into three groups: (a) a lobeline-injection group, (b) a silver-acetate with auto-suggestion exercise group, and (c) a placebo group. One-third of all the subjects stopped smoking, but no differences were found among the three groups. Follow-up cessation rates at four months and six months were 14 percent and 4.4 percent respectively.

In a New York Medical Center, Ejrup reported that during the years 1965-67, 189 subjects were treated with

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29 Borje Ejrup, "Tobacco Withdrawal Clinic at New York Hospital-Cornell Medical Center," (paper presented at the American Cancer Society Conference on Ways to Help People to Stop Smoking Cigarettes, December, 1967, New York City, New York.)
lobeline hydrochloride. The treatment called for daily injections for two weeks, one per week for two months, and then two per month for "a reasonable length of time" (six months to two years). In addition, physician counseling, tranquilizers, and amphetamines were given when needed. Of 154 subjects completing the treatment, 53.9 percent stopped entirely. Seventy-five percent of the subjects had reduced their smoking after three months, 54 percent after six months, and 40 percent after one year.

A large scale, smoking-withdrawal clinic was conducted by Ross at Roswell Park Memorial Institute. Between 1963 and 1965, 1,473 subjects in twenty-four clinics were treated. Various combinations of medication were used including (a) lobeline, (b) lobeline and amphetamine, (c) amphetamine, (d) nicotine and amphetamine, (e) methamphetamine and pentobarbital, and (f) methamphetamine. There were also five placebo combinations. In addition to medication, educational techniques were used which consisted of lectures and literature about the harmful effects of smoking, withdrawal reactions to quitting, and discussion. Time periods varied, but generally consisted of four weekly meetings. Approximately 35 percent immediately stopped smoking, and over the long term (varying from ten to fifty-seven weeks)

withdrawal was approximately 20 percent. Follow-up success rates for clinics varied from 6 to 27 percent. Tests for statistical significances among the methods employed were not presented. Nevertheless, placebo treatment seemed somewhat better than lobeline treatment. Nicotine injections appeared to yield the poorest results.

Leon et al. recruited 312 subjects for study in nine clinics. Lobeline, in the form of pastilles, lozenges, and pills were intermixed with placebos in (a) educative, (b) psychotherapeutic, and (c) repressive-inspirational methods. Eight meetings were held over a period of six to eight weeks, and for seven clinics a reunion session was held one month later. Of 255 who attended three or more sessions, quitting rates were 40 percent immediately after the program and 32.7 percent nine months later. Differences among treatment methods were not given.

3. **The five-day plan**

Under the auspices of the Seventh Day Adventists, the five-day plan was developed by McFarland and Folkenberg. The program consisted of five meetings of about ninety to one hundred and twenty minutes each. Usually the meetings

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are well advertised and are held in a convenient auditorium of a school, hotel, or civic hall. The main techniques of the program include lectures, group meetings, "inspirational" messages, special tips, diets, movies, and scare tactics such as the showing of a cancerous lung specimen and/or a film about the surgical removal of a diseased lung.

In a fairly well-designed study, Guilford evaluated the effectiveness of the five-day plan as compared to a self-initiated, self-sustained regimen of abstinence. Subjects were chosen from among those volunteers who responded to a city-wide publicity campaign. There were 173 experimental subjects and 175 control subjects matched according to sex, age, marital status, education, occupational level, and smoking rate. All subjects signed a "decision card" stating that they would stop smoking. The experimental subjects were requested to attend the five-day program. Success was defined as a reduction in daily intake of at least 90 percent. Based on 50 percent of the experimental subjects who completed the treatment, submitted the "record card", and responded to telephone follow-ups, the success rate immediately after treatment was 47 percent. After six months, the success rate was 28 percent, and after one year,

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16 percent. Success rates for control subjects were almost the same at six months and one year, being 23 percent and 16 percent respectively.

Thompson and Wilson\textsuperscript{33} studied 328 smokers attending one or more sessions of the five-day-plan clinic. Ten weeks after treatment, 84 of 287 subjects (29.4 percent) contacted by telephone reported that they had not smoked during the preceding seven days. Ten months later, 16 percent reported that they had quit since the clinic ended. Failure to employ controls makes evaluation of the results of this study difficult.

Under the sponsorship of Hinsdale Sanitarium and Hospital, twenty five-day-plan clinics were conducted in the surrounding area of Chicago.\textsuperscript{34} Subjects were 1,100 volunteers who attended at least the first session of the clinics and registered for the remaining sessions. A follow-up of subjects returning mailed questionnaires showed quitting rates were 55.9 percent after three months,

\textsuperscript{33} Douglass S. Thompson and Thurlow R. Wilson, "Discontinuance of Cigarette Smoking: 'Natural' and with 'Therapy?" Journal of the American Medical Association, CXCM (June, 1966), 1048-1052.

\textsuperscript{34} C. L. Dale, W. C. Graves, H. B. Beck, and H. S. Lau, "Smoking Withdrawal Achieved by Natural Means" (Hinsdale: Hinsdale Sanitarium and Hospital, 1967), p.15. (Mimeographed.)
41.2 percent after six months, and 33.6 percent after one year. However, results were not reported for all subjects attending the first session, making evaluation of these data difficult.

A modified five-day plan called "Five Step Formula to Stop Smoking" was introduced by Hess.\textsuperscript{35} Five consecutive evening sessions utilizing physical fitness, nutrition assistance, the buddy system, smoking literature, and self-monitoring methods were offered to 63 volunteers. The investigator reported that 14 percent of the subjects stopped smoking at the end of six weeks.

McFarland et al.\textsuperscript{36} conducted a five-day program in Canada in which 144 smokers completed treatment. Follow-up surveys three months and one year later indicated 34 percent and 15 percent, respectively, remained non-smokers. Similar to most of five-day-plan studies, no controls were employed and results were not based on all of the subjects who entered treatment.


Behavioral Correlates of Ex-smokers

Studies reviewed in this part of the chapter are those in which characteristics of smokers and ex-smokers are compared. These characteristics include demographic data, smoking history, and personality variables. Most of the studies reviewed here were undertaken to evaluate a smoking modification program.

Age, sex, educational level, and occupational status proved to be good predictors of smoking cessation in a smoking control project\(^{37}\) in which educational instruction and small group interaction were emphasized. The successful quitter was more likely to be male of a higher educational and socioeconomic level, and older when he began smoking.

Similar results were observed in Lawton's study\(^{38}\) in which a group of 19, adult volunteers were treated with group psychotherapy to modify their smoking behavior. The results showed that the successful quitter was male, older, smoked less, higher in educational level, and more aware of


\(^{38}\) Lawton, "Psychological Process in the Cessation of Smoking".
the health hazards of smoking. Haenszel et al.\textsuperscript{39} in their epidemiologic survey, also reported that the ex-smoker was older and smoked less.

Leon\textsuperscript{40} studied volunteers attending a smoking clinic and found that the ex-smoker smoked less, began smoking later in life, and tended to be older. Ejrup\textsuperscript{41} in his investigation of lobeline treatments among 1,012 volunteers reported similar results. Heavy smokers found it somewhat more difficult than light smokers to give up smoking. Neither age nor the number of years smoked were associated with smoking cessation.

Dale et al.\textsuperscript{42} compared the smoking behavior of 451 smokers and 551 ex-smokers participating in five-day-plan clinics. The authors reported that the length of time the participants smoked did not affect their success in smoking withdrawal.

\textsuperscript{39}William Haenszel, Michael B. Shimkin, and P. Herman Miller, "Tobacco Smoking Patterns in the United States," Public Health Monograph, XLV (1956), 1-85.

\textsuperscript{40}Leon, pp. 247-257.

\textsuperscript{41}Ejrup, "Treatment of Tobacco Addiction," p. 5.

\textsuperscript{42}Dale et al., p. 15.
Weatherly, in a study of 182, undergraduate, male students, found that those who had succeeded in breaking the smoking habit started smoking at an earlier age. Quitters, according to the Edward Personal Preference Schedule, were also likely to be lower in affiliation, deference, change; and higher in achievement needs and aggression. The health hazards of smoking were not associated with quitting.

Whether a consonant smoker (those favorably inclined toward smoking) or a dissonant smoker is more likely to achieve success in modifying his smoking behavior has been questioned. Based on interviews with 845 adolescents and 984 adults, McKennell found that ex-smokers were more likely to be consonant smokers than dissonant smokers.

Conflicting results were obtained by Keutzer. Data based on a measure of Effective Cognitive Dissonance

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administered to 213, volunteer college students indicated that quitters were dissonant smokers. Age, sex, education, previous quitting attempts, smoking level, extraversion, neuroticism, anxiety, and external control were not significantly associated with quitting.

In a retrospective study, Rosenblat et al. administered a smoking behavior questionnaire to 568 smokers and 139 ex-smokers. The items were based on the Horn Smoking Model. Items on the scale of "example", "mastery", and "awareness of health hazards", were significantly associated with quitting.

Rotter's Internal-External Scale was used in several studies to predict the outcomes of smoking-modification programs. James et al. gave a group of smokers and former smokers the scale one week after the release of the Surgeon General's Report on Smoking and Health. A comparison of I-E scales of 82 male smokers to those of 20 male ex-smokers showed that quitters were more internal than non-quitters.

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Similar results were obtained by Platt et al.\textsuperscript{48} in a study of 44, adult male subjects participating in role playing. Those who reduced smoking were more internally oriented than those who did not modify their smoking behavior.

Smoking cessation was related to a number of variables in two, well-designed studies. Straits\textsuperscript{49} interviewed four groups of males: 100 non-smokers, 50 ex-smokers, 50 current smokers unable to quit, and 100 current smokers who never tried to quit. The successful quitters tended to be older, to have health reasons for quitting, to smoke more, to reflect environments conducive to quitting (often the wife was a non-smoker or an ex-smoker), and to have a negative attitude toward smoking. The I-E scale did not relate to quitting behavior, although non-smokers were significantly more "internal" than smokers.

Guilford,\textsuperscript{50} in a well-designed study, administered a smokingmodification program to 348 volunteers. Male


\textsuperscript{50}Guilford, pp. 95-102.
smokers who successfully stopped smoking were older, smoked fewer years, started at a later age, and were less neurotic, more self-confident, more goal-directed, more success-oriented, and more practical. Insignificant variables were education, marital status, occupation, smoking level, number of puffs, inter-personal environment, previous quitting attempts, and participation in the five-day-plan program.

Summary of the Review of Literature

1. Smoking-Modification Methods

Many of the smoking-modification studies reported to date have design limitations which make their evaluation difficult. Limitations common to these studies are as follow.

a. Small sample size: Several studies allocated their total sample of subjects to more groups than was feasible. For example, Lawton\textsuperscript{50} divided 73 subjects into five therapeutic groups and Graff\textsuperscript{51} distributed his 37 subjects into four groups. These small samplings make demonstrating differences between groups exceedingly difficult.

b. No control group: Most smoking-modification studies

\textsuperscript{50}Lawton, "Group Methods," pp. 258-265.

\textsuperscript{51}Graff, pp. 39-43.
failed to employ either control or placebo groups (when drugs are experimented). Without either of these, determining whether the smoking behavior change were brought about basically by the treatment was difficult.

c. **Lack of suitable control:** When controls were employed, many researchers failed to recruit them from the same population that yielded the experimental subjects. Optimally, there should be no priori differences, other than those which naturally result from a random sampling, between smokers serving in experimental and control groups. Than Allen and Facklar\(^5\) and Graff\(^6\) used smokers who were unwilling to continue in treatment as their controls suggests a weakness in their studies.

d. **Inadequately controlled experimental variable:** Two and sometimes more independent variables were manipulated simultaneously making it often difficult or impossible to evaluate the specific effects of either. For example, Ejrup's\(^7\) subjects received daily lobeline injections and/or tranquilizers or amphetamines in addition to counseling from physicians.

e. **Irregular reporting of results (not based on smokers who began the treatment series):** The number fo subjects in

\(^5\) Allen and Facklar, pp. 63-65.

\(^6\) Graff, pp. 39-43.

\(^7\) Ejrup, "Tobacco Withdrawal Clinic," p. 8.
calculating results were often not based on those entering the treatment, but rather on those completing the treatment or those easily accessible at the time of follow-ups. For example, Fredrickson had 1,200 smokers who attended the opening session and 350 who registered for treatment, but results reported were based on 200 subjects who submitted a "record card" to report their smoking behavior.

f. Unevaluated counselors' effects: When more than one counselor was employed, the counselors' effects were not distributed across all groups. Often group or treatment differences may have been confounded with counselor differences. Examples of this limitation can be found in the studies of Hepper and Ross.

Of the smoking-modification studies reviewed, only a handful of studies were free from the limitations described above, and, thus, interpretation and comparison of

55 Fredrickson, p. 6.
56 Hepper, p. 3.
57 Ross, pp. 111-114.
58 Schwartz, "One Year Follow-up," pp. 161-165.
most smoking-modification research is very difficult. Nevertheless, the following observations are apparent.

High recidivist and dropout rates were commonly reported in five-day-plan studies. In most instances, control subjects were not used and scientific follow-ups were not conducted. In one of the better studies,\textsuperscript{61} control subjects did as well as experimental subjects at the end of the clinic. Because of its "inspirational" approach in motivating smokers to give up cigarettes, the five-day plan is not accepted by many researchers as a suitable program for use in other settings.

The stimulus-response-conditioning model has produced only modest results. Average cessation is 20 percent immediately after treatment and 10 percent after six months. In addition to the above observation, the conditioning approach has been criticized from two theoretical points of view. While punishment techniques have often been heavily relied upon to suppress the smoking response, the effects of punishment on behavior have been, in fact, unpredictable and inconclusive.\textsuperscript{62} Secondly, while conditioning aims at the manipulation of behavior, the link between smoking

\textsuperscript{61}Guilford, pp. 95-102.

behavior and associated feelings (anxiety, desire for cigarettes) is not thoroughly understood. 63

Results with lobeline at the end of treatment periods have varied from 12.3 percent 64 to a reported 73 percent, 65 with an average of 30 percent. Lobeline was found effective in abating smoking in two studies, 66, 67 but ineffective in at least four studies. 68, 69, 70, 71 Other medication such as nicotine, amphetamine, methamphetamine, and meprobamate proved to be no better than placebos in the modification of smoking behavior.

Group counseling was generally more effective than drug therapies, 72, 73 and about equally as effective as

63 Schwartz, "One Year Follow-up," pp. 161-165.
64 Ross, p. 112.
66 Perlstein, pp. 40-45.
67 London, pp. 167-175.
68 Merry and Preston, p. 628.
69 Ross, pp. 111-114.
70 Ejrup, "Treatment of Tobacco Addiction," pp. 3-17.
72 Schwartz, "One Year Follow-up," pp. 161-165.
individual counseling. Individual counseling, however, is economically disadvantageous in terms of time and manpower.

Most smoking-modification programs were not well accepted by the subjects. To be treated, subjects were often requested to attend many sessions of group meetings. Frequently, as many as half of the subjects were unwilling to complete the smoking program. Developing a smoking-modification program that will be better accepted by the smoker is the first step in smoking-modification research. Mausner's single-treatment approach seems to be an acceptable alternative to a series approach. Her treatment, however, was effective only for reducing the number of cigarettes smoked, and not for stopping smoking. Unfortunately, her patients received less than a minute of individual counseling from the physician. If more counseling time, particularly in a group setting, had been provided, a better result might have been achieved.

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74 Schwartz, "One Year Follow-up," pp. 161-165.
75 Fredrickson, p. 6.
2. **Behavioral Correlates of Ex-smokers**

Studies reviewed in this part of the chapter were those in which the background characteristics of the smokers and ex-smokers were analyzed and compared. These background characteristics include demographic characteristics, smoking histories, and personality characteristics.

Some of the demographic characteristics that have proved to be good predictors of successful quitters are age, sex, education and occupation. The literature reviewed consistently points out that a successful quitter is an educated, older male whose occupational status is high.

Many investigators have made efforts to compare the smoking history of smokers and ex-smokers. Good predictors of successful quitters are daily cigarette consumption, the age at which the smoker started, the number of years he smoked, and smoking environment. The literature reviewed depicts the successful quitter as one who smokes less, starts later, has a shorter smoking history, has a negative attitude toward smoking, and has a social environment that is conducive to quitting.

The behavioral characteristics differentiating smokers and ex-smokers have been analyzed by the use of behavioral tests including the Minnesota Counseling Inventory, The Internal-External Scale, Edward's Personal Preference Schedule, The Effective Cognitive Dissonance Test and the
Minnesota Multiphasic Personality Inventory. The literature reviewed suggests that the ex-smoker is low in deference, affiliation, change, and neurosis; high in achievement needs, personal adjustment, internal control, and self-confidence; and more goal-directed, success-oriented, and practical.
CHAPTER III

METHODS AND PROCEDURES

Subjects Selection, Grouping, and Randomization

Subjects used in this study were male smokers, aged 40 to 59, employed in Franklin County (Columbus, Metropolitan Area), Ohio. They were all identified by the Coronary Prevention Program as individuals with a high risk for developing coronary heart disease, and all have been included in that major project.

The procedures of subjects selection are described below. First, announcement was made to the selected industry or employment group that a heart screening program would be administered free of charge at that industry at a certain time by the medical team from The Ohio State University. Following the announcement, an invitation letter was sent to every male employee, aged 40 to 59, asking him to come to the screening. After screening, persons having elevated blood pressure and elevated serum cholesterol were identified and invited for a re-examination two weeks later. The criteria for his inclusion in the study were:
a) cholesterol ≥ 250 mg. percent;
b) blood pressure ≥ 160 and/or ≥ 95;
c) no evidence of coronary heart disease;
d) absence of certain other major medical problems that would preclude participation; and,
e) willingness to participate in the program.

When a subject was identified as eligible for the study, he was assigned to either the experimental or the control group by a procedure of random stratification. Subjects were stratified on the factors of age, serum cholesterol level, and blood pressure level. As this allocation was carried out among subjects within industries, and in most instances, within departments as they turned out for screening, the occupational level of the paired subjects also tended to be matched.

During the period between January, 1969, and April, 1970, 9,400 men were screened. Of these screeness, 174 were identified as high risk smokers. Among them, 64 men were oriented by the Coronary Prevention Program to their prevention program. All 64 smokers and their respective control subjects participated in this smoking study.

There were two experimental groups and one control group included in this study. The experimental groups were the Smoking Counseling Group and the Risk Reduction Group. Each of the experimental groups was composed of 32 subjects and the control group was composed of 64 subjects.
Subjects in the two experimental groups were treated with a series of risk-reduction educational activities directed by the Coronary Prevention Program. These activities were designed to assist the subject in altering his high-risk status. This series of activities was comprised of: (a) a general orientation to the program, (b) a group, dietary counseling followed by individual counseling, and (c) a group and individual exercise briefing.

All subjects in the Smoking Counseling Group, in addition to the risk-reduction activities described above, participated in the smoking-counseling program. Subjects in the Control Group were not offered the Coronary Prevention Program activities for reducing the risk of coronary heart disease.

These two experimental programs, the Smoking Counseling Program and the Risk Reduction Program, thus allowed this investigator to compare the effects of a specific educational approach in the treatment of smoking behavior to a second approach, identical except for the smoking-counseling factor.

Risk Reduction Program

This was a series of on-going activities sponsored by the Coronary Prevention Program. The series included orientation, dietary counseling and exercise briefing, and was completed within a six-week period. In this program, smoking modification was not explicitly advised, although
smoking was implicated as a risk factor. All subjects participated in the following series of educational activities.

1. Orientation
   This activity was developed to familiarize the subject with coronary disease and the Coronary Prevention Program. A staff physician after explaining the program, described coronary heart disease and its causes, effects, and primary prevention. A nutritionist after a brief orientation about the role of diet in coronary heart disease, presented the film "Eat to Your Heart's Content". Following the film, a food demonstration was given to explain amounts and methods of preparation for permissible foods.

2. Dietary Counseling
   This counseling was given by a staff nutritionist according to each participant's medical status, eating habits, likes, and dislikes. A diet from the American Heart Association was individually prescribed.

3. Exercise Briefing
   An exercise physiologist explained the purpose and procedures of the exercise program. During the session, he introduced the subjects to the laboratory equipment. Each subject was trained to walk
on the treadmill and to use the mouthpiece for collecting gas samples.

**Smoking Counseling Program**

This program was developed in conjunction with the Risk Reduction Program conducted by the Coronary Prevention Program. The counselor was a male faculty member in the Department of Preventive Medicine at The Ohio State University. Only subjects allocated to the Smoking Counseling Group were entered in this additional program. Subjects were counseled in six groups of five to seven people during the experimental period of four months. The conference room in the Coronary Prevention Program was used for counseling. The room was ten feet wide and thirty feet long, with a rectangular table placed in its middle. The program was always scheduled for eight o'clock on Wednesday evening. Prior to counseling, all subjects had attended the one and a half hour orientation described above.

During smoking counseling, subjects sat on both sides of the rectangular table with the counselor sitting at one end and this investigator sitting at the other end. The entire meeting lasted sixty to ninety minutes depending on the group. The objectives of this smoking-counseling program were

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1In one instance, only 2 subjects showed up for counseling.
a) to educate in regard to the health hazards of cigarette smoking, with particular emphasis on heart disease;
b) to explain cessation and modification principles such as avoidance of critical smoking situations whenever possible immediately after cessation, or reduction of nicotine and tar through brand change or quantity modification;
c) to discuss problems that might arise after giving up cigarette smoking such as increased desire for food, increased "nervousness," or other symptomatic reactions; and
d) to offer the smoker individualized advice in the group setting. The results of the National Smokers Test and information about the smoker's family, social work situation, personal habits, personality, age, and education were utilized in making the advice.

The series of events in this program included an orientation, a film viewing, group discussion and counseling, and individual counseling in the group setting. The following is a description of these activities.

1. Introduction (5-10 minutes)

This event began with the counselor discussing the purpose of this smoking-counseling program.
He explained how cigarette smoking coronary heart disease were related and how the smoking counseling program was to be conducted.

2. Film: "Smoking and Heart Disease" (9½ minutes)
This is a 16mm animated, color film. It depicts the effects of cigarette smoking on various functions of the body; presents the statistical evidence that cigarette smoking is an important precursor in heart attack, especially in the presence of other risk factors; and describes the benefits of quitting in terms of reduced risk.

3. Group Discussion and Counseling (35 minutes)
Following the film, subjects were encouraged to ask questions. Most often asked questions were: "How may I cut down my weight and at the same time give up cigarette smoking?"; "What is the status of pipe and cigar smoking in relation to health?"; and "How do I cope with the nervousness that accompanies quitting cigarettes?" The cessation and modification principles, namely, altering or avoiding smoking situations and altering smoking responses, were explained at this time. During the counseling session, subjects were given selected educational pamphlets to take home. Concerned that the subjects might not read
the handouts on their own, highlights from each pamphlet were read aloud by the counselor after its distribution. Additional optional reading materials were displayed on the table. Subjects were free to take them home as well. Because the selection of these educational materials was considered to be crucial to the success of the program, the criteria and procedures for their selection is discussed at length in a subsequent section.

4. Individual Counseling (35 minutes)
Following the period of group discussion, each smoker was counseled in the group setting on changing his smoking behavior. With the help of the smoker's background information, which was coded on three by five inch index cards, the counselor was able to communicate easily with each smoker about his problems. Information recorded on the index cards included demographic information, behavioral characteristics, smoking history and results of the National Smokers Test. Questions about previous attempts to quit and
critical smoking situations\textsuperscript{2} were asked prior to and during individual counseling. All smokers expressing a desire to quit were advised to quit "cold turkey", that is, abruptly. Some who had experience with pipes or cigars as substitutes for cigarettes were encouraged to use them. Others who were either unable or unwilling to quit were advised to modify their smoking patterns. Alternatives for modifying smoking included changing to a lower tar-nicotine brand, reducing the number of cigarettes smoked, changing the depth of inhalation, and smoking less of each cigarette. These modifications were viewed as temporary alternatives for "difficult" subjects to reducing their risk of coronary heart disease and not as ends in themselves. All subjects were advised that they would be contacted by telephone in six weeks in regard to their progress.

\textsuperscript{2}The critical smoking situations are those situations which, immediately after cessation, call forth powerful smoking responses. These are a function of previous smoking patterns and are individually determined. Some examples are after eating, at cocktail parties, on coffee breaks, while driving, and during stressful social or business encounters or situations.
Smoker's Background Information

Smoker's background information such as demographic data was obtained at the time of the screening test. The behavioral characteristics and the Horn smoking variables were obtained at the time of re-examination, about two weeks later. This information was analyzed and reviewed prior to the time of counseling.

The demographic data obtained were age and educational level. These variables were selected because prior smoking studies indicated that age would bear a positive relationship to smoking cessation, and that the level of education would be positively correlated with quitting.

The smoking-history variables selected were the age at which the subject started smoking and the number of cigarettes smoked daily. These variables were selected

\[3\text{Lawton, "Psychological Process,".}\n\[4\text{Haenszel et al., pp. 1-85.}\n\[5\text{Leon, pp. 247-257.}\n\[6\text{Guilford, pp. 95-102.}\n\[7\text{Straits, pp. 73-78.}\n\[8\text{Philadelphia Smoking and Health Demonstration Project, p. 7.}\n\[9\text{Lawton, "Psychological Process,".}\]
because prior smoking studies indicated that there was a positive relationship between the age at which a smoker started smoking and cessation, and a negative relationship between the number of cigarettes smoked daily and cessation.

Various instruments were used in gathering information related to the subject's behavioral characteristics. These instruments are briefly described below.

The Rotter Incomplete Sentence Blank was used in measuring the degree of conflict the subject expressed with reference to his general life situation. This is a semi-projective-type test, objectively scored, in which the subject is asked to finish a sentence when the first word or phrase is given. It is assumed that the subject's response reflects his own attitudes, wishes, and fears. This measure of conflict was regarded as an index of stress or conversely, adjustment. No literature reported the use

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10 Leon, pp. 247-257.

11 Guilford, pp. 95-102.

12 Leon, pp. 247-257.


14 Haenszel et al., pp. 1-85.

of this variable in predicting smoking behavior change. However, quitters were found to be less neurotic.\textsuperscript{16} This study, thus, predicted that the quitters would be lower in conflict than the non-quitters.

The I-E scale\textsuperscript{17} was employed to measure the individual's beliefs in internal and external control. This is a thirty-one item, forced choice measure with six buffer items. The I-E scale measures the subject's perception of the causal relationship between his own actions and the following rewarding event. The "internal" subject is one who believes that the rewards (or punishments) he experiences are primarily a result of his own actions. The "external" subject believes that his rewards (or punishments) are usually a consequence of chance, fate, luck, or influential people. Quitters were found to be internals.\textsuperscript{18,19} This study, thus, predicted that the subject who were high in internal control would be more likely to stop smoking.

\textsuperscript{16}Guilford, pp. 95-102.
\textsuperscript{18}James, pp. 184-186.
\textsuperscript{19}Platt, pp. 155-170.
The Marlow-Crowne Social Desirability Scale was used to measure the subject's need for approval. A subject who has a high need for approval seeks self-protection and avoidance of criticism, and although lacking self-acceptance, has a strong desire to maintain a socially and personally acceptable image of himself. No study reported the use of this variable in predicting smoking behavior change. Because subjects high in need for approval were more likely to be influenced in a situation of small group interaction, this study, thus, predicted that the quitter would be higher in need for approval than the non-quitter.

The National Smokers Test addresses itself to one's perception of his smoking behavior and the world about him. Four dimensions measured in this test are: (a) the subject's knowledge and attitude toward the association between cigarette smoking and health; (b) the subject's reasons for wanting to change his smoking behavior; (c) the subject's psychological need for cigarettes; and (d) the subject's environmental support or barriers to smoking change. It is predicted that quitters and non-quitters would have different profiles on each of these four dimensions.

The above information thus obtained was entered in the Smoker's Background Information sheet. These information were later recorded in three by five inch index cards, and were laid out in front of the counselor to facilitate counseling.

The personality measures - including need for approval, I-E score and conflict score - gave the counselor an overview of the subject's personality makeup and were useful guides in determining the counseling approach. For example, when talking to a subject who had a high conflict score the counselor was less emphatic about advising immediate cessation.

The smoking history variables, including the number of years smoked and the number of cigarettes smoked daily, often served as discussion points that allowed the counselor to center attention on individual smoking problems. The National Smokers Test variables gave the counselor a general idea about the subject's reasons for smoking, his motivation for quitting, and the kind of support available to him. The most often used information during the counseling were variables relative to the subject's perception

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21 The Smoker's Background Information sheet is presented in the Appendix A.
of the effects of smoking. They very effectively provided the counselor a point of departure for individual counseling.

**The Selection of Educational Materials**

Many educational materials were selected and distributed to the subjects in the Smoking Counseling Group. These materials were used as an aid to educate the subjects regarding the hazards of smoking and to convince them that they could, and were not too late to, change their smoking behavior.

In the early stages of this research, it was found that a great many educational materials were available. To select the best materials, the following criteria were developed to serve as guidelines:

a) relevance to coronary heart disease.

b) emphasis on benefits of quitting.

c) recency and reliability of information.

d) readableness (not overly technical.)

e) economy (available in large quantity.)

With the above guides in mind, many educational

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22 Two excellent educational materials, "Summaries and Conclusions: Smoking and Health" and "The Effects of Smoking", were considered too technical for the average subjects to read. They were thus just used as optional materials.
materials were reviewed. Most of the materials were secured through the mail or by visits made to the local chapters of the American Heart Association and the American Cancer Society.

After a period of reviewing and screening, about thirty pamphlets and seven posters were selected. To make the final selection, a number of faculty members and graduate students in Health Education and Preventive Medicine were invited to study and evaluate the materials for use in the present experiment.

Finally, ten pamphlets and three posters were selected. The five pamphlets considered best were used as core materials and were distributed by the counselor to each Smoking Counseling Group participant. The other five pamphlets, used as optional materials, were available to those participants wishing to take them home.

Three posters were selected for use in this study. The poster "They Quit Smoking - Why Don't You?" was posted

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23 The reference lists included in Zagona's book "Studies and Issues in Smoking Behavior" and the American Cancer Society's "Help People to Stop Smoking" were found most helpful in compiling a list of relevant materials for review.

24 The list of ten pamphlets and three posters selected is presented in Appendix B.
in the reception room. The poster "100,000 Doctors Have Quit Smoking Cigarettes" and the poster "Like Father, Like Son" were displayed in the room in which the smoking-counseling program was conducted.

Among the dozens of films available, "Cigarette Smoking and Health" was selected. It was shown to every subject in the Smoking Counseling Group.

Data Collection

Two kinds of data were collected. They were (1) smoker's background information, and (2) changes in smoking behavior six weeks after the treatment. As mentioned previously, smoker's background information was collected from various sources such as the smokers' screening forms and their behavioral questionnaires. Data thus obtained were entered on the Smoker's Background Information sheet.

Data regarding the changes in smoking behavior six weeks after treatment were collected in the following way. Six weeks after counseling, a trained, female interviewer telephoned the subjects to inquire about their smoking behavior. To preserve the integrity of the major project, the Coronary Prevention Program, the interviewer used a different identification with different groups. When calling a subject in the experimental group, she identified herself as being from the Coronary Prevention Program.
When talking with a subject from the control group, she identified herself as a representative of the Department of Health Education at The Ohio State University. In the latter case, she prefaced the interview with three questions regarding dental practices and cigarette smoking. These questions were designed to establish a non-Coronary-Prevention-Program identification, and at the same time to establish an acceptable basis for the interview that followed.

**Treatment of the Data**

1. **Evaluation of the experimental programs**

   In this part of the study, the proportion of subjects in each group who changed their smoking behavior was calculated. A change of smoking behavior was defined as either quitting or modification. Their definitions are operationally outlined below:

   **Quitting**

   The subject's assertion that he had in fact quit prior to the interviewer's call and during the critical six-week period, between smoking counseling (or orientation in the absence of smoking counseling) and the telephone interview, or the corresponding six-week period for those subjects giving retrospective data.

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25 The interview Questionnaire is presented in Appendix C.
Modification

The subject's assertion that he had modified his smoking behavior prior to the interviewer's call and during the critical six-week period, in any or all of the following ways:

(a) changing to a lower tar-nicotine brand;
(b) reducing the number of cigarettes smoked daily;
(c) reducing the degree of inhalation;
(d) smoking less of each cigarette; and/or
(e) quitting.

The z statistic,\textsuperscript{26} testing for significant differences between proportions of subjects successful in each group, was used for data analysis.

2. The Study of behavioral correlates

In this part of the study, quitters and non-quitters in the Smoking Counseling Group were compared on a number of behavioral variables. For each of the behavioral variables, the difference between the means of quitters and non-quitters was compared and statistically analyzed by a t test.

Profile differences on the National Smokers Test between quitters and non-quitters were evaluated by a

\textsuperscript{26}The computation of the z statistic is presented in Appendix D.
factorial analysis of variance design. A "mixed" design was used to account for both between subject and within subject (repeated measure) sources of variation.
CHAPTER IV

RESULTS

In this chapter the hypotheses are restated and followed by the relevant findings.

Hypothesis 1

The first general hypothesis stated that the Coronary Prevention Program would bring about changes in smoking behavior. Table 1 and Figure 1 present change data for each study group during the six-week follow-up period.

Table 1

<table>
<thead>
<tr>
<th>Change</th>
<th>SCG (N=32)</th>
<th>RRG (N=32)</th>
<th>Controls (N=64)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f  p</td>
<td>f  p</td>
<td>f  p</td>
</tr>
<tr>
<td>Cessation</td>
<td>10 .31</td>
<td>2 .06</td>
<td>2 .03</td>
</tr>
<tr>
<td>Modification</td>
<td>28 .88</td>
<td>11 .34</td>
<td>10 .16</td>
</tr>
</tbody>
</table>

Hypothesis 1.a. stated that the Smoking Counseling Group (SCG) would show the highest proportion of success
Figure 1. Change of Smoking Behavior by Study Groups
of all groups in changing their smoking behavior. This hypothesis was tested by comparing the proportion of success in the Smoking Counseling Group to that of the other two groups combined. Table 2 shows that the proportion of smokers who stopped smoking was .31 in the Smoking Counseling Group and .04 in the other groups combined. The associated z statistic of 4.29 was significant beyond the .01 level. The proportion of smokers who modified their smoking behavior was .88 in the Smoking Counseling Group and .22 in the other groups combined. This difference was also significant beyond the .01 level.

Table 2

<table>
<thead>
<tr>
<th>Change</th>
<th>SCG (N=32)</th>
<th>Other Groups (N=96)</th>
<th>S.E.</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>p</td>
<td>f</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Cessation</td>
<td>10 .31</td>
<td>4 .04</td>
<td>.063</td>
<td>4.29</td>
<td>.01</td>
</tr>
<tr>
<td>Modification</td>
<td>28 .88</td>
<td>21 .22</td>
<td>.098</td>
<td>6.71</td>
<td>.01</td>
</tr>
</tbody>
</table>

Hypothesis 1.b. stated that the Risk Reduction Group (RRG) would show a higher proportion of success in changing smoking behavior than the control group. Table 3 shows that the proportion of smokers who stopped smoking was .06 in the Risk Reduction Group and .03 in the Control Group.
This difference in proportion was not statistically significant. The proportion of smokers who modified their smoking behavior was .34 in the Risk Reduction Group and .16 in the Control Group. The associated z statistic of 2.11 was significant beyond the .05 level.

Table 3

<table>
<thead>
<tr>
<th>Change</th>
<th>RRG (N=32)</th>
<th>Controls (N=64)</th>
<th>S.E.</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cessation</td>
<td>2 .06</td>
<td>2 .03</td>
<td>.042</td>
<td>.74</td>
<td>N.S.</td>
</tr>
<tr>
<td>Modification</td>
<td>11 .34</td>
<td>8 .16</td>
<td>.088</td>
<td>2.11</td>
<td>.05</td>
</tr>
</tbody>
</table>

After the above hypotheses were tested, it was decided that an additional comparison between the Smoking Counseling Group and the Risk Reduction Group would prove useful. Table 4 shows that the Smoking Counseling Group and the Risk Reduction Group were significantly different in both smoking cessation and smoking modification.

Because the N x p values of the two statistics might be questionable here, as a check on its validity the Fisher Exact Probability Test was applied to these data. A p value of < .50 was associated with this difference in cessation, and p value of < .035 was associated with this difference in modification.
Table 4
Difference Between the Smoking Counseling Group and the Risk Reduction Group in Proportion of Smoking Cessation and Modification

<table>
<thead>
<tr>
<th>Change</th>
<th>SCG  (N=32)</th>
<th>RRG  (N=32)</th>
<th>S.E.</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>p</td>
<td>f</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Cessation</td>
<td>10</td>
<td>.31</td>
<td>2</td>
<td>.06</td>
<td>.096</td>
</tr>
<tr>
<td>Modification</td>
<td>28</td>
<td>.88</td>
<td>11</td>
<td>.34</td>
<td>.121</td>
</tr>
</tbody>
</table>

Hypothesis 2
This general hypothesis stated that demographic characteristics are predictors of cessation. This hypothesis was not supported.

Hypothesis 2.a. stated that there would be a positive relationship between age and cessation. Table 5 shows that the mean age of quitters is 48.3 years, and that of non-quitters is 49.0 years. These mean ages were not significantly different.

Hypothesis 2.b. stated that there would be a positive relationship between education and cessation. Results are shown in Table 5. The t of 0.37 was not statistically significant.

Hypothesis 3
This hypothesis predicted that personality measures are predictors of cessation. Hypothesis 3.a. stated that
Table 5

Demographic Differences Between Quitters and Non-quitters

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>48.3</td>
<td>4.08</td>
<td>0.38</td>
<td>N.S.</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>49.0</td>
<td>5.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>11.9</td>
<td>1.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>12.2</td>
<td>2.54</td>
<td>0.37</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

There would be a positive relationship between need for approval and cessation. Table 6 shows that quitters have

Table 6

Difference on Behavior Measures Between Quitters and Non-quitters

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for Approval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>21.0</td>
<td>7.98</td>
<td>2.00</td>
<td>&lt;.10</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>21</td>
<td>15.9</td>
<td>6.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-E Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>4.5</td>
<td>1.96</td>
<td>2.29</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>6.9</td>
<td>3.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>104.6</td>
<td>9.72</td>
<td>1.05</td>
<td>N.S.</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>18</td>
<td>109.9</td>
<td>16.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aSeparate rather than pooled estimates of variance were employed in computing the t ratio.
higher need for approval than non-quitters. A $t$ of 2.00, however, does not reach statistical significance. Therefore, there was no support for this hypothesis.

Hypothesis 3.b. stated that there would be a positive relationship between internal control and cessation. Table 6 shows that quitters are more internal than non-quitters.\(^2\) A $t$ of 2.29 has a $p < .05$. This hypothesis was supported.

Hypothesis 3.c. predicted that there would be a negative relationship between conflict and cessation. This hypothesis was not supported. Results are shown in Table 6.

**Hypothesis 4**

This general hypothesis predicted that smoking history variables are predictors of cessation.

Hypothesis 4.a. predicted that the age at which a person starts smoking and cessation would be positively related. This hypothesis was not supported.

Hypothesis 4.b. stated that there would be a negative relationship between the number of cigarettes smoked daily and cessation. The mean cigarette consumption of the two groups were not significantly different. Results are shown in Table 7.

\(^2\)The higher the I-E scale score, the greater is the externality.
Table 7

Smoking History Differences Between Quitters and Non-quitters

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Began Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>16.6</td>
<td>2.46</td>
<td>0.69</td>
<td>N.S.</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>17.6</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Cigarette Consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quitters</td>
<td>10</td>
<td>26.3</td>
<td>12.35</td>
<td>0.75</td>
<td>N.S.</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>29.7</td>
<td>11.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis 5,

This general hypothesis predicted that Horn Smoking Model (National Smokers Test) variables are predictors of cessation. Hypothesis 5.a. stated that there would be a difference in the "reasons for quitting" profile between quitters and non-quitters. The associated F ratio between groups of quitters and non-quitters is not significant; the F ratio for interaction between the profiles and the groups is also not significant. Therefore, hypothesis 5.a. was not supported. Results are shown in Table 8 and Figure 2.

Hypothesis 5.b. stated that there would be a difference in the "knowledge and attitudes" profile between quitters and non-quitters. The F statistic between groups of quitters and non-quitters is not significant; interaction is also not significant. This hypothesis is not supported. Results are shown in Table 9 and Figure 3.
Table 8
Summary of the Analysis of Variance
Comparing Quitters and Non-quitters on
"reasons for quitting" Profile of the National Smokers Test

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>322.16</td>
<td>30</td>
<td></td>
<td>3.93</td>
<td>&lt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>283.76</td>
<td>29</td>
<td>9.78</td>
<td>38.40</td>
<td>3.93</td>
</tr>
<tr>
<td>Within Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile</td>
<td>342.57</td>
<td>93</td>
<td></td>
<td>16.67</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Interaction</td>
<td>122.99</td>
<td>3</td>
<td>41.00</td>
<td>122.99</td>
<td>16.67</td>
</tr>
<tr>
<td>Error</td>
<td>214.05</td>
<td>87</td>
<td>2.46</td>
<td>214.05</td>
<td>16.67</td>
</tr>
</tbody>
</table>

Hypothesis 5.c. stated that there would be a difference in the "psychological utility" profile between quitters and non-quitters. The F ratio between groups of quitters

Table 9
Summary of the Analysis of Variance
Comparing Quitters and Non-quitters on
"knowledge and attitude" Profile of the National Smoker Test

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups</td>
<td>126.60</td>
<td>31</td>
<td></td>
<td>.39</td>
<td>N.S.</td>
</tr>
<tr>
<td>Error</td>
<td>124.98</td>
<td>30</td>
<td>4.16</td>
<td>1.62</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile</td>
<td>625.40</td>
<td>96</td>
<td></td>
<td>13.85</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Interaction</td>
<td>191.90</td>
<td>3</td>
<td>63.97</td>
<td>191.90</td>
<td>13.85</td>
</tr>
<tr>
<td>Error</td>
<td>415.93</td>
<td>90</td>
<td>4.62</td>
<td>415.93</td>
<td>13.85</td>
</tr>
</tbody>
</table>
Figure 2. "Reasons for quitting" Profile for Quitters and Non-quitters
Figure 3. "Knowledge and attitudes" Profile for Quitters and Non-quitters
and non-quitters is significant. Interaction of groups and profile is not significant. This hypothesis is supported. Results are shown in Table 10 and Figure 4.

Table 10

Summary of the Analysis of Variance
Comparing Quitters and Non-quitters on "psychological utility" Profile of the National Smokers Test

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
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<tbody>
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<td>Between Subjects</td>
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<td>115.83</td>
<td>12.77</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Groups</td>
<td>115.83</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>272.07</td>
<td>30</td>
<td>9.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Subjects</td>
<td>1987.92</td>
<td>115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile</td>
<td>1091.13</td>
<td>5</td>
<td>218.23</td>
<td>36.86</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Interaction</td>
<td>8.32</td>
<td>5</td>
<td>1.66</td>
<td>.28</td>
<td>N.S.</td>
</tr>
<tr>
<td>Error</td>
<td>888.47</td>
<td>105</td>
<td>5.92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11

Summary of the Analysis of Variance
Comparing Quitters and Non-quitters on "support" Profile of the National Smokers Test

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td>24.40</td>
<td>28</td>
<td>.82</td>
<td>.94</td>
<td>N.S.</td>
</tr>
<tr>
<td>Groups</td>
<td>.82</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
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<td>27</td>
<td>.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Subjects</td>
<td>129.05</td>
<td>87</td>
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<tr>
<td>Profile</td>
<td>69.59</td>
<td>3</td>
<td>23.19</td>
<td>32.21</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Interaction</td>
<td>1.06</td>
<td>3</td>
<td>.35</td>
<td>.49</td>
<td>N.S.</td>
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Reasons for Smoking

Quitters

Non-quitters

Figure 4. "Psychological utility"
Profile for Quitters and Non-quitters
Hypothesis 5.d. stated that there would be a difference in the "support" profile between quitters and non-quitters. The $F$ ratio between groups of quitters and non-quitters is not significant, and the interaction is also not significant. This hypothesis is not supported. Results are shown in Table 11 and Figure 5.
Figure 5. The "support" Profile for Quitters and Non-quitters
CHAPTER V

DISCUSSION

In this chapter the results of the Smoking Counseling Program will be discussed relative to the two experimental groups and the control group. The strengths and the shortcomings of the Smoking Counseling Program will be pointed out, and projections will be made relative to additional treatment and follow-ups. Related literature will be discussed as it pertains to this study. Inferences from this study will be generalized to other smoking population where similar conditions might prevail. Variables predicting smoking cessation will be discussed. The final section of this chapter will discuss methodology and present conclusions and recommendations.

The Smoking Counseling Program

The treatment administered to the Risk Reduction Group was effective in terms of smoking modification, but was not effective in terms of smoking cessation. The Smoking Counseling Group when compared to the Risk Reduction Group was more effective for both smoking
modification and smoking cessation. In the Smoking Counsel-
sealing Group, twice as many smokers succeeded in modifying
their smoking behavior, and five times as many succeeded in
 quitting. When the Smoking Counseling Group was compared
to the Control Group five times more smokers modified and
ten times more smokers terminated their smoking behavior.

These results may be attributed to the differential
treatment received by the three groups. Subjects in the
control group were notified by mail of the results of their
medical examination and were referred to their private
physicians. Subjects in the Risk Reduction Group partici-
pated in the Coronary Prevention Program, and subjects in
the Smoking Counseling Group, in addition to the Coronary
Prevention Program, participated in the Smoking Counseling
Program.

It appears that participating in "relevant" risk-
reduction activities is enough to bring about a moderate
change in smoking behavior. However, the critical factor
in altering smoking behavior appears to be the Smoking
Counseling Program - the single variable differentiating
the two experimental groups.

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1 Each subject's physician was also sent the results
of the medical examination. Smoking was listed as one of
the subject's risks when daily consumption exceeded ten
cigarettes.
Comparing this study to other smoking studies is difficult because of differences in subject characteristics, smoking change criteria, denominators employed in calculating change, and follow-up intervals. Nevertheless, selected comparisons will be made wherever useful.

Mausner's subjects were non-volunteers, treated in a health setting, and seen only once. Adjusting to her criteria of modification (reduction of at least one-half pack of cigarettes smoked), 75 percent of the subjects in the Smoking Counseling Group in this study changed their smoking behavior six weeks after treatment. Mausner reported a 47 percent change seven days after treatment.

The following three studies are chosen for comparison because they are relatively well-designed and because they report their data in a meaningful way. Comparing the present study with Schwartz and Dubitzky's experiment and employing their criteria of modification (reduction of at least 85 percent of daily cigarette intake), the success rate of the Smoking Counseling Group is 40.6 percent. This modification rate is higher than the rates Schwartz and Dubitzky obtained for seven of their nine treatment groups.

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3Schwartz and Dubitzky, "One Year Follow-up Results," pp. 161-165.
Their Group Counseling with Placebo Group achieved a 47.2 percent modification rate and their Individual Counseling and Placebo Group achieved a 50 percent modification rate. Schwartz and Dubitzky's subjects attended eight weekly sessions.

Based on all subjects entering treatment, the Smoking Counseling Program was more effective than Guilford's program (23.5 percent) and all but one of Keutzer's six groups. Guilford's subjects attended five nightly sessions and Keutzer's subjects attended five sessions. The Smoking Counseling Program has apparently achieved its results with greater economy of time and manpower.

The cessation rate immediately following treatment reported in most of the smoking modification studies range from 5 percent to 100 percent with an average of about 30 percent. The average cessation rate at three months is about 25 percent. Setting questions of validity and comparability aside, it seems fair to conclude that the

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4 Guilford, pp. 95-102.
6 Horn, p. 4.
7 Graff, pp. 39-43.
present investigation has achieved results comparable to most of the smoking studies conducted to date.

Some Possible Critical Factors

The educational materials, film, pamphlets, and posters, were selected to communicate to the smoker the hazards of smoking, the need to quit, and the benefits of quitting. The use of this material may have increased the smoker's motivation to stop and raised his expectancy that his quitting was possible. During the telephone interview, several subjects expressed the view that the Coronary Prevention Program made a believer of them. Some pointed to the film, others to the listing of tar and nicotine content, and another to a good job of "brain washing".

At the beginning of the counseling program, the subjects were clearly advised to stop smoking. This might have given the subject a means of clear action, without having to work out a course of action for himself. Later in the smoking program, subjects were guardedly advised of various alternatives for modifying their cigarette smoking behavior. For subjects with deeply-rooted smoking patterns, these alternatives may have provided realistic avenues of

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8Average subjects in the Smoking Counseling Group smoked twenty-eight cigarettes a day and had smoked for thirty years.
approaching the problem. This is supported by the evidence that out of 28 smokers who altered smoking behavior in some way, 4 smokers switched to a pipe and 18 modified their smoking behavior (without quitting) in various ways as instructed.

Group size may be a factor of considerable importance. Of the four smokers in the Smoking Counseling Group who did not change their smoking behavior in any way, two were from a group comprised of only themselves. Group interaction, mood, and rhythm appeared, at the time, to be less than optimal. In reviewing each of the group sessions, it appears that groups having five or six members work well together. Within this group size, an atmosphere of group conformity that was directed toward smoking cessation was often observed. This group conformity or group spirit may have provided additional motivation value for the subjects in reaching their goal. The tendency for quitters in this study to be higher in need for approval supports this interpretation of group influence.

During the individual counseling period, the subject's personal problems were discussed and counseled in the group setting. This personal attention may have aided the subject in dealing with very specific personal difficulties that were relative to smoking.

At the close of the Smoking Counseling Program, the subject was informed that he would receive a telephone
inquiry six weeks later concerning his progress. This anticipated inquiry might have provided a constant pressure on the subject - the pressure of achieving an acceptable goal.

An assessment of the individual elements of the Smoking Counseling Program has not been undertaken. While each event in itself is a variable that may have differentially contributed to the final results, there is no way to partition the many separate effects. Consequently, the complete smoking program must be regarded as a single variable.

Similarly, the skill and background of the counselor is a variable capable of influencing the effectiveness of the program. Again, there is no way in the present study to estimate the importance of this variable.

Estimates of Attrition

This study employed a six weeks follow-up only. This short term follow-up may be justified on the following grounds. First, one of the aims of this study is to determine whether a single smoking treatment can bring about an effective change in smoking behavior. This change may

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9The counselor was a faculty member in the Department of Preventive Medicine, a clinical psychologist with experience in psychotherapy and familiarity with the epidemiology of smoking and the effects of smoking upon health.
be most sensitively observed over the short term. Put another way, all long-term gains are first short-term gains. Without first evaluating short-term results, long-term follow-up would be difficult to assess. The short-term study is useful for determining whether additional treatment should be offered and whether further follow-up should be conducted.

An estimate of the general smoking attrition trend from previous studies should prove useful in projecting the long term results of the Smoking Counseling Program. This estimate would also be of value in establishing an optimum time for providing subsequent follow-up treatments. The projected attrition trend\(^\text{10}\) for cessation is plotted in Figure 6 and the attrition trend for smoking modification is shown in Figure 7. The projected trend indicates that the cessation rate for the Smoking Counseling Group should be approximately 25 percent at three months, 20 percent at six months, 16 percent at nine months, and 12 percent at twelve months. Modification rates for the same periods should be 80 percent, 64 percent, 60 percent, and 56 percent.

\(^\text{10}\) An estimated, or projected, attrition trend was arrived at by first selecting several smoking modification studies that (1) used approximately the same number of subjects at follow-ups, and (2) had long term follow-up data available. Next, these studies were plotted on a graph and the average of their curves was used to plot the estimated attrition rate of the Smoking Counseling Group.
Figure 6. Projection of Attrition Rate for Smoking Counseling Group Subjects Using Previous Smoking Cessation Study Results
Figure 7. Projection of Attrition Rate for Smoking Counseling Group Subjects Using Previous Smoking Modification Study Results
Long term estimates as plotted for the Smoking Counseling Group may not be entirely in order. The subjects have been involved in the Coronary Prevention Program and have experienced positive rewards with respect to other risk-reduction efforts. Their periodic return to the Coronary Prevention Program for health counseling and quarterly personal progress reports gives them continual feedback and motivational nurturance. These factors may considerably attenuate the rate of attrition so as to make the projected attrition somewhat conservative.

Subsequent smoking counseling programs might be employed to reduce the estimated attrition rate. The optimal time for providing additional smoking counseling treatment appears to be between six weeks and three months after treatment. This estimate is based on previous trends showing that the attrition slope is steepest during this period. A second basis for this estimate involves the role of the six-week's telephone inquiry. If the inquiry did significantly contribute to the outcome, delaying feedback more than six weeks might destroy the established incentive.

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11 Based on data reported by the Coronary Prevention Program (1969) initial data of 279 high-risk subjects were recorded, and one year later 47 were followed up. Tests showed significant change in cholesterol, systolic blood pressure, diastolic blood pressure, and weight. Dietary analysis showed significant change in total fat, saturated fat, oleic acid, linoleic, carbohydrates, and p/s ratio.
The need for additional follow-up studies can be realized by again referring to Figures 6 and 7. It is noted that the attrition trends drops successively at three months, six months, and one year after the initial treatment. It may therefore be reasonable to assume a need for evaluation of the program at these times.

Maintaining the original groups for an additional smoking modification treatment may be ideal for creating an atmosphere of comradeship, but due to scheduling difficulties, more practical alternatives may be considered. One alternative would be for the staff members in the Coronary Prevention Program to assume the responsibility of reinforcing smoking counseling whenever possible. Another alternative would be the assignment of a trained smoking counselor to offer individual counseling in conjunction with a regularly scheduled visit. This smoking counselor could be selected from the existing staff in the Coronary Prevention Program. An optimal alternative would be to have each staff member in the Coronary Prevention Program give smoking counseling to groups of subjects during their periodic visits, and, in addition, to have a smoking counselor see the subjects at a selected time in conjunction with existing activities.
Other Applications of the Smoking Counseling Program

Since the program described here was developed in a "health setting", it is recommended that others who apply this program consider this factor seriously. Similar conditions may be obtained in physician's offices, hospitals, public or voluntary health agencies, Y.M.C.A.'s health clubs, and other places where persons may gather to improve their general health. The program may be most fruitful when directed toward adult male smokers having health problems such as high blood pressure, elevated cholesterol, weight problems, bronchitis, and other precursors of coronary disease.

The program is easily adaptable to the situation of a private physician who may wish to conduct such counseling sessions in his own office for a single hour or so with groups of approximately five or six patients. Offering this counseling on a complimentary basis, might favorably influence patient motivation to quit and even, perhaps, improve public relations.

Factors that should be considered in the selection of the counselor are: knowledge of the relationship between cigarette smoking and health, counseling experience, awareness of the principles involved in smoking modification, and preferably, past smoking experience. Consideration of a counselor with a professional background in medicine, the behavioral sciences, or health education is also suggested.
Perhaps the most significant aspect in this smoking program for both the smoker and the counselor is the single treatment. For the counselor, there may be a critical time and manpower advantage; here also may be a reasonable alternative for smokers who would normally reject a program that required frequent attendance.

**Behavioral Correlates of Cessation**

The association of "internality" and cessation confirmed the findings of James\(^1\) and of Platt.\(^2\) For the internal, the person who believes he is responsible for his own success or failure, the program might have provided him with both the motivation and avenues of approach that could lead to success in giving up smoking. The external person, under the same conditions, was not able to utilize the situation to his advantage. Perhaps a more elaborate and lengthy program would offer the external smoker more of an external basis for changing his smoking behavior. On the other hand, selecting only internals for a smoking counseling program might yield maximum success.

The "psychological utility" profile clearly indicates that smokers who quit scored lower as group on each of

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\(^1\)James, pp. 184-186.

\(^2\)Platt, pp. 155-170.
the items listed on the profile. This implies that the quitters were less psychologically dependent\textsuperscript{14} on smoking. When their motivation to stop was sufficiently increased by the Smoking Counseling Program, cessation resulted.

The difference between the quitters' profile and that of the non-quitters is quantitative; that is, for each factor, the non-quitters as a group scored an average of two points higher. One may infer that the importance of any factor should be determined by how much the non-quitters' score deviates from the quitters base-line score regarding the same factor. This finding does not support Horn's instructions that the significance of the factor is determined by whether or not the subject receives a scale score of eleven or higher.

For instance, a score of six points in reference to the "handling" factor on the scale would not be considered critical by Horn's interpretation. However, this is a significant score if one considers that this score significantly differentiated the non-quitters from the quitters in this study.

\textsuperscript{14}A high psychological dependence on smoking would be indicated by a score which was an average of two or more points above the quitters' profile for each of the factors on the "psychological utility" profile.
The difference between the mean "need for approval" score for quitters and non-quitters was very close to the .05 level of significance. Quitters tend to have a higher need for approval. As pointed out by Crowne and Marlowe, a person higher in need for approval is more conforming and more easily influenced. Perhaps the counselor's influence and the group atmosphere that is congenial to smoking cessation had cued the smoker who is higher in need for approval to stop smoking. Further research employing a larger sample in investigating this problem may result in a clearer understanding of the role of this personality variable in smoking cessation.

Quitters scored less on each of the factors of the "reasons for quitting" profile than non-quitters, although this difference did not reach statistical significance, p<.10. It appears that those who are more inclined toward cigarette smoking are more likely to stop smoking when they are motivated. This finding does not confirm that of Keutzer. Keutzer's study, however, used volunteers, while this study used non-volunteers. This may be the factor which accounts

15 Marlow and Crowne, p. 233.
for the conflicting outcomes. This explanation is consist-
ing with the work of McKennell, in which consonant
smokers (non-volunteers) who were lower in addiction to
cigarettes were found more likely to be quitters.

No age differences were observed between quitters and
non-quitters. This failure to find age differences as
were found in other smoking surveys may be explained
by the fact that subjects in this study were in the age
group, 40 to 59 years, while subjects in the prior studies
were in the age group of 17 to 60 years.

No difference in mean educational level was found
between the quitters and the non-quitters. This result
was not consistent with previous research, in which
quitters were found to have higher educational level than
non-quitters. This may be due to a restricted educational
range. Few subjects in this study had an education below
the tenth grade or beyond three years of college; earlier
studies reported a far broader range.

\[\text{17} \text{McKennell, pp. 140-164.}\]
\[\text{18} \text{Haenszel et al., pp. 1-85.}\]
\[\text{19} \text{Straits, pp. 73-78.}\]
\[\text{20} \text{Philadelphia Smoking and Health Demonstration}
\text{Project, p. 7.}\]
\[\text{21} \text{Lawton, "Psychological Process."}\]
Other Methodological Consideration

Subjects in the study were well matched making it possible to support the fact that the smoking behavior changes were basically attributable to the Smoking Counseling Program. Also, all subjects experienced identical pre-treatment procedures and all were contacted at the time of the six-week follow-up. Most smoking modification studies did not employ controls and did not or could not follow-up on all subjects entering the study.

Subjects in this study were not obtained by the usual volunteer method. They were, in fact, unaware that a smoking program would partly constitute the orientation evening schedule. Considering that volunteer smokers turning out for the smoking modification program are actually a "selected" type of smoker, possibly in the minority, employing non-volunteers appears to have broadened the implications of this study.

After the initial follow-up was conducted, two practices contributed positively to the study methodology. The telephone interviewer was "blind" about the nature and mechanics of the study, and, therefore, provided unbiased interviewing. Both the counselor and this investigator, the participant-observer, were unaware of the results of previous counseling sessions so as not to bias or contaminate later counseling sessions.
Two shortcomings of the study should be pointed out. One-half of the control group subjects and all subjects in the Risk Reduction Group gave a retrospective account of their smoking behavior for lapsed periods of time ranging from eight weeks to fifty weeks, with an average of twenty weeks. This was entirely a function of designing a study within an ongoing, larger study. Secondly, smoking modification was measured grossly as described earlier. This lack of precision in measuring modification is a relative weakness of the study that might be minimized in a face-to-face interview.

Conclusions

The conclusions reached as a result of this study are:

1. The general health atmosphere that was created in the Coronary Prevention Program was effective for modifying smoking behavior, but not for terminating smoking behavior.

2. The Smoking Counseling Program administered in the framework of the Coronary Prevention Program was effective in bringing about both smoking cessation and smoking modification. Its effectiveness is at least comparable to most of the smoking modification programs developed here and abroad. With respect to economy of time and manpower, and adaptability to other settings, this program appears to offer certain advantages.
3. The long-term attrition rate should be low in the Smoking Counseling Group. The influence of successful experiences in the Coronary Prevention Program and continual feedback in that program suggest this conclusion.

4. The Rotter I-E scale and the "psychological utility" profile of the National Smokers Test are useful predictors of smoking cessation. The smoker who can benefit most by the Smoking Counseling Program may be the one who is internal and low in psychological dependence on cigarettes.

5. Age, education, need for approval, adjustment, age started smoking, number of cigarettes smoked daily, and "reasons for quitting", "knowledge and attitudes", and "support" profiles are not predictors of smoking cessation.

Recommendations

As a result of the findings of this study and their interpretation, the following recommendations are offered.

1. The Smoking Counseling Program should be adapted for use in situations where a general health atmosphere prevails. Examples of these health settings are physician's offices, hospitals, public or voluntary health agencies, and health clubs. This program may be most fruitful when directed by a physician, a
behavioral scientist, or a health educator among adult male smokers with health problems such as high blood pressure, elevated cholesterol, overweight, bronchitis, and other precursors of coronary disease.

2. Further investigation should be undertaken to determine the effectiveness of additional treatments during the six weeks and three months interval following the initial treatment. The optimal approach would be to have each staff member in the Coronary Prevention Program give smoking counseling to the subjects during their periodic visits, and, in addition, have a smoking counselor see the subjects at a selected time in conjunction with existing activities.

3. In order to evaluate the long-term effects of the program, follow-up studies should be completed on these same subjects at time intervals preferably three months, six months, and one year.

4. Smoking counseling programs should be conducted in a small group situation. Groups having five or six members may work the best together. Within this group size, an atmosphere of group conformity that is directed toward smoking cessation may be expected.

5. The I-E scale and the "psychological utility" profile may serve as the basis for selecting subjects to participate in a smoking counseling program. Subjects
scoring low in both the I-E scale and the "psychological utility" profile might yield maximum success in the program.

6. Additional studies relative to the "need for approval" and "reasons for quitting" profile as predictors of smoking cessation should be undertaken. A larger sample size than that used in this study would be necessary.
The purpose of this study was to determine the effectiveness of a single-treatment, smoking-counseling program in an on-going coronary heart disease risk-reduction program, and to investigate possible predictors of smoking cessation.

Five general hypotheses were tested. Hypothesis 1 was concerned with the effectiveness of a single-treatment, smoking-counseling program within the framework of the Coronary Prevention Program. Hypothesis 2 predicted that the quitters would be older and better educated. Hypothesis 3 predicted that the quitters would be higher in need for approval, internal, and better adjusted. Hypothesis 4 predicted that the quitters smoked more cigarettes daily and started smoking at an older age. The fifth hypothesis predicted quitting on the basis of results of the National Smokers Test profiles.

The study involved 128 male subjects, age 40 to 59, with elevated blood pressure and elevated serum cholesterol. Subjects were randomly assigned to a Smoking
Counseling Group, a Risk Reduction Group, and a Control Group. In addition to other risk-reduction activities, subjects in the Smoking Counseling Group took part in a smoking-counseling program. Subjects in the Risk Reduction Group took part in the series of risk-reduction activities without the smoking program. Subjects in the control group were advised of their risk status and were referred to their family physicians.

Demographic information, smoking behavior data, and behavioral characteristics were obtained from all subjects prior to their entrance into the study. Data relative to smoking behavior change was collected at the end of a six-week period for each subject by a trained telephone interviewer.

Results indicated that the general health atmosphere and activities of the Coronary Prevention Program was effective in modifying smoking behavior, but not smoking cessation. The Smoking Counseling Program developed within the framework of the Coronary Prevention Program was effective in bringing about both smoking modification and smoking cessation. Thirty-one percent of the subjects stopped smoking while 88 percent of the subjects modified their smoking behavior. The effectiveness of the Smoking Counseling Program is comparable to most of the smoking modification programs developed in this nation and abroad. In terms
of economy of time and manpower, and in the scope of its implications, this program appears to be promising.

The Internal-External personality variables as measured by the Rotter I-E scale and psychological dependency on cigarettes as measured by the National Smokers Test are useful predictors of smoking cessation. The smoker who is mostly likely to profit from the smoking counseling program is the "internal", and the smoker who is low in psychological dependency on cigarettes.

Age, education, need for approval, adjustment, age smoking began, number of cigarettes smoked daily, and the "reasons for quitting", "knowledge and attitudes", and "support" profiles of the National Smokers Test failed to be related to smoking cessation.

It is recommended that the smoking counseling program be adapted to health settings such as physician's offices, hospitals, public or voluntary health agencies, and health clubs. Adult male smokers having coronary disease or cancer precursors should be counseled in small groups. It is also recommended that the effects of additional treatments be assessed, as well as attrition rates over various time intervals.
APPENDIX A

SMOKER'S BACKGROUND INFORMATION
# Smoker's Background Information

## General Information

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## Smoking Information

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Reasons failed last time:

If have never tried, why not?

## The National Smokers Test

### Why Smoking?

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### Why Want to Quit?

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### OTHER:

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APPENDIX B

EDUCATIONAL MATERIALS
EDUCATIONAL MATERIALS

A. Publication

1. Core Materials
   a. **100,000 Doctors Have Quit Smoking Cigarettes:** A six-page folder, published by the American Cancer Society.
   b. **It's Not Too Late to Stop Smoking Cigarettes:** A twenty-page pamphlet, published by the Public Affairs Pamphlet, #386.
   c. **Cigarettes and Health:** A twenty-page pamphlet, published by Public Affairs Pamphlet, #220A.
   d. **Answering the Most-Often-Asked-Questions About Cigarette Smoking and Lung Cancer:** A ten-page pamphlet, published by the American Cancer Society.

2. Optional Materials
   a. **To the Cigarette Makers: Just the Fact, Please:** An eight-page pamphlet reprinted from the November, 1966, issue of the Reader's Digest and distributed by the American Cancer Society.
   b. **Tar and Nicotine Content of Cigarettes:** A one-page bulletin distributed by the U. S. Public Health Service.
c. **The Effects of Smoking**: A fifteen-page pamphlet reprinted from the July, 1962, issue of *Scientific American* and distributed by the American Cancer Society.

d. **Cigarette Smoking and Cardiovascular Disease**: A four-page bulletin published by the American Heart Association.

e. **Summaries and Conclusions: Smoking and Health**. Report of the Advisory Committee to the Surgeon General of the Public Health Service: A forty-page pamphlet reprinted by the American Cancer Society.

B. Posters

1. "100,000 Doctors Have Quit Smoking Cigarettes": A 9" x 12" poster printed by the U. S. Public Health Service.

2. "Like Father Like Son: Both Risk Death From Heart Disease, Cancer, Emphysema": An 11" x 14" poster printed by the American Heart Association.

3. "They Quit Smoking - Why Don't You?": An 11" x 14" poster printed by the American Heart Association.
Name: __________________________ ID No.: _______________________

Six-week period: __________________________ Phone Number: _______________________

I am calling from the Coronary Prevention Program OR (The Department of Health Education) at the Ohio State University. I would like to ask you some questions about your cigarette smoking habit. The entire conversation will last about two or three minutes. Would you mind answering a few questions for me?

1. When was the last time you went to see your dentist?

2. How often do you go to see your dentist?

3. Do you believe that cigarette smoking can effect a person's dental health?

4. Do you smoke cigarettes now?

   NO
   If you have ever smoked when did you quit?

   YES
   Have you changed your smoking habit in any way over the past period? For example have you changed the brand you smoke, the number of cigarettes you smoke daily, the depth you inhale, the length you smoke each cigarette, or have you quit and resumed smoking in that period of time?

   No
   Critical period: _______________________

   Did you change your smoking habit in any way before you quit?

   No
   Yes

   END

   (See next page for kinds of changes.)

   Answered date: _______________________

   Critical period: _______________________

   QUIT & RESUMED-

   When did you quit?

   Why?

   When and why did you start again?

   END
CHANGES IN SMOKING HABITS:

<table>
<thead>
<tr>
<th>Did you change the brand of cigarettes smoked?</th>
<th>Did you change the number of cigarettes smoked daily?</th>
<th>Did you change the depth of inhalation?</th>
<th>Did you change the length used on each cigarette?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>What cigarettes did you change to?</td>
<td>How did you change it?</td>
<td>How did you change it?</td>
<td>How did you change it?</td>
</tr>
<tr>
<td>Before: _________</td>
<td>Before: _________</td>
<td>Before: _________</td>
<td>Before: _________</td>
</tr>
<tr>
<td>Now: _________</td>
<td>Now: _________</td>
<td>Now: _________</td>
<td>Now: _________</td>
</tr>
</tbody>
</table>

Possibilities:
1. Do not inhale
2. Inhale only occasionally
3. As far back as the throat
4. Only partly into the lungs
5. Deeply into the lungs

This box checked if the man stated any of his habits were changed for a health reason.

Box checked if I had to ask if they made any of the above changes because of any health reason.

NOTES: ____________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
APPENDIX D

THE COMPUTATION OF $z$ STATISTICS
THE COMPUTATION OF $z$ STATISTICS

**Formula**

$$ z = \frac{P_1 - P_2}{\sqrt{\frac{P_1 q_0}{n_1} + \frac{P_2 q_0}{n_2}}} $$

$z$ = The significance of the proportion of success between two groups.
$P_1$ = Proportion of success in group one.
$P_2$ = Proportion of success in group two.
$p_o$ = Pooled estimate of population proportion of quitters.
$q_o$ = Pooled estimate of population proportion of non-quitters.
$n_1$ = Number of subjects in group one.
$n_2$ = Number of subjects in group two.

**Hypothesis 1.a.:** $P_{scnt} > P_{(RRC + CONTROLS)}$

<table>
<thead>
<tr>
<th>Cessation</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$ = 0.31</td>
<td>$P_1$ = 0.88</td>
</tr>
<tr>
<td>$P_2$ = 0.04</td>
<td>$P_2$ = 0.22</td>
</tr>
<tr>
<td>$p_o$ = 0.11</td>
<td>$p_o$ = 0.38</td>
</tr>
<tr>
<td>$q_o$ = 0.90</td>
<td>$q_o$ = 0.62</td>
</tr>
<tr>
<td>$n_1$ = 32</td>
<td>$n_1$ = 32</td>
</tr>
<tr>
<td>$n_2$ = 96</td>
<td>$n_2$ = 96</td>
</tr>
</tbody>
</table>

$$ z = \frac{0.31 - 0.04}{\sqrt{\frac{0.097}{32} + \frac{0.097}{96}}} = \frac{0.27}{0.063} = 4.2857 $$

$$ z = \frac{0.88 - 0.22}{\sqrt{\frac{0.236}{32} + \frac{0.236}{96}}} = \frac{0.66}{0.098} = 6.7073 $$
Hypothesis 1.b. \( P_{RRG} > P_{controls} \)

### Cessation

<table>
<thead>
<tr>
<th>( P_i )</th>
<th>( P_e )</th>
<th>( P_s )</th>
<th>( q_s )</th>
<th>( n_s )</th>
<th>( n_r )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06</td>
<td>0.03</td>
<td>0.04</td>
<td>0.96</td>
<td>32</td>
<td>64</td>
</tr>
</tbody>
</table>

\[
z = \frac{0.06 - 0.03}{\sqrt{\frac{0.0398}{32} + \frac{0.0398}{64}}} = \frac{0.0313}{0.424} = 0.7382
\]

### Modification

<table>
<thead>
<tr>
<th>( P_i )</th>
<th>( P_e )</th>
<th>( P_s )</th>
<th>( q_s )</th>
<th>( n_s )</th>
<th>( n_r )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.34</td>
<td>0.16</td>
<td>0.22</td>
<td>0.78</td>
<td>32</td>
<td>64</td>
</tr>
</tbody>
</table>

\[
z = \frac{0.34 - 0.16}{\sqrt{\frac{0.171}{32} + \frac{0.171}{64}}} = \frac{0.1875}{0.0888} = 2.112
\]

### Additional Testing: \( P_{scg} > P_{RRG} \)

### Cessation

<table>
<thead>
<tr>
<th>( P_i )</th>
<th>( P_e )</th>
<th>( P_s )</th>
<th>( q_s )</th>
<th>( n_s )</th>
<th>( n_r )</th>
</tr>
</thead>
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<td>0.31</td>
<td>0.06</td>
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<td>0.81</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

\[
z = \frac{0.31 - 0.06}{\sqrt{\frac{0.15 \times 2}{32}}} = \frac{0.25}{0.096} = 2.59
\]

### Modification

<table>
<thead>
<tr>
<th>( P_i )</th>
<th>( P_e )</th>
<th>( P_s )</th>
<th>( q_s )</th>
<th>( n_s )</th>
<th>( n_r )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.88</td>
<td>0.34</td>
<td>0.61</td>
<td>0.39</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

\[
z = \frac{0.88 - 0.34}{\sqrt{\frac{0.24 \times 2}{32}}} = \frac{0.54}{0.12} = 4.5
\]
APPENDIX E

PARADIGM OF RESEARCH DESIGN
HIGH RISK SMOKERS IN THE CPP

N = 32
RISK REDUCTION GROUP

ORIENTATION

DIET COUNSELING

EXERCISE BRIEFING

N = 32
SMOKING COUNSELING GROUP

ORIENTATION + SMOKING COUNSELING

DIET COUNSELING

EXERCISE BRIEFING

N = 64
CONTROL GROUP

SIX-WEEK FOLLOW-UP
APPENDIX F

MEANS OF SUB-TESTS FOR QUITTERS AND NON-QUITTERS ON THE NATIONAL SMOKERS TEST
Means of Sub-tests
For Quitters and Non-quitters on "Reasons for quitting" Profile on the National Smokers Test

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Health</th>
<th>Example</th>
<th>Aesthetics</th>
<th>Mastery</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quitters</td>
<td>10</td>
<td>9.00</td>
<td>7.22</td>
<td>9.78</td>
<td>9.78</td>
<td>8.94</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>10.95</td>
<td>8.45</td>
<td>10.45</td>
<td>10.82</td>
<td>10.17</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>10.39</td>
<td>8.10</td>
<td>10.26</td>
<td>10.52</td>
<td>9.81</td>
</tr>
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</table>
Means of Sub-tests
For Quitters and Non-quitters on
"knowledge and attitudes" Profile on the National Smokers Test

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Importance</th>
<th>Relevant</th>
<th>Value</th>
<th>Capability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quitters</td>
<td>10</td>
<td>7.30</td>
<td>6.10</td>
<td>8.00</td>
<td>7.90</td>
<td>7.32</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>7.82</td>
<td>5.23</td>
<td>8.00</td>
<td>9.23</td>
<td>7.57</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>7.66</td>
<td>5.50</td>
<td>8.00</td>
<td>8.81</td>
<td>7.49</td>
</tr>
</tbody>
</table>
Means of Sub-tests
For Quitters and Non-quitters on "psychological utility" Profile on the National Smokers Test

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Stimulation</th>
<th>Handle</th>
<th>Pleasure</th>
<th>Crutch</th>
<th>Addict</th>
<th>Habit</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Quitters</td>
<td>10</td>
<td>5.00</td>
<td>4.00</td>
<td>10.60</td>
<td>8.40</td>
<td>7.80</td>
<td>5.10</td>
<td>6.82</td>
</tr>
<tr>
<td>Non-quitters</td>
<td>22</td>
<td>5.77</td>
<td>5.91</td>
<td>12.14</td>
<td>10.27</td>
<td>10.00</td>
<td>6.86</td>
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<tr>
<td>Total</td>
<td>32</td>
<td>5.53</td>
<td>5.31</td>
<td>11.66</td>
<td>9.49</td>
<td>9.31</td>
<td>6.31</td>
<td>7.79</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Doctor</td>
<td>Climate</td>
<td>Advertisement</td>
<td>Significant Others</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----</td>
<td>--------</td>
<td>---------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-------</td>
<td></td>
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<tr>
<td>Quitters</td>
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<td>3.33</td>
<td>4.19</td>
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<td></td>
</tr>
<tr>
<td>Non-quitters</td>
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<td>4.05</td>
<td>5.30</td>
<td>3.05</td>
<td>4.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>3.79</td>
<td>4.07</td>
<td>5.28</td>
<td>3.14</td>
<td>4.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX G

SELECTED POSTERS
100,000 doctors have quit smoking cigarettes.

(Maybe they know something you don't.)
THEY QUIT SMOKING

WHY DON'T YOU?

MOST DOCTORS WHO USED TO SMOKE HAVE STOPPED
BIBLIOGRAPHY


Epstein, Frederick H. "The Epidemiology of Coronary Heart Disease," Journal of Chronic Disease, XVII (August, 1965), 735-774.


