CIGARETTE SMOKING BEHAVIOR AMONG AFRICAN AMERICAN WOMEN
AND THE FEASIBILITY OF A LOW INTENSITY
SMOKING CESATION INTERVENTION

DISSERATION

Presented in Partial Fulfillment of the Requirements
for the Degree Doctor of Philosophy

by

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* * * * *

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1992

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To Andy, Tonja, and Jeremy
for their continuous encouragement and love.
ACKNOWLEDGEMENTS

I wish to express utmost appreciation to my adviser and mentor, Dr. Mary Ellen Wevers, for her wisdom over the years. I also extend gratitude for the guidance of committee members Drs. Steven Beck, Linda Bernhard, and Jennie Nickell. In addition, I recognize the unique contributions and personal interest of Isabel Jackson, lay facilitator in the study. And finally, I wish to thank the women who gave of themselves and their time to participate in this effort to improve health among black women.
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TABLE OF CONTENTS

Dedication. .................................. ii
Acknowledgements. ........................... iii
Vita. ........................................... iv
List of Tables. ................................. viii
List of Figures ................................. ix

CHAPTER

I. INTRODUCTION. ............................. 1
   Significance of the problem. .............. 1
   Purpose. .................................. 3
   Research Questions ....................... 4
   Definition of Variables ................... 4

II. REVIEW OF RELATED LITERATURE. ....... 7
   Introduction ............................... 7
   Sociodemographic Factors & Smoking ... 10
   State Level Smoking Prevalence & Costs . 13
   Black and Black Women's Health .......... 14
   Theoretical Framework .................... 24
   Positive Outcome Expectancies .......... 30
   Smoking to Cope. .......................... 32
   General Coping Skills .................... 34
   Nicotine Intake ........................... 37
   Nicotine Dependence ..................... 46
   Self-Directed Intervention ............... 49

III. METHODOLOGY. ............................ 61
   Research Design ........................... 61
   Sample ................................... 64
      Subject Selection ...................... 64
      Sample Size ............................ 64
      Subject Recruitment ................... 65
      Protection of Human Subjects ......... 67
   Instrumentation and Measures
      Smoking History and Sociodemographic
      Information ............................ 68
IV. DATA ANALYSIS AND INTERPRETATION. ........ 88

Description of Sample. ................. 89
Relationships among Variables. ........ 95
Nicotine Dependence Predictors and
Theoretical Model. .................. 102
Intervention Feasibility .............. 104
Follow-up Activities ................. 109
Evaluation of Packet ................. 111
Strengths and Weaknesses of Intervention 116
Discussion .......................... 118

V. SUMMARY, LIMITATIONS, SIGNIFICANCE, AND
RECOMMENDATIONS. ................. 128

Summary ................................ 128
Limitations of the Study ............. 130
Significance .......................... 132
Recommendations ...................... 134

APPENDICES

A. Informed Consent Forms ............. 137
B. Sociodemographic and Smoking History . 145
C. Positive Outcome Expectancies .... 151
D. Smoking to Cope .................... 155
E. Coping Response Index ............ 158
F. Nicotine Dependence ................ 162
G. Health Promoting Lifestyle Profile 164
H. Hariharan Chromatography Protocol 168
I. Summary of Field Test Data ........ 172
J. Investigator Developed Introductory
   Sheets for 4-Week Intervention ..... 189
K. Interview Guide for 12 week Evaluation 199
L. Letters to Notify Participants of
   Cotinine Levels in Saliva Sample(s) 202

LIST OF REFERENCES ................. 205
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sociodemographic Characteristics of Sample.</td>
<td>90</td>
</tr>
<tr>
<td>2. Smoking History and Beliefs</td>
<td>93</td>
</tr>
<tr>
<td>3. Presence of Cigarette Smoking in Environment.</td>
<td>94</td>
</tr>
<tr>
<td>4. Current Diagnoses Reported by One-Fourth of Sample.</td>
<td>95</td>
</tr>
<tr>
<td>5. Nicotine Dependence Model Variables Values.</td>
<td>97</td>
</tr>
<tr>
<td>6. Correlation Matrix of 8 Nicotine Dependence Model Variables</td>
<td>100</td>
</tr>
<tr>
<td>7. Stepwise Multiple Regression Model of Nicotine Dependence</td>
<td>103</td>
</tr>
<tr>
<td>8. Stepwise Multiple Regression Analysis for Nicotine Dependence</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>9. 3-Group Intervention Participation over 12 Weeks.</td>
<td>105</td>
</tr>
<tr>
<td>10. Agreement Between Self-Reported Smoking Status and Cotinine Values.</td>
<td>107</td>
</tr>
<tr>
<td>11. Patterns of Cotinine Levels for Individuals over Time.</td>
<td>108</td>
</tr>
<tr>
<td>12. Average Cotinine Levels and Number of Cigarettes Per Day By Group By Time</td>
<td>109</td>
</tr>
<tr>
<td>13. Stepwise Multiple Regression Model of Nicotine Dependence</td>
<td>129</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alcohol Dependence Model</td>
<td>28</td>
</tr>
<tr>
<td>2. Nicotine Dependence Model</td>
<td>30</td>
</tr>
<tr>
<td>3. Quantitative Disposition of Nicotine, Based on Analysis of 24-h Urine Collections in 25 Habitual Smokers</td>
<td>38</td>
</tr>
<tr>
<td>4. Research Design</td>
<td>62</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Women and minorities represent two of four groups targeted for smoking cessation identified by the Surgeon General (USDHHS, 1989). Cigarette smoking prevalence among Ohio's black women was 43% compared to 23-25% for other race-sex groups in 1988 (Capwell & Adams, 1989). Health consequences of cigarette smoking have been identified in retrospective and prospective studies. Smoking accounts for some 30% of all cancer deaths, is the major cause of chronic obstructive lung disease in the United States for both men and women, is a major cause of coronary heart disease and has been found to result in fetal growth retardation (American Cancer Society, 1986; USDHHS, 1980; USDHHS, 1983; USDHHS, 1984). Health consequences of cigarette smoking include increased morbidity, mortality, years of potential life lost, and direct and indirect health care costs (USDHHS, 1989).

Compared with whites, blacks experience excess mortality from cancer, cardiovascular disease, and infant
death, all of which are substantially affected by smoking (CDC, 1987a). The Surgeon General stated, "No private or public effort aimed at improving the health of blacks and other minorities can omit the reduction of cigarette smoking as one of its major goals" (CDC, 1987a, p. 406). One of the most important options, immediately available, for decreasing the wide disparities between the health status of minorities and that of whites, is the reduction of cigarette smoking in the black population (CDC, 1987a).

Research concerning cigarette smoking behavior and smoking cessation intervention focused on black women smokers is limited (Cooper & Simmons, 1985; Orleans, Strecher, Schoenbach, Salmon & Blackmon, 1989; White, Enterline, Alam, & Moore, 1981). One descriptive survey concerning knowledge and acceptance of smoking-related illnesses was conducted with black women who lived in inner city Buffalo, New York (Warnecke, Graham, Rosenthal, & Manfredi, 1978). However, smoking cessation intervention was not a part of their study. Lacey and others (1991) described an effort to encourage black women who lived in public housing to participate in a mass media smoking cessation program but biochemical validation of smoking abstinence was not addressed. More research involving biological and behavioral variables that contribute to cigarette smoking behavior among black women and alternative smoking cessation interventions is needed. In an attempt to
decrease cigarette smoking prevalence among black women an understanding of cigarette smoking behavior and subsequent intervention design is needed.

Cigarette smoking research has focused primarily on subjects in formalized treatment (Prochaska & DiClemente, 1983). Six percent of ever smokers in Ohio in 1987 identified group programs, hypnosis, physicians or counselors as their method of quitting, while 94% reported quitting on their own (Capwell & Adams, 1989). Research on individuals seeking formalized treatment is not necessarily representative of the general smoking population. Self-directed smoking cessation research literature, until recently, was characterized by relatively small-scale studies, many with methodological weaknesses such as reliance on retrospective self reports and the use of small, unrepresentative samples (Marlatt, Curry, & Gordon, 1988). In Marlatt and others' (1988) own study of unaided smoking cessation, more than 75% of volunteers in their sample had attended college and therefore may not have been representative of quitters in general. No information was provided on ethnic background of participants (Marlatt et al., 1988).

Purpose

Since information concerning black women is lacking, the purpose of this study was to examine: 1) selected biopsychosocial variables contributing to an explanation of
cigarette smoking behavior; and 2) the feasibility of a low intensity smoking cessation intervention.

Research Questions

1. What are cigarette smoking behavior and sociodemographic characteristics of black women who currently smoke?

2. What are the relationships among positive outcome expectancies, smoking to cope, general coping skills, nicotine intake and nicotine dependence among black women who currently smoke?

3. What are the best predictors of nicotine dependence among black women who currently smoke?

4. Is it feasible to conduct a 4-week mailed smoking cessation intervention with weekly support from a black woman exsmoker?

5. What are strengths and weaknesses of a low intensity mailed smoking cessation intervention with weekly support by a black woman exsmoker?

Definition of Variables

Positive outcome expectancies are a person's beliefs about the effects that will occur with cigarette smoking influenced by learning history (Abrams & Niaura, 1987). These anticipated effects of smoking mediate the pharmacological and behavioral effects of nicotine (Brown, Goldman, Inn & Anderson, 1980). Positive outcome expectancies of smoking (POES) were measured by a
modification of Rohsenow's (1983) Alcohol Expectancy Questionnaire.

**Smoking to cope** is a tendency to use cigarette smoking to escape, avoid, or otherwise regulate unpleasant emotions (Cooper, Russell, & George, 1988). Smoking to cope (STC) was measured by a questionnaire representing factors of stimulant, sedative, indulgent, psychosocial and sensorimotor smoking (Russell, Peto, & Patel, 1974; West & Russell, 1985).

**General coping skills** are the processes people use to prevent and adapt to stressful life circumstances (Moos, Cronkite, Billings, & Finney, 1986). Three forms of coping include active cognitive, active behavioral, and avoidance coping. Coping skills were measured using the Health and Daily Living (HDL) Coping Response Index (Moos et al., 1986).

**Estimation of nicotine intake** is defined as tobacco smoke exposure or cigarette dose via smoking (Henningfield, 1984; Jacob, Benowitz, & Shulgin, 1988). Nicotine intake was measured by level of salivary cotinine, a nicotine metabolite, as it constitutes a fairly stable measure of chronic intake (Pomerleau, Pomerleau, Majchrzak, Kloska, & Malakuti, 1990) and an approximate index of daily nicotine consumption (Jones, 1987). Harihara and others' (1988) modified liquid chromatography protocol was used to determine cotinine levels in ng/mL. Although individual
topography factors affect nicotine intake, self-reported number of cigarettes per day was another indicator of tobacco smoke exposure (Heatherton, Kozlowski, Frecker, Rickert & Robinson, 1989).

**Nicotine dependence** is a behavioral pattern of nicotine use involving a preoccupation with its acquisition, compulsive use, and propensity to relapse to its use (APA, 1987). West (1988) presented an interactive pharmacological and nonpharmacological model of nicotine dependence where dependence developed basically from nicotine intake but was modulated by cognitions. Dependence was assessed by a questionnaire including addictive and automatic factors (Tonnesen, 1988; Tonnesen, et al., 1988a).

**Low intensity smoking cessation intervention** refers to mediated or self-help interventions as opposed to intensive clinical procedures (Glasgow & Lichtenstein, 1987). In this study the intervention was a 4-week program provided to individual smokers to use on their own with minimal professional contact. Materials, focused on restructuring expectancies of smoking effects, alternative affect regulation strategies and nicotine fading, were mailed four times at weekly intervals to subjects randomly assigned to the treatment group. A trained lay facilitator called each participant weekly.
CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

A biopsychosocial model of addiction involves multiple causality, multiple systems and multiple levels of analyses (Donovan, 1988). Nicotine, the major addictive drug in cigarettes that smokers seek (USDHHS, 1988), increases the bioavailability of several neuroregulators including acetylcholine, norepinephrine, dopamine, beta-endorphin and vasopressin (Pomerleau & Pomerleau, 1984). These neuroregulators are known to yield various effects such as increasing ability to concentrate and providing pleasurable effects (USDHHS, 1988) similar to electrical brain stimulation (Groves & Rubec, 1988). The Pomerleaus (1984) advocated multivariate analyses to integrate findings on behavioral, physiological, biochemical and subjective factors of cigarette smoking.

Similarities between tobacco smoking in humans and animal models of nicotine dependence (Balfour, 1982) suggest that nicotine is a central element in the maintenance of the smoking habit (Kaprio & Koskenvuo, 1988). There is a biological basis for "psychological" dependence that is not
rooted in withdrawal distress (Wise, 1988). Positive reinforcing effects of nicotine in the central nervous system are sufficient to produce the compulsive drug self-administration of psychological dependence (Wise, 1988). Factors that influence the amount of nicotine absorbed by the cigarette smoker include the amount, depth and duration of inhalation, in addition to the type of cigarette and amount smoked (Henningfield & Nemeth-Coslett, 1988). Cigarette smoking is the result of both biological and behavioral influences (Kaprio & Koskenvuo, 1988).

The major emphasis in smoking cessation research has been intervention evaluation and abstinence (Schwartz, 1987). Rosen and Shipley (1983) noted that studies comparing the effectiveness of different treatments usually tallied no more than success rates at follow-up. To improve our understanding of the process of smoking cessation, research needs to assess contributing behavioral and biological variables, as well as the stages of smoking cessation. Studies of smoking cessation tend to address either behavioral or biological variables, while few investigations integrate both components. There have been limited studies linking the person variables to treatment variables (Benfari, Ockene & McIntyre, 1982).

Prochaska and DiClemente (1983, 1986) have described behavior change in which an individual progresses through a series of stages of readiness from no effort to change to
the stage where the behavior is no longer a health problem. As applied to cigarette smoking, this model includes five self-reported stages of smoking cessation: (a) precontemplation - not seriously considering quitting smoking in the next year and have not stopped smoking for at least 24 hours in the past year; (b) contemplation - seriously considering quitting smoking in the next year and have not stopped smoking for at least 24 hours in the past year; (c) relapse - stopped smoking for at least 24 hours in the past year as part of an effort to quit smoking, but resumed smoking again; (d) action or recent quitting - successfully quit smoking within the last six months; and (e) maintenance or long-term quitting - abstinent from smoking for longer than six months (DiClemente & Prochaska, 1985).

More recently DiClemente and Prochaska (personal communication, 1991) have modified the stages of change for smoking cessation to include precontemplation (not seriously considering quitting in the next 6 months), contemplation (seriously considering quitting in the next 6 months), preparation, action and maintenance. Definitions of action and maintenance remain the same, however the newly added preparation stage depicts someone who is planning to quit in the next 30 days and has had a 24 hour quit attempt in the past year. Thus, preparation was a stage added between contemplation and action and relapse as a stage was
eliminated. The value of a stage model of change over dichotomous smoker and nonsmoker categories, is the greater potential to assess the dynamics of change in individuals.

While acknowledging that individuals are at different stages of smoking cessation, it is also critical to examine physiological, psychological and social factors influencing cigarette smoking behavior in individuals.

**Sociodemographic Factors and Cigarette Smoking**

Educational and occupational level, as well as marital status and partner's smoking status have been identified as predictors of individuals' cigarette smoking behavior. Education level is a major sociodemographic predictor of smoking status (Pierce, Fiore, Novotny, Hatzianandreas & Davis, 1989a). Smoking prevalence has declined five times faster among the higher educated compared with the less educated. To illustrate, in 1985, smoking prevalence among persons with less than a high school diploma was 34.2%, while that for persons with four years or more of college was 18.4% (Pierce et al., 1989a). Until 1985, less-educated young women were the only group in which smoking initiation was increasing. A person who does not go to college is more than twice as likely to take up smoking than a person who does, and there is considerably more cessation activity occurring among higher educated than among less educated groups. These trends were upheld in a study of cigarette smoking among blacks and whites (Novotny, Warner, Kendrick,
& Remington, 1988) where smoking prevalence among blacks who had not graduated from high school was 48% compared to 29% among blacks who attended four or more years of college (Novotny et al., 1988).

Based on trends from 1974 through 1985, Pierce and others (1989b) projected that about 40 million Americans (22% of the adult population) will be smokers in the year 2000. Smoking prevalence is forecast to vary with educational level. In the year 2000, smoking prevalence among persons with less than a high school diploma will be 31%, while that for high school graduates will be 30%. Smoking prevalence for those with some college preparation will be 16% and probably less than 10% of college graduates will smoke in 2000.

Smoking prevalence among employees in ten different worksites in Minnesota revealed the highest prevalence among blue collar workers and the lowest among professionals and managers (Sorensen & Pechacek, 1986). Smoking prevalence was higher in women (38% age adjusted) than men (30%) at all occupational levels. Men were more likely to have quit smoking than women in all occupational groups. Nearly half of blue collar workers who smoked did not intend to quit, suggesting this group as a critical target for future interventions. Professional managers had higher cessation rates than blue collar workers which indicates occupational differences in smoking prevalence may widen. There is
considerable overlap between occupation and education level variables.

In a national survey on cigarette smoking, occupational level differences of smoking prevalence were identified irrespective of race (Novotny et al., 1988). There was a 44% cigarette smoking prevalence among blacks in blue collar positions and a 41% prevalence among whites in similar positions. However, lower smoking prevalence rates existed among persons in white collar positions with 32% for blacks and 28% for whites (Novotny et al., 1988).

Cigarette smoking quit rate increased with age, educational level, and occupational level in Kabat and Wynder's (1987) epidemiological study of 5000 subjects. Those who were divorced or separated had lower quit rates than those who were married (Kabat & Wynder, 1987). Successful smoking cessation was related to spouse's smoking habits (Schwartz, 1987).

Smoking status of spouse was strongly related to continued abstinence among 56 subjects in McIntyre-Kingsolver and others' (1986) group smoking cessation study. Forty-four percent of those with nonsmoking spouses (n = 25) were abstinent at 6 month follow-up, while 6% of subjects with smoking partners (n = 31) were abstinent (McIntyre-Kingsolver, Lichtenstein & Mermelstein, 1986). Coppotelli and Orleans (1985) reported that successful quitters (n = 61) significantly more often than recidivists (n = 64) had
partners who were ex-smokers or partners who successfully quit with them.

State Level Smoking Prevalence and Costs

The Behavior Risk Factor Surveillance System has been conducted annually in Ohio beginning in 1984. There was a nonsignificant decline from 29% to 26% smoking prevalence for the five-year period between 1984 and 1988 (Capwell, 1989). In 1988 the difference between prevalence in all whites (25%) and all blacks (35%) became statistically significant (p < .05). Moreover, 43% of black women reported smoking which was significantly different from 25% among white women (Capwell & Adams, 1989).

Of all the deaths in Ohio in 1987, approximately 16% (15,453) were attributable to smoking (Capwell & Adams, 1989). Twenty-one percent of deaths among men were attributed to smoking, while 11% were so attributed among women. Lung cancer was the leading cause of these deaths with ischemic heart disease and respiratory diseases following. The 1987 annual years of potential life lost (YPLL) attributable to smoking from all diseases was 174,366 among Ohioans (Capwell & Adams, 1989). Lung cancer led the list of causes of YPLL for both men (40,000 years lost) and women (15,000 years lost), with ischemic heart disease in second place. Total economic cost attributable to smoking in Ohio in 1987 was $2.77 billion (Capwell & Adams, 1989).
Four target groups identified in the Surgeon General's report for cigarette smoking cessation were: women; minorities; blue-collar workers; and children and adolescents (USDHHS, 1989). These are especially needy subgroups because of the tobacco industry's aggressive advertising and marketing targeted toward minorities (Fiore, et al., 1989) and specific gender-age groups.

Black and Black Women's Health

The Report of the Secretary's Task Force on Black and Minority Health documented that blacks experience substantial excess mortality from cancer, cardiovascular disease, stroke and infant death, compared with whites (Heckler, 1985). In 1985, 41% of black men in the United States smoked cigarettes compared with 32% of white men. The prevalence of smoking among black women (36.3%) was higher than that among white women (30.8%) and there is a lower quit rate among black ever smokers of both sexes compared to white ever smokers (Novotny et al, 1988). Although blacks smoke fewer cigarettes, they tend to smoke brands with higher nicotine and tar yields, especially mentholated brands (Orleans et al, 1989b). Both black men and women were three times more likely to be light smokers (≤20 cigarettes/day) than heavy smokers via self-reported number of cigarettes per day (Kabat, Morabia, & Wynder, 1991). A larger proportion of black men and women smoke
mentholated cigarettes compared to white men and women (Sidney, Tekawa, & Friedman, 1989) and three high nicotine menthol brands (Kool, Salem, and Newport) accounted for 55-60% of the brands smoked by black smokers in two recent studies (Cummings, Giovino, & Mendicino, 1987; Orleans et al., 1989a). Although average daily smoking rate among black current smokers was only 14 cigarettes, 64% of smokers reported high nicotine brands and 64% reported smoking within 30 minutes after awakening, a crude index of high nicotine dependence (Fagerstrom, 1978).

Higher nicotine delivery is associated with menthol brands, compared to their non-menthol counterparts (Cummings et al., 1987). In addition, it is possible that anesthetic or 'masking' effects of menthol additives enable the smoker to tolerate deeper or more frequent inhalations, or to smoke the cigarette to a shorter length (Orleans et al., 1989b). Therefore, low-rate smokers of high nicotine menthol cigarettes may achieve higher than assumed levels of nicotine intake and dependency, and tobacco smoke exposure (Orleans et al., 1989b). For these reasons, future studies of smoking patterns among blacks should include measures of cigarette brand, nicotine dependence, smoking topography, and physiological measures of nicotine absorption (eg. saliva cotinine levels) and measures of exposure to other harmful smoke constituents (eg. alveolar carbon monoxide) (Haley et al., 1983).
Smoking attributable mortality (SAM) and years of potential life lost (YPLL) are two ways to demonstrate the race-specific effect of smoking (CDC, 1987b). Age-adjusted rates were calculated by the direct method using the 1984 U.S. population as the standard. The SAM rate among blacks was 20% higher than the rate among whites (CDC, 1987b). The YPLL rate among blacks was twice that among whites and may reflect smoking-attributable deaths at earlier ages (CDC, 1987b). These findings support concerns regarding the increased burden of smoking-related disease among blacks.

Wagenknecht and others (1990) identified a significant difference in serum cotinine levels between black and white smokers. Cotinine, a major metabolite of nicotine, is considered the best indicator of tobacco smoke exposure (USDHHS, 1989). Among black women 18 to 30 years of age, the mean cotinine level was 251 ng/mL compared to 176 ng/mL among white women (95% CI for difference=52,97). The difference in mean cotinine levels for black and white men was not as great, but statistically significant (245 ng/mL vs. 210 ng/mL, respectively; 95% CI for difference=11,58). Wagenknecht and others (1990) noted that racial differences in cotinine levels may provide clues to reasons for higher rates of some smoking-related cancers in blacks and the observed lower cessation rates.

A theoretical basis for a causal relationship between mentholation and cancer is that menthol combustion produces
carcinogenic compounds such as benzo[a]pyrenes (Herbert & Kabat, 1988). Sidney and others (1989) noted an inverse relationship in age and use of mentholated cigarettes in black and white women. In the 20-30 year old cohort, percent of menthol users was 80% in black men and women, compared to 20% in white men and women (Sidney et al., 1989). A potential consequence of large differences in mentholated cigarette use in young blacks relative to whites of the same age, would be a widening of cancer incidence rates as these individuals reach the higher risk age range for cancer (Sidney et al., 1989).

At the Congressional Black Caucus in 1988, Barber (1990) advocated efforts to develop intervention programs aimed at reducing risk factors for blacks. These health promotional campaigns would target the culture and lifestyles of blacks. Cooper and Simmons (1985) noted that the only realistic hope for prevention of smoking-related diseases among blacks lies in broadening gains made against smoking among the educated and privileged to include the working class and minority groups. It is imperative to "sound the alarm about the compound ill effects of smoking" considering all the other health threats to blacks (Cooper & Simmons, 1985, p.348).

Misconceptions and deeply rooted fears about the cause and cure of cancer held by blacks, along with many other Americans, were summarized by DeVita, director of the
National Cancer Institute (1985). Blacks underestimate the prevalence of cancer; are less knowledgeable than whites about cancer's warning signals; are pessimistic about the curability of cancer and less likely to see a physician if they are experiencing symptoms (DeVita, 1985). DeVita announced that the cancer prevention awareness program targeting black Americans, adopted a message to dispel the negative myths and misconceptions, such as cancer is "inevitable" and "caused by everything."

Cope and Hall (1985) noted that despite the impressive growth of research in psychological applications to health, very little work has been conducted in the area of black women's health care issues. They found that the subject of health care issues was often approached globally, focusing on race or sex and giving only cursory attention to concerns of black women.

An example of research focused on black women's perception of their coping was conducted by Myers (1980). While black-women-headed families are common, they are not necessarily viewed as unstable or broken family forms by black women (Myers, 1980). Myers argued that it was time for a new view of black women allowing for the possibility of self-esteem and pride in their mother/head of family role. She summarized her interviews with 400 black women as: "What others see as weaknesses needs to be looked at a
little closer to see the strengths that are lying underneath," (Myers, 1980, p. 91).

Evelyn White (1990) compiled a collection of black women's personal experiences and insights about health matters in *The Black Women's Health Book: Speaking for Ourselves*, in response to her perceived need for black women to put their own well-being at the top of the program. In her introduction, White commented that for generations, black women have taken care of everything and everyone but themselves. One of the contributors, Mary Lou Lee described the development and maintenance of a 54-year cigarette smoking addiction and her success at quitting after experiencing smoking-related symptoms (White, 1990). She credited physician advice, her religious faith and love of life for her accomplishment.

Moving from personal accounts to reports in the popular press, the focus on health among blacks is evident. For example, recent articles included: in *Ebony* magazine, the ten most serious health problems threatening blacks ("Ten Most Serious," 1991); self-health programs in *Essence Magazine* (Chambers, 1991); brother's lung cancer gives singer Melba Moore personal stake in Black health group featured in *Jet* ("Brother's Lung," 1990), and National Black Leadership Initiative on Cancer urges Blacks to 'do the right thing' in 1990 to prevent and detect cancer ("NBLIC," 1990).
Smoking-related health concerns for black women include heart disease as the major cause of death followed by cancer, cerebrovascular disease, and diabetes (USDHHS, 1984). In the 45 to 64 age cohort, black women died of heart disease at more than twice the rate of white women. The rate of deaths for both cerebrovascular disease and diabetes among black women was twice that among their white counterparts. Cigarette smoking is linked to heart and cerebrovascular disease and has a significant interaction with diabetes such that an estimated 65% of cardiovascular disease deaths among individuals with diabetes could be attributed to a combination of cigarette smoking and diabetes (Suarez & Barrett-Conner, 1984). Nephropathy and proliferative diabetic retinopathy occurred approximately twice as frequently in individuals with diabetes who were smokers than in those who were nonsmokers with race and gender unspecified (Muhlhauser, Sawicki, & Berger, 1986).

The prevalence of definite hypertension is 1.5 times higher among blacks (25.7%) than among whites (16.8%) ("Health Beliefs," 1990). In a small (n=54) longitudinal study of health beliefs and compliance with prescribed medication for hypertension among black women at a public hospital clinic in New Orleans, the folk beliefs about "high blood" and "high-pertension" were explored ("Health Beliefs", 1990). Women characterized "high blood" as a physical disease of the blood and heart in which the blood
was too "hot," "rich," or "thick." Women who held this belief considered it to be caused by heredity, poor diet, and "heat". Patients believed treatments to cool and thin the blood, such as ingestion of lemon juice, vinegar or garlic water, would cause its level in the body to drop.

"High-pertension" was considered a disease "of the nerves" brought on by stress, worry and an anxious personality. The appropriate treatment described by women for this condition was to mitigate stress and emotional excitement through control of emotions and the social environment. Those who believed they had "high-pertension" were less likely to comply with antihypertensive treatment than those who believed in the existence of the biomedical disease hypertension or the folk belief of "high blood" ("Health Beliefs," 1990). Snow (1983) described traditional beliefs among many blacks of lower socioeconomic status and stressed the importance of eliciting the individual's view of health problems and lifestyle.

Smoking cessation intervention studies with a target population of black women smokers are limited. Warnecke and others (1978) conducted a cross-sectional descriptive survey of knowledge and acceptance of risk of smoking related illness among 696 randomly selected black women in inner-city Buffalo, New York. Smoking status of the women was described by four categories: never smoked (45%); continuous smoker (13%); trying to quit (36%); and
successful quitter (6%). Quitters were more likely to have verbalized a relationship between smoking and illness during interview. For example, 44% of quitters believed smoking caused cancer, compared to 23% of continuous smokers who held this belief. Further, the belief that smoking caused other diseases was held by 45% of quitters and only 18% of continuous smokers (Warnecke et al., 1978).

Lacey and others (1991) included lay health educators in an intervention to increase participation of inner-city Chicago public housing residents in a televised smoking cessation program. Initially, 800 black women residents were contacted about the smoking cessation program. Of these, 163 preregistered to participate in classes or a reminder visit. A series of six smoking cessation classes was offered at three of the four housing developments and used a curriculum that followed a concurrent televised program. The reminder visitation was offered at the fourth housing development and involved lay health educators scheduling weekly visits with individuals to remind participants to view the 20-day television smoking cessation series.

Forty-six women attended at least one class and 55 participated in a reminder visit. There were three individuals in the class intervention who reported quitting smoking by the end of the intervention; however, it was not specified if these were women or men. Men were permitted to
participate in either intervention although the initial target was young women. None of the women in the reminder group quit smoking immediately after the intervention. Biochemical verification of smoking status was not included. Lacey and others reported an increased community awareness of the availability of the smoking cessation intervention, although motivation to stop smoking was less than that in the larger community according to unpublished baseline data and focus group findings. They concluded that intervention programs that assume readiness to quit will reach only a small portion of young black women in public housing.

Limited description about the health-care practices and beliefs of minority populations is a special concern since minorities have a higher incidence of morbidity and mortality due to a variety of health problems (Heckler, 1985). Quit-smoking initiatives aimed at black Americans are critically needed as relatively little research has been done to clarify smoking/ quitting patterns and determinants among black Americans, or to test quit-smoking interventions in black populations (Cullen, McKenna, & Massey, 1986; Orleans et al., 1989b). Research on biological and behavioral variables contributing to cigarette smoking behavior and the effect of smoking cessation interventions among black women is needed.
Theoretical Framework

Cognitive social learning (CSL) theory provides a framework for examining biopsychosocial factors of cigarette smoking (Bandura, 1971). This perspective involves three regulatory systems: 1) antecedents as internal or external stimuli; 2) response feedback as vicarious or self-reinforced consequences; and 3) cognitions mediating the relationship between antecedents and responses (Bandura, 1985). Personal cognitive-mediational factors, environment, and behavior are interdependent (Abrams & Niaura, 1987). For example, biochemical factors may influence an individual's cognitions about expectancies of a substance to provide stress reduction as well as influence substance-taking behavior.

Addictions, such as that to nicotine, incorporate operant behaviors that are learned and develop as a result of past experiences and current antecedents and consequences (Jensen, 1987). Nicotine from cigarette smoking may be a positive reinforcer providing pleasure, or a negative reinforcer providing relief from unpleasantness. Within CSL, stimuli and response feedback are important components in cigarette smoking. The acquisition of cigarette smoking behavior is associated with primary reinforcers, while maintenance of the smoking behavior relates to conditioned reinforcers which are stimuli paired with primary
reinforcers (Jensen, 1987). The latter are also termed discriminative stimuli, the cues which set the occasion for reinforcement and signal that reinforcement is available (Feuerstein, Labbe, & Kuczmierekzyk, 1986). Exteroceptive discriminative stimuli may include environmental cues, such as a particular location in one's home where smoking often occurred. Interoceptive discriminative stimuli are internal, such as feelings of anxiety which were previously relieved by smoking.

However, cognitive social learning theory is not based solely on operant conditioning (Abrams & Niaura, 1987) since it assigns prominence to cognitive-mediational factors in explaining learning and behavior (Bandura, 1977). Bandura (1985) viewed individuals as actively constructing their own reinforcement contingencies and not merely being acted upon by stimuli leading to certain responses.

Although cognitive social learning theory is used as the basis of treatment in many areas of behavior change, applications of the theory have not been tested extensively. Cooper and others (1988) proposed and tested a model of alcohol dependence from a CSL framework with a randomly selected sample of 119 alcohol dependent adults and 948 "normal" drinkers. Variables included in their model, depicted in Figure 1, were positive outcome expectancies of alcohol, drinking to cope, general coping skills, alcohol use and alcohol abuse/dependence. Rohsenow's (1983)
modification of Brown and others' (1980) alcohol expectancy questionnaire was used to quantify positive outcome expectancies of alcohol. Drinking to cope was evaluated with a 6-item instrument developed by Cooper and others, that focused primarily on the negative reinforcing properties of alcohol, such as relieving anxiety. General coping skills were operationalized with several instruments. One assessed active behavioral, active cognitive and avoidance coping (Moos et al., 1986). A questionnaire dealing with various ways of managing anger also was used. Alcohol use was operationalized as self-reported quantity and frequency of alcohol intake in the past 12 months. Alcohol dependence was based on DSM-III criteria (Robins, Helzer, Croughan, Williams, & Spitzer, 1981).

Analyses provided support for the model suggesting that individuals who drank heavily were prone to use alcohol to cope, had fewer active coping skills, and held stronger expectancies for the positive effects of alcohol (Cooper et al., 1988). Using three multiple regressions with different criterion variables, Cooper and others (1988) concluded that positive outcome expectancies and emotion-focused coping explained 24.5% of variance in drinking to cope. Drinking to cope explained more variance in alcohol use than did positive outcome expectancies, although both contributed. Log transformation of the dependent variable, alcohol use, was used because of skewness in its distribution. The model
explained 27% of the variance in alcohol dependence (p<.001). Cooper and others (1988) proposed a linear model with the aforementioned variables affecting alcohol dependence either directly or indirectly.
Positive Expectancies

General Coping Skills

Drinking To Cope

Heavy Alcohol Use

Alcohol Abuse/Dependence

Figure 1

ALCOHOL DEPENDENCE MODEL
The alcohol dependence model (Cooper et al., 1988) was modified to develop a framework for smoking behavior based on cognitive social learning theory. Commonalities across various addictions (Brownell, Marlatt, Lichtenstein, & Wilson, 1986) support this modification. Positive outcome expectancies of the effects of smoking were used and were similar to Cooper and others' (1988) alcohol expectancies. Smoking to cope was comparable to drinking to cope. General coping skills included active behavioral and cognitive coping and avoidance coping.

"Normal" and "problem" drinking status was not used since there is no corollary in cigarette smoking. Instead, nicotine intake was considered a continuous variable based on consumption of cigarettes and pharmacokinetics of nicotine absorption and metabolism. It was measured by salivary cotinine, a nicotine metabolite, and self-reported cigarettes per day. Nicotine dependence related to the DSM-III-R (APA, 1987) criteria for nicotine dependence and nicotine withdrawal. These criteria are not developed as fully as those for alcohol. The biopsychosocial variables contributing to an explanation of cigarette smoking behavior in this framework were: positive outcome expectancies, smoking to cope, general coping skills, nicotine intake and nicotine dependence (Figure 2).
Positive outcome expectancies (POE)

Positive outcome expectancies, a component of CSL, are beliefs concerning the effects of a substance such as nicotine. Expectancies are the anticipation of a systematic relationship between behaviors and outcomes in an upcoming situation (Goldman, Brown, & Christiansen, 1987). Information about the relationship between cigarette smoking and certain outcomes is learned and may be the direct result of psychopharmacologic effects (Goldman et al., 1987). However, placebo studies have demonstrated that if persons believed they had consumed a drug, they experienced the desired outcome even if it was a placebo (Goldman et al., 1987). Expectancies mediate between antecedents and responses.

Much of the empirical work on positive outcome expectancies has been conducted with the substance alcohol. Brown, Goldman, and Christiansen (1985) reported that
Brown, Goldman, and Christiansen (1985) reported that expectancy scale scores were directly related to habitual level of alcohol consumption. There was a consistent negative linear relationship between individual alcohol expectancies and measures of treatment success in alcoholics followed after alcoholism treatment (Brown, 1985).

Rather and Sherman's (1989) study of abstinence among 114 Alcoholics Anonymous members indicated that the longer an alcoholic was abstinent, the lower his or her alcohol expectancy scores would be. Rohsenow (1983) found that medium and heavy drinkers expected to experience significantly more social and physical pleasure, sexual enhancement, aggressiveness, expressiveness, and relaxation after drinking than did light drinkers ($p < .01$). Positive outcome expectancies for alcohol were better predictors of alcohol dependence than perceived stress, social support, or participation in follow-up treatment (Wilson, 1987).

The instrument developed by Brown and others (1980) to assess effects expected from moderate alcohol consumption yielded six factors after analysis. Four hundred forty subjects completed the initial 90-item instrument (Brown et al., 1980). One general factor portrayed alcohol as a global, positive transforming agent (eg. Alcohol seems like magic). The second factor indicated subjects expected alcohol to enhance both social and physical pleasure (eg. Drinking adds warmth to social occasions). A third factor
represented an enhanced sexual experience and performance dimension (e.g. After a few drinks, I am more sexually responsive). The fourth factor related to a dimension of arousal with aspects of power and aggression (e.g. I feel powerful when I drink, as if I can really influence others to do as I want). A fifth factor was conceptualized as increased social assertiveness (e.g. A few drinks make it easier to talk to people). The last factor concerned a relaxation/tension reduction dimension (e.g. Alcohol decreases muscular tension) (Brown et al., 1980).

Empirical support of positive outcome expectancies of smoking and nicotine are not available. Baer and Lichtenstein (1988) concluded that, with the exception of self-efficacy, little systematic research exists on the assessment of cognitive variables in the treatment of smoking. It is anticipated that POE will be positively related to nicotine intake, nicotine dependence, and smoking to cope and negatively related to quitting cigarettes.

**Smoking to cope**

Smoking may be used as a form of affect management, or coping, when individuals smoke to enhance relaxation or alleviate boredom, thus modifying responses. Reduction of negative affect or arousal of positive affect were identified as essential ingredients for smoking maintenance (Ikard & Tomkins, 1973). Smoking as a pharmacologic "coping tool" warrants further study (Pomerleau & Pomerleau, 1984).
Negative mood states and stress accounted for half of the reasons for smoking relapse given by 54 subjects post-treatment (Barnes, Vulcano & Greaves, 1985). In general, the reasons people report for their cigarette smoking are at least mediators of the smoking response (Livson & Leino, 1988).

In a secondary analysis combining three longitudinal studies, Livson and Leino (1988) found that women scored significantly higher than men on smoking for pleasure and to reduce negative affect (ps < .01). These two factors can be viewed both as direct reactions to and as attempts to cope with stress (Livson & Leino, 1988). Gender differences could derive, perhaps at least in part, from women being more insightful and/or frank than men in self-reports about their smoking behavior (Livson & Leino, 1988).

Individuals who smoked for stimulation purposes were most likely to report residual withdrawal symptoms when using nicotine gum in conjunction with a smoking cessation program (Niaura, Goldstein, Ward & Abrams, 1989). Pre-abstinence smoking for pleasure predicted the withdrawal symptom of hunger in 29 smokers abstinent for 24 hours (West & Russell, 1985). A moderate positive correlation was evident between cigarette consumption and stimulation, while a small positive correlation resulted between consumption and smoking for pleasure (indulgent) (Russell, Peto & Patel, 1974).
Five factors of stimulant, sedative, indulgent, psychosocial and sensorimotor smoking were identified by Russell and others (1974) and West and Russell (1985). Smoking for stimulation included "getting a lift", increasing alertness and concentration and offsetting tiredness (West & Russell, 1985). The sedative effect of smoking may be used to deal with worry, unhappiness, or anger (West & Russell, 1985). Indulgent smoking refers to obtaining a sense of pleasure (Russell et al., 1974). Psychosocial smoking incorporates the symbolic value of smoking to improve social confidence and create a certain image (Russell et al., 1974). Physical manipulation and sensory rewards comprise sensorimotor smoking (Russell et al., 1974). In these ways smoking may be used to manage affect. It was anticipated that smoking to cope would be positively related to nicotine dependence, positive outcome expectancies, and nicotine intake. Negative relationships were anticipated between active coping skills and smoking to cope, and successful abstinence and smoking to cope.

**General coping skills**

General coping skills can impact all three regulatory systems of CSL - antecedents, responses and mediating cognitions. Avoidance coping may be an individual's effort to reduce exposure to antecedents, while active behavioral coping may include changing an individual's typical
response. Active cognitive coping may mediate the relationship between antecedents and responses.

Coping skills are a critical determinant in the decision to smoke or not to smoke cigarettes (Abrams & Niaura, 1987). Generalized coping skills are required to deal with a variety of life experiences, while there are specific coping skills that may be used to manage smoking behavior (e.g. awareness of cues that trigger smoking). Marlatt (1985) suggested that lifestyle balance was important so that the individual is able to cope with life stressors as they occur and they do not accumulate unresolved.

General coping skill deficits were reflected in epidemiologic studies of developmental factors that predict substance use in young persons, such as social marginality, low self-esteem, and family conflict (Jessor & Jessor, 1977). Deficits in general coping skills appear to increase the probability that substance use experimentation will lead to heavy use and eventually dependence (Abrams & Niaura, 1987). In the ex-smoker, psychological stress elicited smoking if other coping responses were not available and the individual expected smoking to help in coping with the stressor (Marlatt, 1985). Individuals may resort to substance use when they have inadequate methods of coping with fatigue, boredom, stress, depression, anger or other intrapersonal factors (Abrams & Niaura, 1987).
Abrams and Niaura (1987) identified an underemphasized point derived from CSL theory concerning the reciprocal changes in social interaction in the presence of general coping skill deficits. In relation to alcohol use, they suggested that individuals with coping skill deficits would progressively isolate themselves from peers who have adequate coping abilities. This self-selection into a different kind of subculture with peers who have similar skill deficits and who have distorted, overly positive expectations of drug effects tended to reinforce the skills and beliefs within that culture (Abrams & Niaura, 1987).

A strong association with such a subculture, limits the skill-deficit group's exposure to healthy role modeling and other learning experiences that would counteract their distorted expectations (Abrams & Niaura, 1987). Moos and Finney (1983) identified that alcoholics who have impoverished social networks, a poor work history, and are divorced had a poorer prognosis for recovery than less socially isolated alcoholics.

Effective behavior and good decision making result from an accurate appraisal of environmental demands and the strengths and limitations of an individual's repertoire of coping skills (Abrams & Niaura, 1987). Having a rich, flexible repertoire of general and smoking-specific coping skills to achieve desired goals without smoking is crucial to adequate self-regulation. Symbolizing capability in
cognitive social learning theory refers to the capacity of individuals to use internal cognitive models of experience as guides for decision making and future actions (Bandura, 1985). Forethought capability involves the capacity to anticipate consequences of action and set goals (Bandura, 1985). Within CSL theory, an individual accepts personal responsibility for learning self-regulatory skills and using them as alternatives in the future when smoking would be a likely behavior (Abrams & Niaura, 1987).

In the model of nicotine dependence it was anticipated that general active cognitive and behavioral coping skills would be negatively related to smoking to cope, nicotine dependence and nicotine intake. Avoidance coping was anticipated to be positively related to smoking to cope, nicotine intake and nicotine dependence.

**Nicotine intake**

Estimation of nicotine intake is defined as tobacco smoke exposure or cigarette dose via smoking (Henningfield, 1984; Jacob et al, 1988). However, the intake of any particular tobacco smoke constituent varies with many factors including inhalation amount, depth, and duration as well as absorption characteristics of individual constituents (Henningfield, 1984). In addition, nicotine metabolism and elimination is highly variable (Jacob et al., 1988). Nicotine is primarily metabolized in the liver and to a small extent in the lung and kidney (Benowitz, Porchet
& Jacob, 1990). Renal excretion typically accounts for 5-10 percent of total elimination and depends on urinary pH and urine flow. Cotinine and nicotine-N-oxide are primary metabolites of nicotine, with cotinine itself being extensively metabolized (Figure 3) (Benowitz et al., 1990).

![Diagram of nicotine metabolism](image)

Figure 3. Quantitative disposition of nicotine, based on analysis of 24-h urine collections in 25 habitual cigarette smokers. (Benowitz et al., 1990).

Nicotine metabolism may be affected by physiological, environmental, pathological and genetic differences (Idle, 1990). For example, two studies have reported effects of phenobarbital on nicotine metabolism with results of increased elimination of cotinine (Foth, Walther & Kahl, 1990) and doubled nicotine conversion by hepatocytes in the presence of phenobarbital (Kyerematen, Morgan, Warner, Martin & Vesell, 1990). A possible genetic difference may
be cytochrome P-450-mediated metabolic oxidations which are frequently subject to genetic polymorphism (Idle, 1990).

While Jacob and others' (1988) complex study using stable isotope-labeled nicotine was more precise in determining nicotine bioavailability, they concluded this is not practical in most studies. Instead, research has focused on correlating nicotine intake with various markers of tobacco smoke exposure in biologic fluids of smokers (Benowitz & Jacob, 1984; Feyerabend, Ings, & Russell, 1985; Galeazzi, Daenens, & Gugger, 1985).

Typically the number of self-reported cigarettes has been used to determine tobacco exposure dose (Muranaka, Higashi, Itani, & Shimizu, 1988). However, there is strong evidence that inter-individual variation in smoking pattern results in highly variable uptake of or exposure to tobacco smoke constituents even when individuals smoke the same brand and number of cigarettes (Benowitz, Hall, Herning, Jacob, Jones & Osman, 1983; Gori & Lynch, 1985; Russell, Jarvis, Iyer & Feyerband, 1980). Differences in individual smoking topography and in metabolic rates could contribute to wide ranges of cotinine concentrations and moderate correlations ($r = .447$) between cotinine levels and number of cigarettes smoked (Machacek & Jiang, 1986).

Muranaka and others (1988) evaluated various biochemical parameters of tobacco smoke uptake in Japanese smokers ($n = 149$) and nonsmokers ($n = 87$). They concluded
that plasma and urinary cotinine were most suitable tobacco smoke uptake variables for discriminating smokers and nonsmokers, as well as for ranking smoke uptake within smokers. Other biochemical variables included in their study were nicotine (in plasma and urinary creatinine ratios), thiocyanate (in plasma and urine), carboxyhemoglobin and expired carbon monoxide (Muranaka et al., 1988).

Biochemical validation of self-report of smoking was recommended as a basic requirement of all studies of smoking prevalence (Ossip-Klein, 1986). The three measures most commonly used, alveolar carbon monoxide (COa), salivary thiocyanate (SCN), and salivary cotinine, were evaluated by Stookey and others (1987). Carbon monoxide had a half-life of four hours, a sensitivity (ability to correctly detect smokers) of 96%, and a specificity (ability to correctly identify nonsmokers) of 100%. A cut-off value of 8 parts per million (ppm) was used. The short half-life was a disadvantage and the measure, which assesses products of combustion during smoking, does not provide an indication of level of nicotine in the body.

Salivary thiocyanate is a breakdown product of cyanide in cigarette smoke and had a half-life of 6 to 14 days, a sensitivity of 67%, and a specificity of 95% (Stookey et al., 1987). A cut-off value of 110 micrograms/mL was used. Rate of elimination varies from individual to individual
leading to considerable half-life variability. This measurement was confounded by certain vegetables in the subject's diet resulting in false positive findings. SCN was not as reliable a measure for those who smoked less than 20 cigarettes per day (Stookey et al., 1987).

Cotinine, the major nicotine metabolite, had a long biological half-life of approximately 20 hours (Benowitz, Kuyt, Jacob, Jones & Osman, 1983) in contrast to an average nicotine half-life of 2 hours (range, 1 - 4 hours) (Benowitz, Jacob, Jones, & Rosenberg, 1982) and is commonly used as a marker of nicotine intake (Benowitz, 1988). For these reasons, salivary cotinine is superior to salivary nicotine as a biochemical measure of cigarette exposure (Jarvis, Tunstall-Pedoe, Feyerabend, Vesley & Saloojee, 1987).

Typical ranges of cotinine for nonsmokers were 0 - 10 ng/ml and for smokers, 10 - 1600 ng/ml (Feyerabend & Bryant, 1987). Salivary cotinine demonstrated discriminant power by distinguishing smokers and nonsmokers (Coul tas, Howard, Peake, Skipper & Samet, 1988; Muranaka et al., 1988; Wall, Johnson, Jacob & Benowitz, 1988). Carey and Abrams (1988) were able to use salivary cotinine to detect light and intermittent smokers, a concern in smoking cessation research. Cotinine levels >14ng/mL were used recently to define a biochemical smoker (Perez-Stable, Marin, Marin, & Benowitz, 1992). Passive smokers (n = 20) and nonsmokers (n
= 28) did not have detectable levels of cotinine in saliva specimens (Wall et al., 1988). Passive smokers either lived with a smoker or worked in an office where smoking was permitted. Salivary cotinine was able to discriminate between active smokers and passive and non-smokers (Wall et al., 1988).

Cotinine elimination times were similar from various body fluids such as saliva, urine or plasma (Sepkovic & Haley, 1988). Carey and Abrams (1988) reported salivary cotinine at nonsmoker levels (< 10 ng/ml) 2.8 days following smoking cessation. Cotinine elimination is a function of both its initial level and its half-life. Individuals smoking at heavier rates and experiencing higher baseline salivary cotinine levels would take longer to reach nonsmoker levels than light smokers would. For example, time for a person's cotinine concentration to decline from 300 to 10 ng/mL, with a typical half-life of 19 hours, would be approximately 4 days (Benowitz et al., 1983).

In a hierarchical regression analysis with salivary cotinine as the criterion variable, time to first cigarette provided maximal adjusted variance explained (Heatherton et al., 1989). Adding the variable, number of cigarettes per day, increased the proportion of variance only slightly. Individuals grouped by time to first cigarette (≤ 5 minutes, 6–30, 31–60, 61+ minutes) had significantly different cotinine levels with the category ≤ 5 minutes the
highest at 341 ng/ml (Heatherton et al., 1989). Heatherton and others (1989) recommended logarithmic transformations of continuous data to increase predictive power.

The correlation of reported cigarette consumption and salivary cotinine was 0.34 in Pierce and others' (1987) Australian study of 975 subjects. This finding was similar to the 0.4 correlation (p<.01) reported by Benowitz and others (1983) and the 0.45 correlation among men and 0.39 correlation among women between reported smoking rate and cotinine in Hill and others' (1983) study. In a sample of 96 subjects enrolled in a smoking cessation program, cotinine was correlated ($r = .47$, 95% CI=.22,.67) with reported smoking rate among light smokers (Abrams, Pollick, Diener, Carey & Hitti, 1987a). However, the relationship disappeared among heavy smokers ($r = -.05$, 95% CI=-.33,.24). These negligible and moderate correlations may reflect inaccurate self-report of number of cigarettes smoked, variability in strength of cigarettes, the cotinine measure itself, topography, and differences in metabolism (Pierce et al., 1987).

Orleans and Shipley (1982) stated that retrospective global self-report of cigarettes per day has relatively low reactivity and is not likely to elicit resistance. However, errors in self-report may occur because of presumed digit bias. Vogt (1977) noted that half of 98 smokers reported smoking 20, 30 or 40 cigarettes per day. With individuals
smoking less than a pack, the tendency is to report in increments of 5. Inaccuracy was evidenced by 22% of subjects giving different estimates of daily cigarette consumption on questionnaires administered an hour apart (Vogt, 1977). Orleans and Shipley (1982) concluded that when combined with verifying physiologic measures, global self-reports were an acceptable basic rate measurement.

Abrams and others (1987a) determined a mean salivary cotinine of 349.2 ng/mL, SD = 195.4 in 63 smokers with a range of 26 - 933. In nonsmokers the mean was .3 ng/mL, SD = 1.6, range = 0-9 (Abrams et al., 1987a). Haley and others (1983) calculated a mean of 361 ng/mL and SD =80 in 12 smokers. Salivary cotinine was not detected in nonsmokers (n =18) as the limits of sensitivity were set at 1 ng/ml (Haley et al., 1983). Wall and others (1988) reported a mean salivary cotinine of 283.7 ng/ml in smokers (n = 40) who smoked > 10 cigarettes per day and a mean of 66.9 ng/ml in smokers (n = 9) who smoked ≤ 10 cigarettes per day. No standard deviations were reported.

While there is a relatively high degree of intersubject variability of cotinine levels among subjects claiming to smoke the same number of cigarettes per day, this may indicate differences in metabolism, inhalation, or amount of each cigarette smoked (Wall et al., 1988). It is this variability that makes salivary cotinine a potentially useful indicator of tobacco smoke exposure and an estimate
of nicotine intake. Retaining the interval level data of cotinine values provides more information on tobacco smoke exposure than dichotomizing the variable into smoker/nonsmoker status with a cutoff point of 14 ng/ml.

Salivary specimen collection is preferable to venipuncture in many situations (Haley et al., 1983) because of its noninvasive nature. There is a high correlation ($r = .9$) between cotinine in plasma and saliva (Haley et al., 1983). However, a substantial social barrier exists in certain cultures to "spitting," and subjects often experience decreased salivary secretion if asked to provide a sample (Schramm, Smith, Craig, Paek, & Kuó, 1990). Mechanical stimulation of secretion can lead to nonspecific binding of the analyte to the stimulant and gustatory stimulants may interfere with some assays (Schramm et al., 1990). Desquamated cells, bacteria, food debris, and enzymes may lead to metabolic degradation or nonspecific binding of the analyte.

To overcome these shortfalls, Schramm and others (1990) developed a device for the in situ collection of an ultrafiltrate of saliva, the SalivaSac® (BioQuant, Ann Arbor). The collector, based on the principle of an osmotic pump, is a semipermeable membrane that encloses 2 grams (g) sucrose. Before use, the SalivaSac® is hydrated by dipping in tap water 5 seconds and the person is encouraged to move the device around freely in the buccal cavity during the
sampling period. An ultrafiltrate of saliva is drawn into the collector. The density of the ultrafiltrate is determined to obtain a correction factor for calculating the concentration of the substance assayed (Schramm et al., 1990). Correlations between a chemical assayed in whole saliva and an ultrafiltrate were .95 (Schramm et al., 1990).

Since the membrane of the SalivaSac® has an exclusion limit of approximately 12,000 Da, it provides a saliva sample free of food debris, bacteria and enzymes (Schramm et al., 1990). The mucopolysaccharides in saliva give it a stringy, sticky texture of variable viscosity, making raw saliva very difficult to pipette. The clear ultrafiltrate obtained with the collector is free of mucopolysaccharides and has a uniform consistency.

Nicotine intake as measured by salivary cotinine level was anticipated to be positively related with nicotine dependence, smoking to cope, avoidance coping and positive outcome expectancies, while a negative correlation was anticipated with active coping skills.

Nicotine dependence

Recently, nicotine as an addicting drug has received considerable attention (Henningfield & Nemeth-Coslett, 1988; Hughes, 1988; Jasinski & Henningfield, 1988; Jones, 1987; Martin, 1990; Pomerleau, Pomerleau, Majchrzak, Kloska, & Malakuti, 1990; USDHHS, 1988; West, 1988). Nicotine meets the criteria of drug dependence in that patterns of its use
are regular and compulsive; a withdrawal syndrome usually accompanies tobacco abstinence; nicotine is psychoactive; and can serve as a reinforcer to motivate tobacco-using behavior (USDHHS, 1988). While smokers differ in their degree of dependence on nicotine, the magnitude of this variability and its distribution have not been described (Hughes, 1984).

Nicotine dependence is linked to the discriminative stimuli associated with reinforcing properties of the drug nicotine. West (1988) presented an interactive pharmacological and nonpharmacological model of nicotine dependence where dependence developed basically from nicotine intake but was modulated by cognitions. With continued drug use over time, the risk for physical and psychological dependence increases (Abrams & Niaura, 1987). Smoking behavior may be reinforced negatively by avoidance of withdrawal symptoms or when an individual relays on nicotine to cope with psychosocial problems (Abrams & Niaura, 1987). Dependence is viewed as an important determinant of sustained consumption (Abrams & Niaura, 1987).

Dependent smoking measured pre-abstinence in 29 smokers had a significant, high, positive correlation ($r = .76; p < .05$) with craving during abstinence (West & Russell, 1985). Dependence was measured with a modified Russell and others' (1974) questionnaire. There were also positive, significant
correlations between dependent smoking and irritability during abstinence ($r = .39$, $p < .05$) as well as overall withdrawal severity ($r = .51$, $p < .05$) (West & Russell, 1985).

Habit was given as a major reason for relapse by 32.8% of a group of 54 subjects six months post-cessation (Barnes et al., 1985). Successful abstainers ($n = 50$) tended to have had lower scores on automatic or habit smoking pre-abstinence (Barnes et al., 1985).

Low or medium dependent smokers ($n = 75$) had better abstinence success in a study evaluating 2 and 4 mg nicotine gum during cessation, than high dependent smokers ($n = 36$) (Tonnessen et al., 1988a). High dependence was defined as a score $\geq 19$ on the modified Horn-Russell scale. Plasma nicotine concentrations resulting from the use of nicotine gum were higher for highly dependent smokers than for smokers with low or medium dependence (Tonnessen et al., 1988a).

In another study, 4 mg nicotine gum was superior to 2 mg nicotine gum among highly dependent smokers ($n = 60$) during a two year follow-up period (Tonnessen et al., 1988b). For example, 44% of highly dependent smokers who had used the 4 mg nicotine gum were abstinent at 12 months, while 12% of those who used 2 mg nicotine gum were abstinent. Those with high dependence scores ($\geq 19$ on dependence questionnaire) compensated more by achieving plasma nicotine concentrations with nicotine gum that were 74% of smoking
levels, while medium/low dependent smokers (<19 on dependence questionnaire) achieved 55% of smoking levels (Tonnesen, 1988). There was a significant relationship between nicotine exposure, estimated by number and nicotine content of cigarettes, and the dependence questionnaire ($r = .39, p < .001$) in a group of 175 smokers (Tonnesen, 1988). Tonnesen and others (1988b) concluded that these findings supported the usefulness of the Horn-Russell scale for measuring nicotine dependence.

Nicotine dependence was anticipated to be positively related to positive outcome expectancies, smoking to cope, avoidance coping and nicotine intake.

**Self-directed intervention**

Treatment within cognitive social learning theory requires an individual to accept personal responsibility for learning self-regulatory skills and using them as alternatives in settings where smoking is quite likely (Abrams & Niaura, 1987). Learning to delay gratification and exercising self-control is essential since alternative reinforcers as powerful and immediately effective as nicotine are difficult to find (Abrams & Niaura, 1987). Methods used to treat addictive behaviors in this framework include: 1) self management strategies such as self-monitoring, restructuring the environment, self-reinforcement and cognitive restructuring (Prochaska & DiClemente, 1983); 2) contingency management providing
alternative reinforcers to change addictive behavior (Schwartz, 1987); 3) teaching alternatives to the addictive behavior such as relaxation training (Best et al., 1988); and 4) social skills training such as more effective assertion and problem solving skills (Marlatt, 1985).

Recently, a trend away from intensive clinical interventions toward the development of mediated or self-help interventions was noted (Glasgow & Lichtenstein, 1987). These low intensity interventions have the potential to reach larger numbers of smokers without the expense of frequent health professional contact. While initial cessation rates are considerably lower in low intensity programs, abstinence rates are maintained better than those in more intensive treatment programs (Glasgow & Lichtenstein, 1987). In Schwartz' (1987) review of smoking cessation methods, there were only a few evaluations of self-help materials and yet most smokers preferred to stop smoking on their own. Self-help materials supplemented by phone messages were the most cost-effective approach to improving maintenance (Davis, Faust, & Ordentlich, 1984).

In Schwartz's (1987) review of smoking cessation studies during the period 1978-1985, programs with multiple components had the highest median quit rates for trials with 1-year follow-ups. Two-thirds of the 17 multiple component trials achieved at least 33% abstinence at 1 year post treatment and had a median of 40% abstinent (Schwartz,
1987). These were contrasted with single component treatments with lower success rates. For example, one year follow-up of hypnosis only trials yielded a median quit rate of 20%, nicotine chewing gum alone an 11% median quit rate, acupuncture alone a median of 27% abstinent, and rapid smoking alone a 21% median quit rate (Schwartz, 1987).

Decker and Evans (1989) compared a five-week multimodal smoking cessation program delivered in two formats: a weekly group setting with a leader and a minimal contact weekly mailing of the same content. Abstinence rates at one year follow-up were not significantly different ($p > .20$) for 86 individuals in the two groups. Thirty-seven percent of the meeting group were consistently abstinent, while 41% of the mail group were. Abstinence was biochemically validated with carbon monoxide in expired air. Based on comments from the by-mail participants, Decker and Evans (1989) concluded that progressive weekly modules were preferable to a one-time comprehensive mailing. Participants in Decker and Evan's study were individuals who had responded to advertisements for research on smoking cessation.

Readability of smoking education literature was reviewed by Meade and Byrd (1989). In testing the reading level of 258 smoking patients in a primary care clinic in a Milwaukee public hospital, they found a median level of grade 6 (range = grade 3 to above grade 12). In evaluating
randomly selected passages from smoking education materials, they determined the majority were above grade 9. Meade and Byrd (1989) recommended assessing the comprehension levels of patients and smoking educational material to avoid this disparity.

Lacey and others (1991) concluded that employing local individuals as lay health educators could have a positive impact on participation in smoking cessation programs by black women public housing residents. Access to individuals is enhanced by this approach. Also in Chicago, Jason and others (1988) identified infrequent attendance at free smoking cessation support groups by inner-city residents for a variety of reasons including inclement weather, lack of transportation, fear of crime, and the press of other priorities.

Lando (1987) compared smoking cessation for groups of individuals in formalized smoking cessation programs led by health professional doctoral students and those led by trained lay facilitators. Lay facilitators were successful graduates of the program themselves. There were no significant differences in smoking abstinence rates at 1, 3, 6 and 12 months after the program for individuals in groups led by either type of facilitator.

Literature to support intervention strategies for positive outcome expectancies, affect regulation and self-monitoring and nicotine fading are summarized below.
McMullin and Giles (1981) identified that within cognitive restructuring, clients are assisted to understand that beliefs can be changed and that some feelings are not necessarily true. They countered the assumption that if you believe something, there is nothing you can do about it, by asking clients why they no longer believe in Santa Claus (or an appropriate myth). Positive outcome expectancies of cigarette smoking, an aspect of CSL theory, are amenable to change.

In cognitive restructuring, the individual is assisted to identify irrational beliefs, dispute these and replace them with more adaptive beliefs (Grinc, 1982). Cognitive restructuring was used successfully with chronic pain patients (Blinchik & Grzesiak, 1979). Patients were trained to be aware of their thoughts and self-verbalizations prior to and/or during their experience of pain. They were instructed to omit the word "pain" and to use a new cognitive representation of the pain experience by using self-descriptive statements when they felt the pain (eg. "I feel aroused," "I feel numb") (Blinchik & Grzesiak, 1979).

Klesges and others (1988) assessed beliefs about the health consequences of cigarette smoking and determined that race, education, smoking status, and income were predictors of knowledge. Tipton and Riebsame (1987) developed an instrument to evaluate beliefs about smoking and health which discriminated among smokers, former smokers and
nonsmokers. Research dealing with personal beliefs about expected effects of smoking and/or cognitive restructuring of such expectancies was not found.

Kamarck and Lichtenstein (1988) stated that a relatively unexplored class of behaviors that might account for successful smoking cessation was the use of affect-regulation strategies. Karmack and Lichtenstein (1988) found significant differences on affect regulation between standard and enriched treatment groups. The latter included affect regulation strategies. Abrams and others (1987) reported that successful ex-smokers in their cross-sectional study were rated as more skillful and showed less anxiety while describing how they would respond to emotionally stressful situations, when compared to relapsed smokers.

Livson and Leino (1988) suggested that smoking for pleasure and to reduce negative affect were more psychological motives than other self-reported reasons for smoking, such as addiction. By endorsing them, a smoker may be indicating greater acceptance of some degree of personal responsibility for smoking (Livson & Leino, 1988). Women more than men, reported that they smoked for these reasons (Livson & Leino, 1988). Therefore, smoking cessation programs should present themselves, especially to women, as being able to counter these two affect management factors of
smoking for pleasure and to reduce negative affect (Livson & Leino, 1988).

Physiological strategies are used to help individuals cope with pharmacological aspects of nicotine addiction (Best et al., 1988). Along with cognitive and behavioral changes, nicotine fading provides for progressive reductions in nicotine intake and associated nicotine dependence.

Berecz (1984) compared a low-contrast nicotine fading technique with a high-contrast number fading procedure. Contrast is the relationship between body nicotine level and cigarette nicotine level. Reducing the number of cigarettes and "cold turkey" methods significantly increase the contrast between levels of body and cigarette nicotine (Berecz, 1984). Under these high-contrast conditions, when a smoker lights a cigarette it produces a powerful hit. Reinforcing value of a cigarette is directly proportional to the contrast (Berecz, 1984). Primarily blue collar factory worker participants (n = 104) were randomly assigned to nicotine fading or number fading treatment groups lasting 2 weeks. Nicotine fading participants had a significantly lower drop out rate than number fading smokers during three of seven phases in the study (ps < .05). Drop out rate was identified as a possible indicator of withdrawal discomfort. Drop out rates in phases 4, 5, 6, and 7 of the nicotine fading group were similar to those of the number fading group, and could probably be prevented by slowing the fading
schedule (Berecz, 1984). There were no significant
differences in urge ratings between the two groups and there
was no trend in increased urges over the two week fading
period. However, dropouts may have experienced increased
urges and left, therefore leading to biased findings. At
baseline, number of cigarettes was moderately correlated
\((r = .55, p < .01)\) with number of caffeine beverages among
women. A lower \((r = .26, p < .06)\) correlation between number of
cigarettes and caffeine beverages exited for men. Caffeine
intake was not addressed specific to the two treatment
groups, so it is unclear what effect this may have had on
outcomes.

With nicotine fading, individuals can continue to smoke
the same number of cigarettes while changing to brands with
lower nicotine yield ratings which may or may not affect
plasma nicotine levels. Brands are switched in the
direction of gradually lowering nicotine intake to wean the
individual from nicotine dependence (Schwartz, 1987). Foxx
and Brown (1979) recommended changing brands to lower
nicotine content from baseline by 30\%, 60\% and 90\% over 3
weeks. As participants record decreases in nicotine content
over brand changes, they can perceive considerable progress
in nicotine reduction even if much of this apparent decrease
is illusory (Schwartz, 1987). Hill and Marquardt (1980)
demonstrated that when smokers switched to lower yield
cigarettes, their plasma cotinine values tended to stay
about the level they were with their usual brand. The potential for individuals to compensate nicotine fading via topography exists.

Foxx and Brown (1979) assigned 38 smoking subjects to 4 treatments: nicotine fading; self-monitoring; combination of the two; or a modified American Cancer Society smoking cessation program. At 18 month follow-up, 10% of the nicotine fading and ACS program groups were abstinent; none of the self-monitoring groups were abstinent; while 40% of the smokers in combined nicotine fading and self-monitoring treatment were abstinent.

Nicotine fading produced variable results in the 13 studies reviewed by Schwartz (1987). An increased interest in brand fading was indicated by nine of the studies being conducted in the last three years of the period reviewed (Schwartz, 1987). For 1-year trials, quit rates ranged from 7 to 46% with a median of 25%. Nicotine fading provides an opportunity for smokers to reduce their dependence on nicotine gradually, but should be supplemented with cognitive-behavioral strategies (Schwartz, 1987).

Since there was little to summarize, Orleans and others (1989b) identified recommendations for smoking cessation initiatives for black Americans instead of a review of past research in the area. Attractive black peer models would seem the most appropriate sources for messages to counter cigarette ad images of a 'better life through smoking.'
There is evidence that blacks do not receive messages about risks of cigarette smoking as often as whites (USDHHS, 1987a) and the twenty year lag between widespread smoking adoption and widespread incidence of smoking-related disease may have created a fallacy of black immunity to smoking health risks (Cooper & Simmons, 1985). Therefore, messages should make it clear that black smokers are not immune to smoking-related diseases. However, it is imperative to emphasize the reversibility of smoking health risks to offset the 'fatalistic' view of disease, particularly cancer, among blacks (Snow, 1983).

Given a modal low rate/high nicotine menthol smoking pattern for blacks, another important motivational message should challenge likely misconceptions about the 'safety' of continued low-rate smoking (Orleans, Strecher, Thompson, Numan, Holloway, & Allen, 1987) and stress that menthol additives may pose additional health risks (Cummings et al., 1987) or enable more dangerous smoking.

Smoking cessation may not be as high on the need hierarchy (Maslow, 1967) as other more basic life issues such as employment or family well-being for lower socioeconomic status (SES) smokers in any racial or ethnic group. Therefore, messages aimed at lower SES black smokers might highlight that quitting smoking frees up time and energy for more important issues (Orleans et al., 1989b) as well as the monetary gains.
An example of a specific tailored intervention resulted from a survey of low-income black life insurance policy-holders that revealed a high prevalence of obesity among black women smokers. This indicated a need to design culturally sensitive post-quitting diet guidelines to prevent excessive weight gain (Orleans et al., 1989a).

Anti-smoking messages aimed at family groups and kinship networks through churches, schools, workplaces and mutual aid organizations offer special opportunities to shape norms and influences within families and extended social networks (Eng, Hatch, & Callan, 1985; Kong, Miller, & Smoot, 1981). On the other hand, a special challenge exists to reach target populations, such as the chronically unemployed, outside of these mainstream institutions who are not active in church or other community groups (Lemann, 1986). Another important determinant of treatment outcome is patient-provider similarity on sociocultural variables (USDHHS, 1986). Thus, efforts to recruit and train facilitators from the black community could improve outreach and effectiveness (Orleans et al., 1989b). Blacks must be assured access to existing state-of-the-art programs and resources including self-help and more intensive treatments using innovative delivery modes within the black community (Orleans et al., 1989b). A special role for cost-effective self-quitting programs is evident when considering the primacy of self-quitting methods among black exsmokers.
(Orleans et al., 1989a) and the strength of the self-help tradition in the black community (Martin & Martin, 1987).

It was anticipated that individuals who received the low intensity intervention in this study would experience decreases in positive outcome expectancies, smoking to cope, nicotine dependence and nicotine intake compared to individuals in advice only or waiting list control groups.

The review of literature included the importance of a biopsychosocial approach to cigarette smoking research, sociodemographic risk factors, costs of cigarette smoking at the state level, minority health issues with a focus on women, cognitive social learning theory, positive outcome expectations, smoking to cope, general coping skills, nicotine intake, nicotine dependence and self-directed intervention targeted at expectations, affect management and nicotine fading.
Chapter III

METHODOLOGY

Research Design

The first three research questions of the study focused on examining a model of nicotine dependence. To answer these questions, a descriptive cross-sectional survey one-group design was implemented with 187 women participating.

To answer the fourth research question regarding feasibility of a low intensity intervention, a subset of 66 women who were part of the larger study, participated again at 6 and 12 weeks after entering the study. Women offered the opportunity to participate in the feasibility study were those whom the investigator would be able to contact through an alternative means, such as a worksetting or a friend or relative, to improve retention in the study. These subjects were randomly assigned to one of three groups upon entering the study: intervention, advice-only, or waiting list control group (Figure 4).

A complete description of intervention is provided later in this chapter. One-time advice consisted of the investigator sharing her concern as a nurse regarding the importance of quitting cigarettes and suggesting that the
participant make every effort in the next six weeks to quit smoking. Participants were reminded that they would be recontacted at that time. Waiting list control group members were told they would be contacted to set up an appointment in 6 weeks. An advantage of a wait-list control group is that it provides information about the natural history of cigarette smoking, in this case, and is important in early stages of research with clinical problems (O'Leary & Borkovec, 1978).

Women were paid $10 for participating in the cross-sectional survey and, for those in the feasibility study, an additional $15 after completing the 12 week follow-up.

<table>
<thead>
<tr>
<th>Cross-Sectional Survey</th>
<th>3-Group Intervention Feasibility*</th>
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<td>6 and 12 week follow-up</td>
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| 187 women | Subset of 66 Women | Intervention (n=22) | Advice only (n=22) | Control (n=22) |

* Random assignment to group

Figure 4. Research Design

In examining a model of nicotine dependence, data on variables in the model were collected in the cross-sectional survey. Predictor variables were smoking to cope, positive
outcome expectancies, general coping skills (avoidance, behavioral and cognitive) and nicotine intake (salivary cotinine) and the criterion variable was nicotine dependence. Information was also obtained on additional potential explanatory variables: sociodemographic information, smoking history, environmental exposure to cigarette smoking and current medical diagnoses.

In the feasibility study portion, the independent variable was the 4-week mailed smoking cessation intervention with telephone follow-up by a lay facilitator. At 6 and 12 weeks after entering the study, women in this phase provided information on dependent variables of smoking status (via self-report and salivary cotinine) and variables in the model to describe differences or similarities across three groups over time. At 12 week follow-up women in the intervention group offered their ideas on procedural aspects of the intervention in a semi-structured interview. Also at this time, women in the intervention group contributed general and specific information regarding strengths and weaknesses of the content and process of the intervention in a semi-structured interview.

Data collection for the cross-sectional survey was conducted from December 1990 through December 1991. Women were entered into the 3-group feasibility study from January 1991 through October 1991. The last 12 week follow-up was completed in January 1992.
Sample

Subject selection.

Target population of the proposed study was black women in the Columbus metropolitan area who smoked cigarettes regularly. Estimated number of black women smokers in this area is 25,000+ based on 1986 population estimates and 43% smoking prevalence (Capwell & Adams, 1989; Bureau of Census, 1988).

Inclusion criteria were: black female; ≥ 18 years; English literate; self-reported daily cigarette smoker; live in the Columbus metropolitan area; and willing to participate either once or three times over a 3 month period. Minimum age of 18 was selected to be comparable with other studies of adult smoking cessation. The majority of female smokers are in an age group 20 to 44 years (USDHHS, 1987b).

Exclusion criteria were: self-reported nonsmoker; consumption of nicotine in forms other than smoking, such as nicotine chewing gum; currently involved in formalized smoking cessation program; or living in an inpatient psychiatric facility or prison. Only one member per household was knowingly entered into the study.

Sample Size.

A power analysis was calculated for the multiple regression used to identify the best predictors of nicotine dependence. Given there were three potential explanatory
variables beyond model predictor variables (possibly education, age and partner's smoking status) and those variables had an overall $R^2$ of .10, to detect an overall increase in $R^2$ of .07 for six additional independent variables of interest, with a power of .80 and an alpha=.05, a sample size of 172 participants was needed (Cohen & Cohen, 1983).

Education level is a major predictor of smoking status with higher smoking prevalence among the less educated (Pierce et al., 1989a; Novotny et al., 1988). Higher nicotine dependence may be associated with continued smoking and therefore lower education levels. Kabat and Wynder (1987) found that smoking cessation rate increased with age, and if quitting is related to lower nicotine dependence, age may be an additional explanatory variable. McIntryre-Kingsolver and others (1986) and Cappotelli and Orleans (1985) reported that successful quitters were significantly more likely to have a nonsmoking partner than recidivists. With these findings, partner's smoking status may influence nicotine dependence in the proposed model.

Subject Recruitment.

Subject recruitment was conducted in various settings such as community centers, neighborhood health centers, work settings, and through referral of other participants. A report of a Chicago inner-city smoking cessation program recommended the use of trusted community leaders in subject
recruitment versus random selection (Jason et al., 1988). In some settings, individuals from the community assisted with recruitment. The black woman mayor of Urbancrest, a village with a large percentage of black residents, was instrumental in providing access to local community center staff who recruited women who smoked cigarettes to participate in the study. In a nursing home setting, a black woman who was director of housekeeping recruited staff to participate in the study. An administrator of the Columbus Urban League, who was a black woman smoker, recruited participants from their onsite training program. Initially, the investigator met with the intended recruiters to explain the purposes and requirements of the study.

Groups and organizations were contacted through promotional flyers given to leadership persons or through recruitment presentations. Groups and organizations included Black Singles, Inc., Coalition of 100 Black Women, several sites of the Community Pediatric Adolescent Services, Ohio State University Internal Medicine Outpatient Clinic, and directors of all employee departments at Ohio State University Hospitals. Very few participants were recruited through these efforts.

In other cases, such as neighborhood health center waiting areas, the investigator approached women directly about participating in the study. The investigator explained that she was a nurse interested in the health of
black women, and in particular about health of those who smoked cigarettes. The investigator asked if the woman currently smoked cigarettes. If the woman responded affirmatively, the investigator explained the general purpose of the study, time commitment in completing written questions, reason for saliva sample for cotinine and payment for participation. Participants were encouraged to ask questions about the study and their involvement. Informed written consent was obtained (Appendix A). One year of data collection, from December 1990 through December 1991 was required to recruit 187 women to the study.

**Protection of Human Subjects**

Women who agreed to participate in the study were given a clear explanation of its purpose and the value of their contribution to a better understanding of cigarette smoking. There were virtually no risks associated with participation. Benefits of participation, beyond payment for their time and information, included obtaining results of salivary cotinine analysis with an accompanying explanation, for those women who provided an address where this could be mailed. In addition, those in the intervention portion received the 4-week program during the feasibility study. Women in advice only and control groups were given the option of receiving the 4-week program following their final 12 week data collection appointment.
Confidentiality was addressed by using a number code on each written questionnaire and on saliva samples. Names of participants were not written on either of these data sources. Participants were assured their information would not be shared with others. This was emphasized particularly in workplace data collection settings. Raw data were stored in a locked metal cabinet prior to analysis and after completion of the study.

Instrumentation and Measures

Smoking history and demographic information were assessed at the beginning of the study for each participant (Appendix B). Variables included were age, household income, employment status, education, current smoking rate per day, brand of cigarette, use of mentholated cigarettes, number of years of continuous smoking, use of other forms of tobacco or smoking products, prior treatment for smoking cessation and approximate date, number of previous quit attempts, level of interest in quitting cigarettes, percentage of friends who smoke, proportion of cohabitating smokers, and smoking status of partner (current smoker, exsmoker, never smoked). These are commonly used indices in smoking cessation research (Marlatt et al., 1988). Information on existing diagnosed medical conditions was also obtained.

Positive outcome expectancies of cigarette smoking was determined by the 40-item alcohol expectancies instrument
(Brown et al., 1980; Rohsenow, 1983) modified to reflect smoking rather than drinking behavior and eliminating nine negative outcome alcohol expectancy items. The resulting 31 item instrument has 6 subscales: global positive (5 items), social and physical pleasure (5 items), sexual enhancement (5 items), power and aggression (6 items), social expression (5 items), and tension reduction (5 items) (Appendix C). The modified POE was pretested with thirty black women who smoked cigarettes and no changes were made as a result. Internal consistency was satisfactory (Kuder-Richardson=.82).

The POE items are true/false statements arranged in random order (Rohsenow, 1983). Respondents are instructed to mark true if an item is always or sometimes true for them, or false if it is rarely or never true for them. The score for each subscale is the sum of items marked true with higher scores reflecting more positive outcome expectancies (Rohsenhow, 1983). Low alpha coefficients reported by Rohsenow (1983) for the subscales ranging from .49 to .74 may have been a function of the dichotomous item responses. A Kuder-Richardson analysis would have been more appropriate since it is used with dichotomous responses, while coefficient alpha is used with continuous responses (Mueller, 1986).

Cooper and others (1988) used a composite score of the alcohol expectancy subscales since all six subscales loaded
on a single factor with loadings ≥.65. A summary score for positive outcome expectancies was obtained by computing a mean of the means from each subscale to adjust for different number of items on subscales (Cooper et al., 1988). The coefficient alpha for the resulting composite score reported by Cooper and others (1988) was .86. A total score for POE of smoking was used in the study derived from a mean of means from the six subscales.

Smoking to cope was measured by a 25-item instrument composed of five factors: stimulant, indulgent, sedative, psychosocial and sensorimotor smoking (Appendix D) (Russell et al., 1974; West & Russell, 1985). The 25 items resulted from an oblique factor analysis with 175 subjects, but reliability was not reported. Response options were 0 to 3 with 0 = not at all; 1 = a little; 2 = quite a bit; and 3 = very much so (Russell et al., 1974). Russell and others (1974) chose this scoring scale rather than a typical "always to never" continuum to decrease ambiguity for the respondent. For example, on an item such as "I smoke in order to keep myself from slowing down," the respondent may be confused as to whether an "always" response would mean one always smoked to keep from slowing down or that when one began to slow down, smoking always helped to prevent it (Russell et al., 1974). Total score ranged from 0 to 75. A higher score indicated greater use of smoking to cope.
Coping skills was assessed using the 32-item Health and Daily Living Coping Response Index (Appendix E) (Moos et al., 1986). Subjects were asked to indicate a recently experienced stressful event or situation. Then they rated their frequency of use on a 4-point scale (no, once or twice, sometimes, fairly often) of 32 potential coping responses to deal with the stressful situation. The items included active behavioral coping (13 items), active cognitive (11 items), and avoidance coping (7 items). The avoidance coping item "tried to reduce tension by smoking more" was eliminated in this study because of redundancy. Scoring for each item was from zero (no) to 3 (fairly often) with active cognitive coping scores ranging from 0 to 33; active behavioral coping ranging from 0 to 39; and avoidance coping from 0 to 24 (Moos et al., 1986). This is comparable to Cooper and others' (1988) modification of the general coping skills measurement in that they eliminated the avoidance coping item on drinking more. Therefore, the range for avoidance coping was 0 to 21. Alpha coefficients of the subscales ranged from .55 to .76 in two studies with 424 subjects each (Moos et al, 1986). Variability was as follows in the two studies: Active cognitive coping - means (SD) = 17.4 (5.91) and 17.5 (5.55); active behavioral coping - 20.51 (7.34) and 19.49 (7.09); and avoidance coping - 7.9 (3.55) and 4.52 (3.29). In personal communication,
Moos (1990) reported the proportion of black women involved in either study was 5% or less.

**Nicotine dependence** was measured via self-report with 9 items assessing automatic and dependent or addictive smoking behavior (Russell et al., 1974; Tonnesen, 1988; West & Russell, 1985). The Nicotine Dependence questionnaire is found in Appendix F. Oblique factor analysis supported the six initial addiction and automatic factor items (Russell et al., 1974). Three dependence items related to ability to abstain were added in 1985 (West & Russell, 1985). No internal consistency information of the 9 item dependence questionnaire was reported by Tonnesen, but test-retest reliability was .79 in 163 smokers over a 4 to 6 week interval (Tonnesen, 1988). Since subjects were participating in treatment involving smoking cessation counseling groups and use of nicotine gum (Tonnesen et al., 1988b), the stability of nicotine dependence and the use of test-retest reliability is questionable.

Convergent construct validity was supported by a moderate correlation ($r=.49, p<.001, n=171$) of the 9 item Nicotine Dependence instrument with the Fagerstrom Tolerance Questionnaire (FTQ) (Fagerstrom, 1978) ($p<.001, N=171$) (Tonnesen, 1988). The FTQ has been used frequently to assess nicotine dependence (Clavel, Benhamou, & Flamant, 1987; Jarvik & Schneider, 1984; Killen, Fortmann, Telch, & Newman, 1988) although several concerns regarding scoring
ambiguous have been noted (Moore, Schneider, & Ryan, 1987; Pomerleau et al, 1990).

Responses for each item on the Nicotine Dependence questionnaire were 0 to 3 with 0 = not at all; 1 = a little; 2 = quite a bit; and 3 = very much so. Total scores ranged from 0 to 27 with a higher score indicating more nicotine dependence. A score ≥19 was considered high dependence (Tonnesen, 1988). In support of this definition of high dependence, Tonnesen (1988) found that plasma nicotine and cotinine from smoking and carbon monoxide in expired air were significantly (p<.01) higher among high dependent smokers (score ≥19) than among medium to low dependent smokers (score <19). Additionally, highly dependent smokers compensated more than their less dependent counterparts in use of 4 milligram (mg) nicotine gum, achieving plasma nicotine concentration at 74% and 55% of smoking levels, respectively (Tonnesen, 1988).

The Health Promotion Lifestyle Profile (HPLP) instrument was placed at the beginning of the instruments participants completed, in an effort to diffuse the focus on cigarette smoking exclusively (Appendix G). Written permission to use the copyrighted instrument was obtained from Walker. The HPLP is a 48-item summated behavior rating scale that employs a 4-point response format (1=never, 2=sometimes, 3=often, and 4=routinely) to measure the frequency of health-promoting behaviors (Pender, Walker,
Sechrist & Frank-Stromborg, 1990; Walker, Sechrist, & Pender, 1987; Walker, Volkan, Sechrist, & Pender, 1988). Subscales include self-actualization, health responsibility, exercise, nutrition, interpersonal support and stress management (Walker et al., 1987). Following a pilot study and content validity review by four nursing faculty, a 107-item instrument was completed by 952 individuals (Walker et al., 1987). Item and factor analysis resulted in a 48-item instrument with the 6 subscales identified above. Alpha coefficients ranged from .702 - .904 for individual subscales, while the alpha coefficient for the total 48-item instrument was .922 (Walker et al., 1987). Subsequent internal consistency scores of the total 48-item instrument were similar at .93 (Pender et al., 1990) and .923 (Walker et al., 1988). Test-retest reliability over a 2-week period for the total scale was .93 (Pender et al., 1990).

Six dimensions of health-promoting lifestyle represented by the six subscales are: 1) self-actualization - having a sense of purpose, seeking personal development and experiencing self-awareness and satisfaction; 2) health responsibility - attending to and accepting responsibility for one's own health, being educated about health, and seeking professional assistance when necessary; 3) exercise - adhering to regular exercise patterns; 4) nutrition - establishing meal patterns and making food choices; 5) interpersonal support - maintaining
relationships involving a sense of intimacy and closeness; and 6) stress management - recognizing sources of stress and acting to control stress and achieve relaxation (Walker et al., 1988).

Estimation of nicotine intake is defined as tobacco smoke exposure or cigarette dose via smoking (Henningfield, 1984; Jacob et al., 1988) as measured by salivary cotinine, a nicotine metabolite. Cotinine level measurement can provide a sensitive estimate of tobacco smoke exposure (Jarvis et al., 1987). The range of salivary cotinine values is 0 to 1000 ng/mL with nonsmoking status identified as ≤ 14 ng/mL and > 14 ng/mL considered smoking status (Perez-Stable et al., 1992).

Cotinine assay was performed in blinded fashion by reversed-phase C-18 ion-pair high performance liquid chromatography and detection by absorbance at 256 nanometer (nm) following a modified Hariharan and others' (1988) protocol. (Appendix H) Intra-assay coefficients of variations (CVs) were 2.3 - 5.8% and interassay CVs were 2.4-5.5%, while extraction efficiency for cotinine standard was 84% (Hariharan et al., 1988). Using a cut-off of 10 ng/mL, Abrams and others (1987) reported a 95% sensitivity and 91% specificity of salivary cotinine supporting its validity.

The assay was standardized every day, using a series of cotinine standards from values of 3.9 ng/mL to 250 ng/mL or
500 ng/mL. A uniform amount of internal standard (N-ethyl nornicotine) was injected with each cotinine standard. A series of ratios of cotinine to internal standard (IS) peak heights was used to calculate a regression line for a standard curve to use to estimate the level of cotinine in each saliva sample. Lotus® 1-2-3® software (Lotus Development Corp, Cambridge, MA) was used to perform the regression calculations. Following injection of each unknown saliva sample, peak heights were obtained for cotinine and the IS and compared to a standard curve. Additional calculations included a correction factor for specific gravity as described in the saliva sample collection procedures below.

Processing was done in batches to improve reliability. Participants who were involved with 6 and 12-week follow-up had a potential of 3 specimens each. Each subjects' three samples were assayed within the same run to decrease interassay variability.

Saliva specimen collection was accomplished using the recently developed Saliva Sac® (BioQuant, Ann Arbor). The SalivaSac is a soft, pliable membrane that forms a spherical pouch enclosing an osmotically active carbohydrate. It is externally flavored with citric acid to stimulate salivation. The subject dips the SalivaSac in water for 5-6 seconds to prevent it sticking to oral mucosa. Then she places it in her mouth and moves it around for approximately
10 minutes during which about 1 - 2 mLs of saliva ultrafiltrate enters the SalivaSac. Women were instructed not to bite or swallow the SalivaSac. They completed written questionnaires during this time period. This technique overcomes earlier problems of saliva samples obtained in a conventional manner yielding viscous, "stringy" saliva specimens due to nonfood particulate matter and mucopolysaccharides as well as subject hesitancy to provide saliva samples (Schramm et al., 1990).

The participant placed the filled SalivaSac in a plastic container which was capped, placed in a plastic bag and stored in a refrigerator until the sample could be frozen. One mL of saliva was withdrawn from the SalivaSac with a 1 1/2" 21 gauge syringe. The weight of 1 mL was recorded to determine the specific gravity of the sample.

One mL specimens were then stored in 5 mL capped tubes and frozen at - 70° C. until cotinine assays were performed. Feyerabend and Bryant (1987) cautioned that care should be taken when storing small volumes of samples over a long period of time to avoid effects of sublimation and vapor loss. Assays were performed within six months of collection and performed without knowledge of the reported smoking status (Coultas et al., 1988).

Field Test

Information on the use of self-report instruments of positive outcome expectancies, smoking to cope, general
coping skills and nicotine dependence among black women was not available. Therefore, a field test of the instruments was conducted with 30 black women smokers to support the validity and reliability of these instruments. The focus of this field test was to establish clarity and readability of the instruments. One item on the Smoking to Cope questionnaire was reworded from "It is easier to talk and get on with other people when smoking" to "It is easier to talk to and feel comfortable with other people when smoking". This recommendation was made by a participant and reduced misinterpretation of the phrase "get on".

In addition, women were asked about their beliefs in relation to cigarette smoking and smoking cessation. They also evaluated various types of intervention materials and procedures being considered for the low intensity intervention feasibility portion of the study and offered suggestions on acceptable ways to present saliva collection. A summary of responses appears in Appendix I.

**Low Intensity Intervention**

**Intervention components.**

The intervention consisted of four weekly mailings to each woman who had been randomly assigned to the experimental group. Topics addressed included self-monitoring of cigarette smoking, nicotine fading, alternative coping skills, and cognitive restructuring. Materials were selected from existing smoking cessation
literature: *Quit for Life* (Schoenbach et al., 1988), *Freedom from Smoking for You and Your Family* (ALA, 1987), and *Don't Let Your Dreams Go Up In Smoke* (ALA, 1990), while the role of lay facilitator was adapted from the Freedom from Smoking Clinic Facilitator Guide (ALA, 1984). The investigator developed weekly cover sheets to introduce the focus of each packet (Appendix J).

The investigator was advised to incorporate existing materials targeted at black Americans rather than design all the educational information. Victor Schoenbach and others (1988) developed *Quit for Life*, a mediated, self-help smoking cessation intervention for middle and lower-middle class black smokers. North Carolina Mutual Life Insurance company, the nation's largest black-owned insurance company, collaborated with Schoenbach and others in the development of this program to implement with their policy holders. A North Carolina minority-owned design firm assisted in tailoring the content and format along black-oriented themes identified through consultants and focus groups of black smokers (Schoenbach et al., 1988). Materials were written at the fifth grade level and incorporated black peer models in photovignettes about quitting methods and benefits. Photography was donated by Pinderhughes, a nationally known award-winning professional photographer.

The investigator obtained written permission from Schoenbach to use the materials in this study and purchased
Quit for Life kits from North Carolina Mutual Life Insurance Company.

*Freedom from Smoking for You and Your Family* is a 56-page colorful, well-illustrated self-help smoking cessation guide that addresses needs of individuals in precontemplation, contemplation and active quitting stages (American Lung Association, 1987). It is also written at a fifth grade reading level and uses multicultural images.

A black woman exsmoker was trained as a lay facilitator to contact individuals in the treatment group. The facilitator had been exsmoker for three years, quitting through a worksite structured smoking cessation program, *Freedom from Smoking®* by the American Lung Association. She was a single parent with one schoolage daughter and thus had similarities with many women in the study. The lay facilitator received monetary compensation for her contribution to the study.

The investigator reviewed the 4-week program plan with the facilitator. Some of the content was similar to the cessation program in which she participated. The facilitator's input was encouraged during final development of the 4-week program.

The facilitator attempted to contact participants on a weekly basis by telephone to clarify questions about information in the materials and provide encouragement. She maintained written notes on these contacts. Findings
from an inner-city self-help smoking cessation program in Chicago indicated what participants liked most about the program were support phone calls, a free manual, and being able to follow the program in their homes since research also noted that attendance at group meetings was low (Jason et al, 1988).

Week-by-week content is summarized below.

Week 1: The objectives were increased self-awareness of cigarette smoking behavior and beginning to contemplate quitting cigarettes. Several "Pack Track" forms and a pen to self-monitor each cigarette smoked over a three day period were included. Self-monitoring focused on the time each cigarette was smoked, as well as perceived need and mood with each cigarette. Also included was "Don't Let Your Dreams Go Up In Smoke", an 8-page multi-color booklet focused on the black family who are not considering a change in cigarette smoking (American Lung Association, 1990). This booklet addressed the following topics: taking control; nicotine is a drug; a poison to the ones you love; tobacco companies want you and your money; and leading causes of death for black Americans (ALA, 1990). Several pictures and personal testimony quotes were incorporated with each topic (ALA, 1990). An introductory letter by the investigator was included explaining that the facilitator would be calling each of four weeks (Appendix J).
Week 2: Specific techniques to prepare for quitting were presented. One technique was nicotine fading information - a chart with cigarette brands grouped into those with high, medium and low nicotine content (American Lung Association, 1987, pp. 16-17) and a guide with specific steps to implement nicotine fading (Schoenbach et al, 1988). Two apple-shaped refrigerator magnets with the phrase "Quit for Life" were included to keep the guide sheet visible during the week. The 4-page introduction materials from Freedom from Smoking for You and Your Family (ALA, 1987, pp. 3-8), addressed reasons people decide to quit smoking. The investigator-designed introductory letter suggested the participant write down the names of one or two friends who would help the individual during the quitting process. Also contained in this pamphlet were facts to address the stimulant effects of nicotine in an effort to counter a common belief that nicotine is relaxing.

Week 3: The focus was on selecting a specific date to quit smoking cigarettes and providing sample substitutes. Tips to prepare the home and family/friends for quit day were described on a two-color heavy weight card suitable to place on the refrigerator (Schoenbach et al., 1989). "Removing Roadblocks" was a 4-page section of Freedom from Smoking for You and Your Family that discussed alternative coping strategies of relaxercise (deep breathing) and exercise (ALA, 1987, pp. 9-13). A packet of substitutes
consisted of sugarfree mints, straws the size of cigarettes, lollipop, a spice cinnamon stick, word search booklet with a pencil, a wallet card with 4 D's - Do something else; Delay; Drink water; and Deep breathe. A calendar with heart-shaped stickers was included to be placed on each nonsmoking day as a reward, as well as a simmering potpourri sample to create an olfactory sensation.

Week 4: Maintenance coping strategies incorporated were a card on weight control (Schoenbach et al., 1988), a list of low calorie snacks and suggestions (ALA, 1987, pp. 41-44), and suggestions for staying smokefree (Schoenbach et al., 1988). Rewards for not smoking were suggested (ALA, 1987, p. 35), as well as accumulating the money not spent on cigarettes in a bank provided. Benefits to be gained from not smoking illustrated on a figure drawing of a woman included reduced risk for low birth weight infants, heart disease, emphysema, lung cancer, and cancer of the cervix. This addressed misconceptions about increased illness following smoking cessation. Additional benefits of less shortness of breath, improved sense of taste and smell and increased sense of control were identified.

Pilot Test of Intervention

Before the three group feasibility study was begun, a pilot study of the 4-week intervention was conducted with two black women smokers. Their feedback was incorporated into the final intervention plan. For example, amount of
information each week was deemed appropriate, more permanent
covers were added to sections of the *Freedom from Smoking*
*For You and Your Family* literature, and the participant who
was more interested in quitting was very positive about lay
facilitator support. It was helpful for the lay facilitator
to experience differences in the amount of telephone contact
desired by the two women in the pilot so that she could
anticipate ways to make the best use of discussions in the
feasibility phase.

**Feasibility of intervention.**

At 6 and 12 week follow-up appointments, women in the
three groups provided information on smoking status (self-
report and salivary cotinine) and nicotine dependence model
variables to be able to describe differences or similarities
across the three groups over time. At 12 week follow-up
women in the intervention group offered their ideas on
procedural aspects of the intervention in a semi-structured
interview.

**Strengths and weaknesses of intervention.**

Also at the 12 week follow-up appointment, women in the
intervention group contributed general and specific
information regarding strengths and weaknesses of the
intervention in a semi-structured interview. Purposes for
doing an interview include obtaining here-and-now
constructions of events, reconstruction of events from the
past, and projection of such events/entities to be
experienced in the future (Lincoln & Guba, 1985). An interview is frequently a method of choice because it allows opportunity to identify misinterpretation and clarify communication, probe for additional information and pursue selected topics in depth and with greater detail than other methods may allow (Waltz, Strickland, & Lenz, 1984).

The interview guide approach was selected for this study to address research question 5 on strengths and weaknesses of the intervention and aspects of research question 4 on feasibility procedural issues. In this approach, topics and issues to be covered are specified in advance in outline form and the interviewer decides the sequence and wording of questions in the course of the interview (Patton, 1980). Having a prepared list of topics increases the comprehensiveness of the data and makes data collection somewhat systematic for each respondent. With the flexibility of this approach, the interviews remain fairly conversational and situational. To assure the meaningfulness of questions for each respondent, the interviewer may change the words to fit the respondent and the situation (Waltz et al., 1984). Since the focus of the research question was evaluation, many interview questions were those seeking opinions about what women participants thought about aspects of the intervention (Patton, 1980).

One disadvantage of the interview guide method is that interviewer flexibility in sequencing and wording questions
may result in substantially different responses, decreasing the comparability across respondents (Patton, 1980). More interviewer bias may be introduced compared to the structured interview situation. However, in this study, the information sought was fairly concrete and evaluation of weekly intervention materials was organized chronologically, reducing the potential for interviewer bias.

To reduce validity threats, the interview guide for input at the 12 week appointment was developed to include questions relevant to the research purpose and sequenced to flow from general to specific (Hutchinson & Wilson, 1992). A major threat to validity is the retrospective nature of the interview occurring at least 6 weeks after participants completed the intervention. However, it was determined that an evaluation interview at 6 week follow-up could become part of the intervention itself and alter the outcome. To improve participants' ability to recall aspects of the intervention, the investigator used sample week-by-week packets as cues throughout the interview.

The interview guide was pretested with both women in the pilot study after they had completed the intervention. The evaluation interview was conducted with one of the women at her place of work, while the other was interviewed in her home with her 4-year-old granddaughter present. The guide was determined suitable to obtain information needed to address the research question of strengths and weaknesses of
the intervention. Comments from participants were handwritten on the interview guide during and immediately after the interview. These were summarized by each topic on the guide after all 12 week interviews were completed.
Chapter IV

DATA ANALYSIS AND INTERPRETATION

Descriptive statistics were used to answer Research Question 1 - What are cigarette smoking behavior and sociodemographic characteristics of black women who currently smoke cigarettes? For Research Question 2 (What are the relationships among positive outcome expectancies, smoking to cope, general coping skills, nicotine intake and nicotine dependence among black women who currently smoke cigarettes?) Pearson correlation coefficients were used to analyze the question of association.

A stepwise forward multiple regression analysis was used to answer Research Question 3 - What are the best predictors of nicotine dependence among black women who currently smoke cigarettes? Nicotine dependence was the dependent variable, with model predictor variables of positive outcome expectancies, smoking to cope, active cognitive coping, active behavioral coping, avoidance coping, and nicotine intake. Additional potential explanatory variables of smoking history and sociodemographic variables were also correlated with nicotine dependence to identify variables to include in
multiple regression analysis. Point biserial correlations were used with categorical variables as indicated.

Procedural issues, as well as descriptive data on nicotine intake and other model variables, were used to address Research Question 4 - Is it feasible to conduct a 4-week mailed smoking cessation intervention with weekly support from a black woman exsmoker? Evaluations from participants and the lay facilitator provided information regarding feasibility. Qualitative information from participants and the lay facilitator was used to address the issue of Research Question 5 - What are strengths and weaknesses of a low intensity mailed smoking cessation intervention with weekly support by a black woman exsmoker?

Description of Sample

The total sample consisted of 187 black women between the ages of 18 and 69 years (M=36.1, SD=9.9, Med=34.5), who currently smoked cigarettes. An additional 7 women completed questionnaires and provided saliva samples, but their cotinine values were at nonsmoker levels. Their data were eliminated from the study. Sociodemographic characteristics for the 187 women are presented in Table 1. The majority of the women reported being single, divorced or separated (70% combined). Twenty-eight percent of women had not graduated from high school, while 32% had completed high school and 40% had more than a high school education.
Fifty-two percent were employed full time in predominantly health care, clerical, professional, and cleaning service occupations. Many women (60%) reported a household annual income less than $15,000, while 12% reported incomes greater than $30,000. There were 122 women (65%) who reported one or more children under the age of 18 living in their household.

Table 1. Sociodemographic Characteristics of Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percent of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>45%</td>
</tr>
<tr>
<td>Married</td>
<td>18%</td>
</tr>
<tr>
<td>Divorced</td>
<td>16%</td>
</tr>
<tr>
<td>Separated</td>
<td>9%</td>
</tr>
<tr>
<td>Live with partner</td>
<td>6%</td>
</tr>
<tr>
<td>Widowed</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>8 years</td>
<td>0.5%</td>
</tr>
<tr>
<td>9 years</td>
<td>2.2%</td>
</tr>
<tr>
<td>10 years</td>
<td>4.3%</td>
</tr>
<tr>
<td>11 years</td>
<td>21.0%</td>
</tr>
<tr>
<td>12 years</td>
<td>31.7%</td>
</tr>
<tr>
<td>13 years</td>
<td>17.2%</td>
</tr>
<tr>
<td>14 years</td>
<td>10.8%</td>
</tr>
<tr>
<td>15 years</td>
<td>3.8%</td>
</tr>
<tr>
<td>16 years</td>
<td>6.5%</td>
</tr>
<tr>
<td>17 years</td>
<td>2.2%</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>52%</td>
</tr>
<tr>
<td>Part time</td>
<td>8%</td>
</tr>
<tr>
<td>Not employed</td>
<td>40%</td>
</tr>
</tbody>
</table>
Table 1. Sociodemographic Characteristics (cont.)

Occupations reported

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care</td>
<td>32%</td>
</tr>
<tr>
<td>Clerical</td>
<td>24%</td>
</tr>
<tr>
<td>Professional</td>
<td>12%</td>
</tr>
<tr>
<td>Cleaning Services</td>
<td>12%</td>
</tr>
<tr>
<td>Others</td>
<td>20%</td>
</tr>
</tbody>
</table>

(n=121)

Household Annual Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - $4,999</td>
<td>28%</td>
</tr>
<tr>
<td>$5 - 9,999</td>
<td>18%</td>
</tr>
<tr>
<td>$10-14,999</td>
<td>14%</td>
</tr>
<tr>
<td>$15-19,999</td>
<td>10%</td>
</tr>
<tr>
<td>$20-24,999</td>
<td>12%</td>
</tr>
<tr>
<td>$25-29,999</td>
<td>6%</td>
</tr>
<tr>
<td>$30-34,999</td>
<td>4%</td>
</tr>
<tr>
<td>$35-39,999</td>
<td>3%</td>
</tr>
<tr>
<td>$40-44,999</td>
<td>2%</td>
</tr>
<tr>
<td>$45,000 and up</td>
<td>3%</td>
</tr>
</tbody>
</table>

(n=174)

Number of Homes with Children < 18 years of Age Present

<table>
<thead>
<tr>
<th>Number of Children</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 child</td>
<td>59</td>
<td>(32%)</td>
</tr>
<tr>
<td>2 children</td>
<td>32</td>
<td>(17%)</td>
</tr>
<tr>
<td>3 children</td>
<td>20</td>
<td>(11%)</td>
</tr>
<tr>
<td>4 children</td>
<td>3</td>
<td>(1.6%)</td>
</tr>
<tr>
<td>5 children</td>
<td>5</td>
<td>(2.6%)</td>
</tr>
<tr>
<td>6 children</td>
<td>3</td>
<td>(1.6%)</td>
</tr>
<tr>
<td>No children</td>
<td>65</td>
<td>(35%)</td>
</tr>
</tbody>
</table>

(n=187)

Smoking history information revealed women had smoked regularly an average of 14 years and an average of 15 cigarettes per day (Table 2). Four cigarette brands accounted for 78% of the types of cigarettes smoked by participants (Newport, Kool, Salem, and Benson & Hedges). Four women (2%) reported smoking cigars as well. Women reported few previous serious attempts to quit smoking,
although 52% expressed high levels of interest in quitting cigarettes. Twelve women (7%) reported attending classes or treatment to help them quit smoking, primarily with a behavioral modification focus and within the past two years.
Table 2. Smoking History and Beliefs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Regular Smoking</td>
<td>Range: 1-51 years, Mean = 14 years, SD = 8.5</td>
</tr>
<tr>
<td>Number of Cigarettes/Day</td>
<td>Range: 1-60, Mean = 15, SD = 11</td>
</tr>
</tbody>
</table>

**Brand of Cigarette**

- Newport: 34% of sample
- Kool: 20%
- Salem: 13%
- Benson & Hedges: 11%
- Virginia Slims: 5%
- More: 2%
- Winston: 1%
- Miscellaneous: 14% (n=182)

- Mentholated cigarettes: 90% (n=185)

**Number of Previous Serious Quit Attempts**

- None: 17% of sample
- 1 time: 16%
- 2 times: 25%
- 3 times: 14%
- 4 times: 7%
- 5 times: 8%
- 6 times: 4%
- 8 or more: 10% (n=185)

**Interest in Stopping Smoking**

- Not at All Interested: 2%
- Interested Very little: 8%
- Somewhat Interested: 38%
- Very Much Interested: 52% (n=185)

The majority of women reported the presence of others in their environments who smoked (Table 3). Sixty-four
percent of current partners were smokers. For the 136 women who lived with other adults, 42% reported that all of those adults were smokers. While 20% of women reported they lived alone, several commented that cigarettes were their companions and helped to relieve boredom. Seventy-one percent reported that half or more of their friends smoked cigarettes.

Table 3. Presence of Cigarette Smoking in the Environment

<table>
<thead>
<tr>
<th>Variable</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner's Smoking Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td>Exsmoker</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Never Smoker</td>
<td>23%</td>
<td>148</td>
</tr>
</tbody>
</table>

Percent of Adult Smokers in Households where Other Adults were Present

<table>
<thead>
<tr>
<th>Percent of Adult Smokers in Households</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>49%</td>
</tr>
<tr>
<td>50%</td>
<td>5%</td>
</tr>
<tr>
<td>67%</td>
<td>2%</td>
</tr>
<tr>
<td>75%</td>
<td>1%</td>
</tr>
<tr>
<td>80%</td>
<td>1%</td>
</tr>
<tr>
<td>100%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Proportion of Friends who Smoke Cigarettes Regularly

<table>
<thead>
<tr>
<th>Proportion of Friends who Smoke regularly</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None of friends smoke</td>
<td>4%</td>
</tr>
<tr>
<td>One-fourth of friends</td>
<td>24%</td>
</tr>
<tr>
<td>One-half of friends</td>
<td>34%</td>
</tr>
<tr>
<td>Three-fourths of friends</td>
<td>19%</td>
</tr>
<tr>
<td>All of friends smoke</td>
<td>19%</td>
</tr>
</tbody>
</table>

(n=185)
One-fourth of the women in the sample reported a current illness, with hypertension (56%) being the most frequently identified (Table 4). "High blood" was reported by six of these women, with one reporting "very high blood". They were grouped with others reporting high blood pressure. Information on self-reported weight revealed a wide range from 98 to 325 pounds (Mean=158; SD=33; Median=155), while heights ranged from 55" to 74" (Mean=65"; SD=3"; Median=64"). The mean Health Promotion Lifestyle Profile score was 2.5 (SD=.44; Range=1.5-3.8). Likert scale descriptors were never = 1; sometimes = 2; often = 3; routinely = 4.

Table 4. Current Diagnoses Reported by One-fourth of Sample

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Percent of 48 women reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>56%</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>15%</td>
</tr>
<tr>
<td>More than 1 condition</td>
<td>10%</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>6%</td>
</tr>
<tr>
<td>Emphysema/asthma</td>
<td>6%</td>
</tr>
<tr>
<td>Others</td>
<td>6% (n=48)</td>
</tr>
</tbody>
</table>

Relationships among Variables

To answer the research question about relationships among model predictor variables (smoking to cope, positive outcome expectancies, general coping skills, and nicotine intake) and the criterion variable (nicotine dependence), a scatterplot of the variables was first completed. Nicotine
intake as defined by cigarettes per day and cotinine values were not normally distributed. Log transformations were done to adjust for skewed distributions of these two variables. Prior to transformation the correlation between cigarettes per day and cotinine was \( r = .15 \) \((p = .037)\), while after log transformation this became \( r = .30 \) \((p = .0001)\). Scores for each of the variables from the model of nicotine dependence are listed in Table 5.
Table 5. Nicotine Dependence Model Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
<th>Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Outcome Expectancies</td>
<td>0-.83</td>
<td>.23</td>
<td>.18</td>
<td>0-1</td>
</tr>
<tr>
<td>Smoking to Cope</td>
<td>2-61</td>
<td>28.9</td>
<td>13.4</td>
<td>0-75</td>
</tr>
</tbody>
</table>

General Coping Skills:

| Active Cognitive Coping   | 0-31   | 20.4 | 5.5 | 0-33     |
| Active Behavioral Coping  | 4-39   | 22.2 | 7.2 | 0-39     |
| Avoidance Coping          | 0-19   | 6.4  | 4.2 | 0-21     |

Nicotine Intake:

| Cigarettes/day            | 1-60   | 14.9 | 11.4|          |
| Cotinine                  | 25-1052| 402  | 224 | 0-1000+  |
| Log Transformation Cigarettes | 0-4.6 | 2.5  | 0.7 |          |
| Log Transformation Cotinine | 3.2-7.0 | 5.8  | 0.74|          |

Nicotine Dependence 0-27 12.3 7.0 0-27

n=187 (except cotinine n=146)

Internal consistency for each questionnaire was evaluated with alpha coefficient or Kuder-Richardson 20 as appropriate. Results were as follows: Active cognitive coping scale, \( \alpha = .66 \); Active Behavioral Coping scale, \( \alpha = \)
Avoidance Coping scale, α = .67; Positive Outcome Expectancies scale, Kuder-Richardson-20 = .89; Smoking to Cope α = .91; and Nicotine Dependence scale, α = .87.

The average within run coefficient of variation (CV) for cotinine in the concentration range 7.8 to 500 ng/mL was 7.6%. Extraction efficiency for a 250 ng/mL cotinine standard was an average of 89% (n=3). Extraction efficiency was determined by comparing peak heights of extracted standard in saliva with those of unextracted ones. High performance liquid chromatography equipment difficulties led to deletion of cotinine information analyzed on two dates (n=41). Equipment was subsequently serviced and cotinine values were again reliable and valid.

A correlation matrix of the model variables revealed four variables with a significant (p<.05) correlation to nicotine dependence: positive outcome expectations (r=.50), avoidance coping (r=.23), smoking to cope (r=.61), and log transformed cigarettes per day (r=.45) (Table 6). Relationships among six predictor variables in the model were reviewed. Variables with a significant (p<.05) Pearson correlation to smoking to cope were: avoidance coping (r=.19), active cognitive coping (r=.16), log transformed cigarettes per day (r=.31) and positive outcome expectations (r=.70). Variables with a significant correlation to positive outcome expectancies, beyond those already identified were: avoidance coping (r=.25) and log
transformation of cigarettes/day ($r = .20$). Correlations among the predictor variables were low and moderate except for a substantial correlation between positive outcome expectancies and smoking to cope. The effects of collinearity between these two variables with both in the statistical model may be of concern since in multiple regression analysis, the first of these variables to enter may obscure the contribution of the other in explaining variance in nicotine dependence.
Table 6. Correlation Matrix of 8 Nicotine Dependence Model Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positive Outcome Expectancies</td>
<td>0.05</td>
<td>-0.002</td>
<td>0.26</td>
<td>0.70</td>
<td>-0.03</td>
<td>0.20</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>(0.5)**</td>
<td>(0.9)</td>
<td>(0.0004)</td>
<td>(0.0001)</td>
<td>(0.75)</td>
<td>(0.007)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>2. Cognitive Coping</td>
<td>0.67</td>
<td>0.20</td>
<td>0.16</td>
<td>-0.03</td>
<td>0.07</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.006)</td>
<td>(0.03)</td>
<td>(0.75)</td>
<td>(0.36)</td>
<td>(0.35)</td>
<td></td>
</tr>
<tr>
<td>3. Behavioral Coping</td>
<td>-0.01</td>
<td>0.08</td>
<td>-0.001</td>
<td>-0.04</td>
<td>-0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.90)</td>
<td>(0.27)</td>
<td>(0.99)</td>
<td>(0.58)</td>
<td>(0.63)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Avoidance Coping</td>
<td>0.19</td>
<td>0.01</td>
<td>0.20</td>
<td>0.20</td>
<td>0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.87)</td>
<td>(0.006)</td>
<td>(0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Smoking to Cope</td>
<td>0.04</td>
<td>0.31</td>
<td>0.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.61)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Log Cotinine***</td>
<td>0.30</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Log Cigarettes****</td>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Variable 8 = Nicotine Dependence
** p value
*** Log Cotinine = log transformation of cotinine
**** Log Cigarettes = log transformation of cigarettes/day

Minimum N = 184, except cotinine n=146
To examine additional potential sociodemographic and behavioral predictors of nicotine dependence, correlations among sociodemographic and smoking history variables and nicotine dependence were determined. Age, years of education, and number of previous attempts to quit smoking were not significantly related to nicotine dependence, while number of years of regular cigarette smoking was significantly correlated to nicotine dependence ($r = .24$, $p = 0.0013$).

Categories of other sociodemographic and smoking information were collapsed yielding dichotomous variables for point biserial correlation analysis with model variables. These included: interest in quitting cigarettes (very much interested or less than this), employment status (part/full time or unemployed), household income level (< $15,000 or ≥ $15,000), marital status (married or other status), education level (< high school or > high school), proportion of friends who smoke (<50% or ≥ 50%), presence of smoking adults in household (present or not), partner's smoking status (current smoker or not), and self-reported medical diagnosis (present or not). The only variable with a significant, although low, relationship to nicotine dependence was interest in quitting smoking ($r = .17$, $p = 0.02$).

Women who reported they were very much interested in quitting smoking were more likely to have higher scores on nicotine dependence than women who reported none to somewhat
interested in quitting. A nonsignificant correlation between years of regular smoking and interest in quitting \( r = -0.04, \ p = .44 \) indicated multicollinearity was not an issue when both were entered into multivariate analysis. There were only two significant correlations between either of these additional explanatory predictors and nicotine dependence model variables. Low correlations existed between years of regular smoking and smoking to cope \( r = .20, \ p = .007 \) and years of regular smoking and log transformation of cigarettes per day \( r = .20, \ p = .008 \).

**Nicotine Dependence Predictors and Theoretical Model**

The best predictors of nicotine dependence were first determined through stepwise forward multiple regression analysis using the six variables from the model of nicotine dependence. The model was significant \( \ p = .0001 \) and explained 46% of the variance in nicotine dependence (Table 7). Smoking to cope explained the most variance (37%) with cigarettes/day (8%) and positive outcome expectations (1%) contributing significantly. General coping skills of avoidance, behavioral and cognitive coping were nonsignificant contributors to the equation.
Table 7. Stepwise Multiple Regression Model of Nicotine Dependence

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Partial $R^2$</th>
<th>Model $R^2$</th>
<th>F</th>
<th>Prob&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smoking to Cope</td>
<td>.3691</td>
<td>.3691</td>
<td>105.3</td>
<td>.0001</td>
</tr>
<tr>
<td>2</td>
<td>Log Cigarettes</td>
<td>.0767</td>
<td>.4458</td>
<td>24.8</td>
<td>.0001</td>
</tr>
<tr>
<td>3</td>
<td>Expectations</td>
<td>.0144</td>
<td>.4603</td>
<td>4.8</td>
<td>.0304</td>
</tr>
<tr>
<td>4</td>
<td>Avoidance Coping</td>
<td>.0034</td>
<td>.4637</td>
<td>1.1</td>
<td>.2878</td>
</tr>
<tr>
<td>5</td>
<td>Behavioral Coping</td>
<td>.0029</td>
<td>.4666</td>
<td>1.0</td>
<td>.3281</td>
</tr>
</tbody>
</table>

Model $R^2 = .467$  $p = .0001$

As noted earlier in univariate analysis, years of regular cigarette smoking and interest in quitting were two additional variables that had low significant correlations with nicotine dependence. When behavioral and cognitive coping variables in the regression were removed and replaced by the dichotomous variable of interest in quitting, the resulting multiple regression analysis resulted in 48% of variance in nicotine dependence explained (Table 8). Coefficients of the other model variables remained stable with the substitution assessed in this second model.
Table 8. Stepwise Multiple Regression Analysis for Nicotine Dependence with Model and Other Predictor Variables

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Partial $R^2$</th>
<th>Model $R^2$</th>
<th>F</th>
<th>Prob&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smoking to cope</td>
<td>.3527</td>
<td>.3527</td>
<td>95.9</td>
<td>.0001</td>
</tr>
<tr>
<td>2</td>
<td>Log cigarettes</td>
<td>.0811</td>
<td>.4339</td>
<td>25.1</td>
<td>.0001</td>
</tr>
<tr>
<td>3</td>
<td>Interest</td>
<td>.0300</td>
<td>.4639</td>
<td>9.8</td>
<td>.0021</td>
</tr>
<tr>
<td>4</td>
<td>Expectations</td>
<td>.0135</td>
<td>.4774</td>
<td>4.5</td>
<td>.0360</td>
</tr>
<tr>
<td>5</td>
<td>Years smoking</td>
<td>.0060</td>
<td>.4835</td>
<td>2.0</td>
<td>.1581</td>
</tr>
<tr>
<td>6</td>
<td>Avoidance coping</td>
<td>.0037</td>
<td>.4872</td>
<td>1.2</td>
<td>.2658</td>
</tr>
</tbody>
</table>

Model $R^2 = .487$ \[ p = .0001 \]

To determine the extent of an indirect effect of positive outcome expectancies on nicotine dependence, through smoking to cope, a multiple regression analysis was conducted with smoking to cope as the dependent variable and predictor variables of positive outcome expectancies, avoidance coping, active behavioral coping, and active cognitive coping. This was similar to the model testing Cooper and others (1988) employed. In this analysis, positive outcome expectancies contributed 51% of the variance in smoking to cope. In addition to the direct effect of positive outcome expectancies on the prediction of nicotine dependence, it also has a major indirect effect through the smoking to cope variable.

**Intervention Feasibility**

Of the 187 women in the study at baseline, 66 were randomly assigned to one of three groups for the intervention feasibility phase of the study (Table 9). In
the intervention group, one individual's salivary cotinine was at nonsmoker levels at baseline and her data were eliminated. One individual in the waiting list group failed to return her completed baseline questionnaire and was eliminated from further follow-up.

Women offered the opportunity to participate in the feasibility study were those whom the investigator would be able to contact through an alternative means, such as a worksetting or a friend or relative, to improve retention in the study. Only a 9% attrition occurred over the 12-week period.

Table 9. 3-Group Intervention Participation over 12 Weeks

<table>
<thead>
<tr>
<th>TIME</th>
<th>Baseline</th>
<th>6 Weeks</th>
<th>12 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>21</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>Advice-Only</td>
<td>22</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Waiting List</td>
<td>21</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

None of the women successfully quit smoking as determined by salivary cotinine analysis at 6 and 12 week follow-up. One participant in the intervention group reported no cigarettes/day at 6 weeks and although there was no nicotine in her sample, cotinine was still present (>500
ng/mL). This indicated she had probably smoked the day prior to data collection. A second participant in the advice only group, reported no smoking for the past 16 days at 6 week follow-up. Her cotinine level had decreased to 33 ng/mL from a baseline measure of 287 ng/mL (15 cigarettes/day), and no nicotine was present in her sample. This raises a question on metabolism and clearance assuming self-report of 16 days abstinence is valid. Using the 20 hour half-life of cotinine (Benowitz et al., 1983) and an initial cotinine level of 287 ng/mL, a level of 36 ng/mL would be reached in three half-lives (60 hours or 2.5 days). At 12 week follow-up, this individual had resumed smoking at a cotinine level of 264 ng/mL (7 cigarettes/day) indicating the calculations based on 287 ng/mL would be fairly accurate. From this illustration, the issue of clearance after quitting cigarettes is puzzling since cotinine is present longer than one would anticipate.

Agreement between self-reported smoking status and cotinine values was quite high as indicated in Table 10. There were three individuals who reported quitting at 6 week follow-up whose cotinine values were >14 ng/mL. Two were described above and a third, in the advice only group, reported quitting cigarettes following hypnosis treatment, but had a cotinine level of 114 ng/mL and low nicotine levels.
Table 10. Agreement between self-reported smoking status and cotinine values. (number agreeing/number in group).

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Baseline</th>
<th>6 Weeks</th>
<th>12 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>21/21</td>
<td>18/19</td>
<td>17/17</td>
</tr>
<tr>
<td>Advice Only</td>
<td>22/22</td>
<td>20/22</td>
<td>21/21</td>
</tr>
<tr>
<td>Waiting List</td>
<td>21/21</td>
<td>20/20</td>
<td>20/20</td>
</tr>
</tbody>
</table>

At twelve week follow-up appointment, five women in the intervention group (n=17) reported quitting for: one day (n=3), two weeks, and "six weeks off and on" since baseline. Salivary cotinine collections did not coincide with the first four women's quit periods and the fifth woman's level was in smoker range. Others reported cutting down in number of cigarettes or changing brands.

At baseline there were no significant differences (p<.05) across the three experimental groups on the following variables: education, income, marital status, partner's smoking status, interest in quitting, proportion of friends who smoked, employment status, brand of cigarettes, or presence of illness (Chi-square analysis) or on variables of age, number of previous attempts to quit, number of cigarettes per day, number of years of regular smoking, or percentage of adults in household who smoke (ANOVA). To determine significant changes over 3 data
collection points and the 3 groups, a repeated measures ANOVA of the nicotine dependence model variables was performed. There were no significant time or group effects on nicotine dependence, smoking to cope, positive outcome expectancies, cognitive coping, behavioral coping or avoidance coping.

Changes and stability of cotinine concentrations for an individual over three data collection points are summarized in Table 11. A crude indicator of change over time defined as a fluctuation of 50 ng/mL or more from baseline to 12 weeks, or baseline to 6 weeks if 12 week data were not available (n=2). The advice only group had the largest percentage (41%) who maintained stable cotinine levels, while the waiting-list control group had the largest proportion (25%) who increased their cotinine concentrations over time. Fifty-eight percent of the intervention group experienced decreases in cotinine levels.

Table 11. Patterns of cotinine levels for individuals over time. (number and % per group)

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Stable</th>
<th>Increased</th>
<th>Decreased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>5 (26%)</td>
<td>3 (16%)</td>
<td>11 (58%)</td>
</tr>
<tr>
<td>Advice Only</td>
<td>9 (41%)</td>
<td>2 (9%)</td>
<td>11 (50%)</td>
</tr>
<tr>
<td>Waiting List</td>
<td>6 (30%)</td>
<td>5 (25%)</td>
<td>9 (45%)</td>
</tr>
</tbody>
</table>
While none of the women in the three groups were abstinent from smoking at 6 and 12 week follow-up, there was a decrease in mean cotinine levels in all groups across time and a decrease in average number of cigarettes per day in the intervention and advice only groups (Table 12).

Table 12. Average Cotinine Levels and Cigarettes Per Day By Group and By Time.

<table>
<thead>
<tr>
<th>TIME</th>
<th>Baseline</th>
<th>6 Wk</th>
<th>12 Wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotinine (ng/mL)</td>
<td>377</td>
<td>353</td>
<td>318</td>
</tr>
<tr>
<td>Cigarettes/day</td>
<td>13</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Number of women</td>
<td>21</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td><strong>Advice Only</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotinine</td>
<td>326</td>
<td>244</td>
<td>241</td>
</tr>
<tr>
<td>Cigarettes/day</td>
<td>12</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Number of women</td>
<td>22</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td><strong>Waiting List</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotinine</td>
<td>335</td>
<td>268</td>
<td>240</td>
</tr>
<tr>
<td>Cigarettes/day</td>
<td>16</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Number of women</td>
<td>21</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

**Follow-up Activities.**

Four weekly intervention packets were mailed to each person in the intervention group within a week after they were admitted to the study. The lay facilitator determined that she would be able to contact up to four participants
during a given time period. Individuals could be in different weeks of the intervention. Of the 22 women randomly assigned to the intervention group, one was lost due to an out-of-state move and another to lack of interest in participating. Of the remaining 20 participants, the lay facilitator's handwritten notes indicated she was able to make telephone contact once in the 4-week program period with 13 participants, twice with 2 participants and was not able to reach 5 women during the 4-week intervention. Notes on inability to contact included no answer, call back later, or an answering machine. Several participants held two jobs making it difficult to find them at home in the evenings when the lay facilitator was free to make calls. Length of calls ranged from 5 to 55 minutes each with an average of 18 minutes per completed call. Women were particularly interested in how the lay facilitator had managed withdrawal symptoms and shared their concerns about quitting, as well as life situations that seemed to impinge on changing this behavior.

In interview with the investigator, participants evaluated the lay facilitator's telephone contact positively by commenting that she was easy to talk to, seemed like a "friend," shared helpful personal experiences about quitting smoking, and asked if they were confused about anything in their materials. Women believed it would have been helpful
to have more frequent telephone contact with the lay facilitator.

In addition to attempting to facilitate women in the intervention group (n=21), the lay facilitator also contacted women (n=35) in the advice only and waiting list control groups who expressed an interest in receiving the mailed intervention at the completion of their 12 week follow-up in the study.

Evaluation of Packet.

On exit interview at twelve weeks, intervention group participants all reported packets arrived in good condition with sufficient postage. None was returned to the investigator as undeliverable. The majority of the women believed the week-long spacing of mailings was appropriate, particularly if the individual was ready to quit. One participant preferred more frequent mailings and another wanted mailings spread out to one every three weeks to allow more time to prepare. The amount of material each week was deemed suitable, with one participant reporting she usually did not read everything all at one sitting. Women said they looked forward to the packages and were interested to see what would be in the next one.

General impressions of the material were that women "liked it", it was all interesting, bright and colorful, was not "drab" news, was clear and easy to follow, and had good layout and organization. Women reported they were saving
the materials for the time when they were ready to quit. Several kept it at the bedside for reading at the end of the day.

Evaluations of specific aspects of each week's intervention materials are summarized. "Don't Let Your Dreams Go Up In Smoke" pamphlet (Week 1) was reviewed positively by the majority with comments such as, "You were talking about people like me," or "It made me think about it more like a 'drug' like heroin." Negative comments about the piece were: "Too much scare tactics," "I'm the bad guy," and "They don't really know about causes of cancer. My dad died of lung cancer and he never smoked."

Self-monitoring of cigarette use via Pack Tracks (Week 1) was found helpful by those who reported completing it (n=7 or 41%). "I discovered I smoked 6 cigarettes before I left the house in the morning." While they were "easy to use," women forgot to record when they were busy or found it difficult to do during their work day. Several women who did not use Pack Tracks, saved them for the time when they did attempt to quit.

Nicotine fading was introduced in Week 2 with a chart of high, medium and low nicotine brands and an instruction sheet to post on the refrigerator with enclosed magnets. One woman reported switching to Salem Lights as a result, while several participants reported they were already on a low nicotine cigarette and this did not apply to them. One
woman who attempted nicotine fading felt like she was "blowing air," and another woman's brand of cigarette was not listed (White Nights). Participants used the apple-shaped "Quit for Life" refrigerator magnets and perceived them as a gentle reminder about quitting. The North Carolina Mutual Insurance Company card on nicotine fading was perceived positively because it included photographs of black Americans "in different walks of life."

The packet of cigarette substitutes in Week 3 was quite well received as women appreciated specific alternatives. Women reported they now carried sugarfree mints and enjoyed the word search booklet with pencil for something to do when they were bored and would have smoked cigarettes. One participant would have preferred crossword puzzles, while one woman's daughter completed the word searches instead of the intended use. Although several participants used the straws frequently, others did not understand that the purpose of the cigarette-length straws was as a substitute for holding something in the mouth. The spice cinnamon stick, also intended for this purpose, was not understood by a number of women. One participant reported that using the cinnamon stick made her crave a cigarette more. Simmering potpourri was included based on a comment from a smoker in the preliminary field test phase. She found that a tutti-frutti spray created olfactory stimulation and decreased craving for a cigarette. While the majority of intervention
participants enjoyed the potpourri, they did not understand its purpose. One person stated she did not like candy much (lollipop), while another did not like sugarfree products. Other oral substitutes suggested by a participant were "lemon heads" and "gummy fish."

Several women reported wearing the "Be Kind I'm Quitting" button or carried it in their purse. The 30-day calendar scorecard with stickers to record smokefree days was evaluated as helpful and would be saved for later use. One woman, who reported quitting for two weeks, used the calendar during that period. One participant used it to record her reduction in number of cigarettes per day.

Three women reported they did not receive a Week 4 packet. The evaluation took place at least 8 weeks after that would have arrived so lack of recall may have occurred. No packets were returned to the investigator. Home mailboxes for a number of participants were smaller than the 9" x 12" envelopes used for mailing, which may have caused some materials to be lost. Regular weekly telephone contact would identify such gaps in the program. Weight control information in Week 4 was important to a number of women ("Since I gained 30 pounds the last time I quit," while others who were at or below recommended weight ranges stated no concerns about gaining weight.

Cost-savings were emphasized through the use of a small cardboard bank participants assembled as well as a chart of
cost-savings per week and month. Several women had assembled the bank or thought it was a good idea, while one woman commented she would not use it, since she "would spend the money on something else." One participant had implemented the reward system, by having her friends take her out to dinner when she was smokefree for a week. This same person stressed the importance of support from nonsmoking roommates.

Participants' recommendations to improve the program included: spreading it out over a longer period and more contact with lay facilitator. One participant commented, "I need to bemoan to someone who understands. I can't get support from nonsmoking friends -- too sanctimonious-- or my smoking friends." They acknowledged that much of success depends on motivation level. One person wanted more information on hazards of smoking and yet several others did not want "scare tactics." One woman suggested improving Week 4 with a stronger message to encourage people to at least try to quit.

Half of the women in the intervention group stated that they seriously planned to quit smoking in the next three months and most of these had set a specific date (eg. a birthday.) They expressed more confidence now that they had a plan.
Responses to the question, "What would it take to get you to quit cigarettes?" were varied. Several examples are included.

"My own attitude. At first I was pretty motivated, but then things got in the way. My main reason to quit will be my daughter--if she would be hurt by it. I'll try again. My boyfriend's mother is real helpful."

"One month in the woods alone to work through withdrawal symptoms. My main problem is that I feel like I am in slow motion [when I quit]. I know I need to quit and am on borrowed time at age 51. I know the possibilities of illness."

"Get everything in perspective. I am trying to get my daughter moved out, my mother calls, and then there's the children and work. The only time for myself...when I take a break for me is with a cigarette."

"Now that I'm retired there is no excuse for not quitting. My friends at work smoked and it made it hard to quit."

A woman on disability from her job as a nursing assistant stated she would try to quit when she could "get out of this house and back to work." Another woman identified motivation level as a major influence in moving her to quit by stating, "Only when I want to. It is comfortable to have cigarettes on hand. After my daughter goes to bed, I smoke while I crochet alone."

Another simply stated what it would take to quit as, "My mind."

**Strengths and Weaknesses of Intervention**

As evidenced in the above summary, a number of women seriously began to consider quitting cigarettes as a possibility. Since about half of the women in each of the three groups had expressed limited interest in quitting initially, this is a beginning to move beyond precontemplation. The lay facilitator reported anecdotally her view that the program increased women's awareness about
cigarettes and quitting, as well as specific techniques. She believed this could occur even if participants did not use all the intervention materials.

Women expressed appreciation for receiving materials in their own homes. Some were limited in ability to attend group programs because of small children to care for, no transportation, financial costs of existing programs, or lack of time because of working two jobs. Women could review intervention materials at their leisure, some mentioning they read before bedtime.

Several women acknowledged the effort to incorporate black American themes into the program. In conversations with the lay facilitator, a participant commented that there were different issues black women needed to deal with in the quitting process and the importance of support from a "sister."

A weakness of the intervention was the limited time the lay facilitator was able to devote to the program. She was very interested in participating and stated that both her daughter and mother were proud of her making this contribution. However, her work situation changed during the study, such that she worked overtime every weekday and worked many Saturday's. The time period when she tried to do telephoning was after 8 pm. She commented it was difficult to reach people even when she called as late as 10 pm. During one month, she experienced personal problems
which further reduced her availability. Employment of several lay facilitators would increase the possibilities of reaching participants, but introduce more variability into the actual intervention. Submission of monthly reports of telephone contacts would assist in monitoring this process more closely.

Improved instructions regarding the purpose of specific items was needed, particularly with Week 3 packet of substitutes. Timely follow-up calls would assist with clarification also.

A major weakness is the fact that individuals who were randomly assigned to intervention regardless of their interest in quitting were expected to be ready to set a quit date two weeks after receiving their first mailing. Those in precontemplation at the beginning of the intervention may need more time to move to contemplation and then the action stage of quitting. Matching the pace of the program with the individual's stage is essential.

**Discussion**

Sociodemographic information reveals that the sample included a wide age range and important representation of those with less than college education and lower household incomes. While no comparable community statistics are available, several general comparisons can be made. In 1991 the Franklin County poverty rate was 14% using the federal
government definition of poverty as a family of four earning < $13,400/year or an individual earning ≤ $6,620 (Council for Economic Opportunity, 1991). Forty-six percent of women in this current study reported annual household incomes of <$10,000 exceeding the overall county poverty rate of 14%. However, Ohio's black poverty rate is triple that of whites and single female parents have a poverty rate six times higher than other families (Council for Economic Opportunity, 1991). Based on this information, low income reported by many women participants is reflective of the community in which they live. This wider representation is a strength in comparison to several studies with highly educated or middle income focused samples.

There are no other large studies focused on cigarette smoking among black women with which to compare sociodemographic characteristics. In Novotny and others' (1988) national survey comparing socioeconomic and demographic differences among blacks and whites, they combined information on black men and women who were smokers and nonsmokers. Fifty-four percent of blacks in their sample were married, compared to 18% in this study. Those with high school education or less composed 70% of Novotny and others' sample versus 59% of the sample in this study, while 76% were employed compared to 52% in this study. Those who were more likely to have quit smoking were men, employed persons, persons with four or more years of
college, married persons and persons above the poverty level as compared with women, unemployed persons, less-educated persons, unmarried, separated/divorced, or widowed persons, and persons below the poverty level, respectively (Novotny et al., 1988).

Smoking behavior in this sample is similar in some respects to national studies of differences among blacks and whites. Black smokers, independent of their socioeconomic status, were substantially less likely to quit than whites (Novotny et al., 1988). Over half of the women in this study reported two or less serious attempts to quit smoking. Blacks prefer high-tar, high-nicotine, mentholated brands (Cummings et al., 1987). Ninety percent of women in this study smoked menthol cigarettes, and the four most frequently reported brands are in the high nicotine category (ALA, 1987). The cigarette industry has "exploited racial divisions in defining a profitable black market" especially with brands of Kool (Brown & Williamson), Winston, More, Salem (RJ Reynolds), Newport (Loews) and Virginia Slims (Philip Morris) (Cooper & Simmons, 1985, p.344). Newport, Salem, and Kool brands accounted for 67% of the brands reported by the sample in this study. Cooper and Simmons (1985) noted that cigarette advertisements account for in excess of 12% of total advertising in Essence, the "magazine for today's black women." Cigarettes are the second leading product category in the magazine, second only to alcohol
advertising at 20%. During Black History Month, R.J. Reynolds marked the occasion in *Essence* with a discount coupon for a carton of Salem cigarettes (Cooper & Simmons, 1985).

Women in this study reported an average daily consumption of 15 cigarettes, which is similar to Romano and others' (1991) findings that black women were less likely than black men to consume 20 or more cigarettes daily. Eleven cigarettes per day were reported by young black women in Wagenknecht and other's (1990) research (mean age=25 versus 36 years in this study). An average salivary cotinine level of 402 ng/mL in this study was actually higher than the average of 250 ng/mL reported for black women by Wagenknecht and others (1990). Two participants in this study reported they could purchase a single cigarette for a quarter at a neighborhood grocery store. They reported this was an option, when one could not afford a pack of cigarettes. With limited resources, women may smoke individual cigarettes differently than if they had a carton of cigarettes available. Topography factors would influence the level of nicotine derived from a given cigarette and possibly explain a cotinine average higher than previously reported.

While 52% of women in this study identified they were very much interested in quitting cigarettes, the remainder reported lower levels of interest in quitting (none, very
little, some). Lacey and others (1991) concluded there were low levels of interest in smoking cessation among young black women (ages 18-39 years) who lived in urban public housing developments in their study. They determined that women in their study did not accept the fact that smoking placed them at risk for adverse health outcomes and were not motivated to stop smoking. Several women in the intervention phase of this study identified their potential risk for smoking-related illness, while others commented that the role of smoking and cancer is unclear.

The nicotine dependence model modified from Cooper and others' (1988) alcohol dependence model explained 47% of the variance in nicotine dependence. Since smoking to cope was a major contributor to the regression analysis, this would be an appropriate focus for intervention planning to alter nicotine dependence, as well as positive outcome expectancies of smoking as these contributed indirectly through smoking to cope.

While it was anticipated that cotinine would be a better nicotine intake predictor of dependence than reported number of cigarettes per day, that was not the case. A low, nonsignificant correlation (r=.11, p =.14) between log transformation of cotinine and nicotine dependence may be explained by considerable unconscious variability in topography. Cotinine concentration is also dependent on rate of conversion to cotinine, rates of competing metabolic
transformations to nornicotine and nicotine-N-oxides, together with both the rates of excretion of nicotine and cotinine in urine and any sequestration of the two compounds (Idle, 1990).

The correlation between the log transformation of cigarettes/day and nicotine dependence was $r = .45$ ($p = .0001$). This higher correlation between cigarette/day and dependence compared to the correlation between cotinine and dependence may be attributed to the fact that both nicotine dependence and self-reported cigarettes per day were variables relying on the individual's perception. If they believed their daily consumption was relatively high, they may have also perceived a higher dependence on nicotine.

Sociodemographic and smoking history variables did not add considerably to the explained variance in nicotine dependence, with years of regular smoking and interest in quitting the only two which had low, significant correlations to nicotine dependence. Other variables which might have added to variance explained in nicotine dependence include stress of daily hassles (Romano et al., 1991), social network structure (Romano et al., 1991) and alcohol and caffeine consumption (Ginne, 1989).

Daily hassles were characterized as the "irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment" (Kanner, Coyne, Schaefer, & Lazarus, 1981). Daily hassles
could be interpreted as antecedents in cognitive social learning theory framework. High frequency of hassles in the previous three months was associated with increased likelihood of smoking for both black men and women in a California study (Romano et al., 1991). Structural features of Berkman and Syme's (1979) Social Network Index included marital status, number of close friends, number of close relatives, and membership in neighborhood groups. Strong social networks were associated with lower odds of smoking among black women, but not among black men (Romano et al., 1991). Social networks could influence cognitive mediations in cognitive social learning theory.

Cigarette smoking has been linked to alcohol and caffeine use. Battjes (1988) reported numerous studies documenting the affinity between alcohol use and tobacco use. Wingerd and Sponzilli (1977) examined the tobacco, alcohol and caffeine habits of almost 10,000 white women. They found that in never smokers, 36% were nondrinkers and 1.5% reported heavy drinking (>3 drinks per day), compared to heavy smokers with 16% nondrinkers and 20% reporting heavy drinking (Wingerd & Sponzilli, 1977). Heavy caffeine consumption (>6 cups per day) among never smokers was less than 15%, while heavy coffee drinkers represented 55% of women who smoked heavily.

Bridges and others (1990), in a study of smoke exposure in 170 male smokers, concluded that univariate and multiple
regression analyses provided evidence that coffee and alcohol consumption may be important determinants of smoke exposure. Several women in the intervention phase of this study reported to the lay facilitator that they currently drank alcohol daily or had in the past. More specific information on alcohol and caffeine use would be appropriate.

A low intensity smoking cessation intervention of four weekly mailings and telephone support by a black woman exsmoker is feasible. The effect of the intervention can be enhanced. Lay facilitator support was not adequately tested in this study since none of the women received four follow-up calls. Additional facilitators with more time to make repeated efforts to reach participants are warranted.

Macken and others (1991) noted difficulties in telephone follow-up in their study to involve patients from a Minnesota family practice clinic in smoking cessation program appointments. Their predominantly low-income urban patient population was surveyed and those who indicated an interest in quitting smoking (n=146) became a part of their study offering free smoking cessation counseling with a physician at the clinic. Telephone contact was attempted with 93 potential participants who had supplied their telephone numbers with 20% of those calls reaching a disconnected number; 5% of potential participants had moved; and 27% were not able to be contacted. Transient nature of
the population and low-income leading to not being able to maintain telephone service were noted as possible problems for lack of telephone availability (Macken et al., 1991).

Lacey and others' (1991) incorporation of indigenous lay health educators was successful in organizing young black women in urban public housing to become more aware of the dangers of smoking and to become more interested in participating in a structured smoking cessation program. While indigenous educators were able to mobilize the population to participate in smoking cessation programs, new methods are needed to sustain their involvement after they have been reached (Lacey et al., 1991).

While none of the women in this study were abstinent from smoking at 6 and 12 week follow-up, there was evidence of reduction in average number of cigarettes per day in the intervention and advice only groups, as well as a decrease in mean cotinine levels in all three groups over time. Contact with the investigator at 6 and 12 week appointments and completing questionnaires about cigarette smoking probably increased individuals' awareness about their behavior. Since many women had made few previous attempts to quit smoking, these activities had a consciousness-raising effect.

Smoking cessation research indicates most smokers make two or three unsuccessful attempts to quit before successfully becoming a nonsmoker (DiClemente & Prochaska,
1985). Seventeen percent of women in this study reported no
previous attempts to quit smoking and 41% reported one or
two lifetime attempts, indicating this sample of women were
in the early stages of behavior change. Therefore, evidence
of slight shifts in smoking behavior, such as reduction in
number of cigarettes and cotinine levels, along with
statements of setting a quit date in the next three months
were positive effects of the program.

Specific suggestions by women in the intervention phase
of this study can be incorporated including increased
clarity when explaining certain techniques, consistent
telephone follow-up, and matching the pace of the
intervention with the individual's stage of readiness.
Chapter V

Summary, Limitations, Significance, and Recommendations

Summary

The purposes of this research were to describe biopsychosocial variables contributing to an explanation of cigarette smoking behavior, to examine a model of nicotine dependence and to determine the feasibility of a low intensity smoking cessation intervention among African American women who smoke cigarettes. One phase of the study was based on a cross-sectional one-group survey design. A descriptive summary provided smoking history and sociodemographic information of 187 women who participated. The dependent variable in examining a model derived from cognitive social learning theory was nicotine dependence, while the predictor variables included general coping skills, positive outcome expectancies of smoking, smoking to cope, and nicotine intake. Additional explanatory variables with low correlations to nicotine dependence were participant's interest in quitting smoking and years of regular cigarette smoking.

In a subset of the larger study, an experimental 3-group design with 22 women in each group was used to
evaluate smoking cessation intervention feasibility and successful quitting at 6 and 12 weeks after women entered the study. Women were randomly assigned to one of three groups: intervention, one-time advice to quit smoking, and waiting list control. Women with post-intervention cotinine levels <14 ng/mL were classified as nonsmokers. Intervention involved four weekly mailings of motivational and smoking cessation strategies with telephone follow-up by a lay facilitator who was a black woman exsmoker.

Multiple regression analysis revealed that predictor variables explained 46% of variance in nicotine dependence with smoking to cope, log transformed cigarettes/day, and positive outcome expectancies as the best predictors of nicotine dependence (Table 12).

Table 13. Stepwise Multiple Regression Model of Nicotine Dependence

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Partial R²</th>
<th>Model R²</th>
<th>F</th>
<th>Prob&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smoking to Cope</td>
<td>.3691</td>
<td>.3691</td>
<td>105.3</td>
<td>.0001</td>
</tr>
<tr>
<td>2</td>
<td>Log Cigarettes</td>
<td>.0767</td>
<td>.4458</td>
<td>24.8</td>
<td>.0001</td>
</tr>
<tr>
<td>3</td>
<td>Expectations</td>
<td>.0144</td>
<td>.4603</td>
<td>4.8</td>
<td>.0304</td>
</tr>
<tr>
<td>4</td>
<td>Avoidance Coping</td>
<td>.0034</td>
<td>.4637</td>
<td>1.1</td>
<td>.2878</td>
</tr>
<tr>
<td>5</td>
<td>Behavioral Coping</td>
<td>.0029</td>
<td>.4666</td>
<td>1.0</td>
<td>.3281</td>
</tr>
</tbody>
</table>

Model R² = .467  p = .0001

At 12 week follow-up, none of the participants in the three groups were nonsmokers, although 5 of 17 women in the intervention group reported at least 24 hours of smoking
abstinence since the beginning of the study. Women evaluated general intervention content and approach positively on exit interview. However, they identified that more consistent telephone follow-up would have been helpful as well as more explicit instructions with certain activities.

Findings from this study begin to address a lack of information concerning black women smokers and possible alternative smoking cessation interventions. Many women in this study would be considered to be in the precontemplation stage of smoking cessation, having made few previous attempts to quit smoking and/or expressing limited interest in quitting. This aspect is an important consideration in future intervention planning.

Limitations of the Study

Nonrandom selection of participants and the inherent fixed variables of the model created limitations of the phase of the study examining a model of nicotine dependence. The sample of 187 women was not randomly selected from the population of black women smokers in the Columbus metropolitan area, and therefore may reflect biases of locations and strategies employed in subject recruitment. The findings are not generalizable to men or children, or women living in other areas of the country. Six main variables were identified in the model of nicotine dependence, and although additional potential explanatory
variables were assessed through smoking history and sociodemographic information, there may be other biopsychosocial factors which could influence nicotine dependence as discussed previously in Chapter 4.

Nicotine dependence as measured by the 9-item questionnaire was each woman's perception of her potential nicotine withdrawal difficulty and therefore was an indirect assessment of dependence. Ideally, the model variable nicotine intake would have been measured via frequent plasma nicotine levels; however, this was not practical and would have been affected considerably by the time since last cigarette. Operationalizing nicotine intake as salivary cotinine level, a nicotine metabolite, reduced variability related to time interval since last cigarette, but introduced measurement error of factors influencing metabolism, sequestration and elimination of nicotine.

Quantitating cotinine concentrations in saliva samples was a potential source of error and to reduce this possibility standard curves were employed with each run, fresh chemical reagents were made as recommended in the protocol, and steps of the assay were complied with carefully. Machine error was noted during runs on two successive days and these cotinine values were eliminated from the study. An average coefficient of variation of 7.6% and an extraction efficiency of 89% were confirmation of respectable reliability and validity.
In the 3-group experimental portion of the study, internal validity threats were controlled theoretically by the nature of a pretest posttest control group design. However, there were potential threats to external validity in reactive arrangements since women in a given worksetting may have been assigned to different groups and could potentially discuss the type of treatment they were or were not receiving with an individual in another group (Campbell & Stanley, 1963). A limitation of generalizability included interaction of pretesting and treatment since the initial data collection may have sensitized participants to treatment, which would probably not occur in natural situations where individuals receive an intervention without pretesting.

Another external validity threat was acknowledged as part of the process of identifying individuals to whom to present the 3-group design participation option, since an alternative means of contacting the person was desirable to enhance retention over 12 weeks and thus created a selection bias in this phase of the study. However, since this was a small feasibility study, these threats to generalizability, once recognized, were acceptable.

Significance

Smoking-related disease results in more deaths among black Americans than those from homicide, car accidents,
drug abuse, and AIDS combined (ALA, 1990). Further, black Americans make up the nation's largest ethnic/racial group and have the highest smoking rate: 35% of Black adults smoke, compared to 30% of non-Hispanic white and 26% of Hispanic adults (Marcus & Crane, 1987). Additionally, smoking intensifies a number of serious health problems that disproportionately affect black Americans, including hypertension, diabetes, low birth weight and infant mortality and hazardous occupational exposures (Heckler, 1985). While determinants of quitting motivation and success among black smokers appear similar to those among smokers in general, access to effective quitting resources and treatment is more limited (Orleans et al., 1989).

For these reasons, efforts to examine cigarette smoking behavior, nicotine dependence, and alternative smoking cessation interventions among black women are critical. This study was designed to fill a gap in smoking related research among black women cigarette smokers. The finding that many women in this study were precontemplators is important in planning intervention to focus on this early stage where few previous attempts to quit smoking and low interest in quitting are prevalent. Smoking to cope and positive outcome expectancies of smoking explained considerable variance in perceived nicotine dependence and would be essential to address in future interventions. About half of the women in the intervention group indicated
a plan to quit smoking in the next three months and one-third of the intervention group reported at least a 24 hour nonsmoking period since beginning the program. These behaviors demonstrate movement to contemplation and preparation to quit stages and the potential for success of treatment matched to an individual's stage.

Recommendations

Implementation of the low intensity intervention with a larger group of women would be essential to determine its wider applicability. More frequent follow-up by lay facilitators is vital, as well as adapting the timing of intervention segments to an individual's stage. For example, a woman who is not considering quitting smoking at the outset may need more time to establish a quit date, than one who is already considering a change. Ockene and others (1991) found that 22% of smokers with heart disease who were in precontemplation stage prior to smoking cessation treatment were not smoking at 6-month follow-up, compared to 44% of contemplators quitting in the same time interval, and an 80% quit rate at 6 months among those ready for action or in action stage at the beginning of the study.

Appropriate strategies to address women in the precontemplation stage of smoking cessation include consciousness-raising activities, such as self-monitoring cigarette intake and becoming open to information about smoking and quitting. Efforts to encourage self-
reevaluation about the impact of smoking in their lives is pertinent at cognitive and affective levels (DiClemente & Prochaska, 1985).

Transdermal nicotine replacement as an adjunct to low intensity intervention may improve cessation success since women in this study had higher than average cotinine levels possibly indicating higher nicotine absorption. In addition, 22% of women were highly dependent on nicotine as indicated by a score of 19 or higher on the nicotine dependence measure (Tonnesen, 1988). There are no reported studies of transdermal nicotine replacement among black women smokers.

Implementation of a modified intervention by lay facilitators with small groups in worksite locations would be another area for exploration, since there were concentrations of women who smoked cigarettes in different work settings. This alternative approach may increase the likelihood of sustained, repeated contact with the lay facilitator, compared to telephone follow-up. Attendance at group programs in the evening may not be well attended as full-time employed women may have family responsibilities or a second job. Incorporating a program in the work day has greater potential for success.

A technical area for further study is that of topography variables among black women who have a low-rate high-nicotine mentholated cigarette smoking pattern since it
may be potential factor influencing higher than average cotinine levels observed among black women smokers. Also, information on time needed for cotinine clearance following smoking cessation may need further exploration since smoker levels of cotinine were present a reported 16 days after cessation by a participant in this study. In future studies including cotinine as a variable, data collection should incorporate information on participants' daily intake of alcohol, caffeine, prescribed medications, and street drugs since it has been noted that phenobarbital, for example, increases nicotine metabolism.

Findings of this study suggest that black women who smoke cigarettes have made few previous attempts to quit smoking and express low to moderate levels of interest in quitting. Interventions more specifically targeted to early stages of smoking cessation are needed. In addition, interventions organized by health professionals and implemented by lay facilitators have the potential for successfully assisting black women to move to more active stages of quitting.
Appendix A

Informed Consent Forms
CONSENT TO INVESTIGATIONAL TREATMENT OR PROCEDURE - Form A

I, __________________________, hereby authorize or direct MARY
ELLEN WEVERS, PH.D., R.N. or associates or assistants of her
choosing, to perform the following treatment or procedure:

participation in a study to describe general health and
cigarette smoking behaviors among black women upon
____________________ (name of subject). In addition to
today, I will be contacted again in 6 weeks and in 12 weeks
to complete written questionnaires and provide a saliva
sample. I may receive information about health issues
during this time period. I will receive $10 today for
participating and $15 more at the end of 12 weeks.

The experimental (research) portion of the treatment or
procedure is: I may receive health information or I may
not. This will be determined by chance. I will complete
questionnaires about health and smoking and provide a saliva
sample 2 times after today.

This is done as part of a study called:

Health and Cigarette Smoking Among Black Women in Central
Ohio.

1. Purpose of the procedure or treatment: to better
understand health and cigarette smoking among black women in
order to develop ways to help women improve their health.
The saliva sample is a better way to measure the amount I
smoke instead of just the number of cigarettes I have each
day.

2. Possible appropriate alternative procedures or treatment
(not to participate in the study is always an option):
There are a number of ways to improve your health with
health information being one of them. Some people have used
individual counseling, group discussions, or medications.
These methods are available in the community. A blood test
could be used to measure my level of smoking but there are
fewer problems with a saliva test.

3. Discomforts and risks reasonably to be expected: There
are no risks in providing a saliva sample. There will be a
slight sweet taste in my mouth after completing the test. I
will be given a drink of water to get rid of this taste.

4. Possible benefits for subjects/society: The study may
help explain how what I believe and do affects my health.
This may help people develop better ways to improve the health of black women.

5. Anticipated duration of subject's participation (including number of visits): Approximately 30 minutes today, and again in 6 weeks and 12 weeks. Appointments will be made for follow-up.

I hereby acknowledge that Karen Ahijevych has provided information about the procedure described above, about my rights as a subject, and she answered all questions to my satisfaction. I understand that I may contact her at 888-8094 should I have additional questions. She has explained the risks described above and I understand them; she has also offered to explain all possible risks or complications.

I understand that, where appropriate, the U.S. Food and Drug Administration may inspect records pertaining to this study. I understand further that records obtained during my participation in this study that may contain my name or other personal identifiers may be made available to the sponsor of this study. Beyond this, I understand that my participation will remain confidential.

I understand that I am free to withdraw my consent and participation in this project at any time after notifying the project director without prejudicing future care. No guarantee has been given to me concerning this treatment or procedure.

In the unlikely event of injury resulting from participation in this study, I understand that immediate medical treatment is available at University Hospital of The Ohio State University. I also understand that the costs of such treatment will be at my expense and that financial compensation is not available. Questions about this should be directed to the Human Subjects Review Office at 292-9046.
I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date:__________ Time ______AM/PM

Signed _______________________________ (subject)

______________________________

(Person authorized to consent for subject, if required).

Witness (if required) _______________________________

I certify that I have personally completed all blanks in this form and explained them to the subject or her representative before requesting the subject or her representative to sign it.

Signed _______________________________

(Project director or her authorized representative)
CONSENT TO INVESTIGATIONAL TREATMENT OR PROCEDURE - Form B

I, ___________________________, hereby authorize or direct MARY ELLEN WEWERS, PH.D., R.N. or associates or assistants of her choosing, to perform the following treatment or procedure:

participation in a study to describe general health and cigarette smoking behaviors among black women upon ____________________________ (name of subject). I will receive $10 today for participating.

The experimental (research) portion of the treatment or procedure is: I will complete written questionnaires on health and smoking and general background information. I will provide a saliva sample to measure my level of smoking.

This is done as part of a study called:

Health and Cigarette Smoking Among Black Women in Central Ohio.

1. Purpose of the procedure or treatment: to better understand health and cigarette smoking among black women in order to develop ways to help women improve their health. The saliva sample is a better way to measure the amount I smoke instead of just the number of cigarettes I have each day.

2. Possible appropriate alternative procedures or treatment (not to participate in the study is always an option): A blood test could be used to measure my level of smoking but there are fewer problems with a saliva test.

3. Discomforts and risks reasonably to be expected: There are no risks in providing a saliva sample. There will be a slight sweet taste in my mouth after completing the test. I will be given a drink of water to get rid of this taste.

4. Possible benefits for subjects/society: The study may help explain how what I believe affects my cigarette smoking. This may help people develop better ways to assist black women to quit smoking.

5. Anticipated duration of subject's participation (including number of visits): Approximately 30 minutes today.
I hereby acknowledge that Karen Ahijevych has provided information about the procedure described above, about my rights as a subject, and she answered all questions to my satisfaction. I understand that I may contact her at 888-8094 should I have additional questions. She has explained the risks described above and I understand them: she has also offered to explain all possible risks or complications.

I understand that, where appropriate, the U.S. Food and Drug Administration may inspect records pertaining to this study. I understand further that records obtained during my participation in this study that may contain my name or other personal identifiers may be made available to the sponsor of this study. Beyond this, I understand that my participation will remain confidential.

I understand that I am free to withdraw my consent and participation in this project at any time after notifying the project director without prejudicing future care. No guarantee has been given to me concerning this treatment or procedure.

In the unlikely event of injury resulting from participation in this study, I understand that immediate medical treatment is available at University Hospital of The Ohio State University. I also understand that the costs of such treatment will be at my expense and that financial compensation is not available. Questions about this should be directed to the Human Subjects Review Office at 292-9046.
I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date:_____________ Time _____AM/PM

Signed ________________________________ (subject)

____________________________________
(Person authorized to consent for subject, if required).

Witness (if required) ________________________________

I certify that I have personally completed all blanks in this form and explained them to the subject or her representative before requesting the subject or her representative to sign it.

Signed ________________________________
(Project director or her authorized representative)
Script for subject recruitment:

I am a nurse concerned about the health of minority women who smoke cigarettes. I am also a graduate student at the Ohio State University College of Nursing working with Dr. Mary Ellen Wewers. I need your help in two ways. One is to complete several written questionnaires about health and smoking. The second way is to provide a sample of saliva so we can better measure your level of cigarette smoking. We will not take any blood samples. You can have the results of the test if you would like, but I will not have those results right away. There is an easy way to get a sample of your saliva. You take this small plastic bubble and put it in your mouth. There is sugar inside of it that makes the saliva go into the bubble. Nothing comes out of the bubble. You move the bubble around in your mouth like you might do with a Life-Saver until it is full. This takes about 8 minutes and you can be doing this while you fill out some of the forms. You can swallow your saliva just like you usually would. Do not bite or chew the bubble. You might have a sweet taste in your mouth when you take it out so I will have a drink of water ready for you.

Filling out the form usually takes between 20 and 40 minutes and I will give you $10 for you help. It is important to me that you answer the questions exactly how you feel, so getting the $10 does not depend on answering questions a certain way. Your name will not be written on any of the papers. Will you help me in this way?

(Use consent form B)

For subjects participating in 3-group experimental design:

It is important to look at health and smoking over time since people may change. I will contact you again in 6 weeks and in 12 weeks to set up a time that would be good for you to complete some of the written questionnaires again and give another saliva sample. At the end of the 12 weeks, I will give you another $15 for your help. During this time you may receive some health information.

(Use consent form A)
Appendix B

Sociodemographic and Smoking History Information
What is your year of birth? 19 _________

What is the highest level of education you have completed? (circle number)

1 1st GRADE
2 2nd GRADE
3 3rd GRADE
4 4th GRADE
5 5th GRADE
6 6th GRADE
7 7th GRADE
8 8th GRADE
9 9th GRADE
10 10th GRADE
11 11th GRADE
12 12th GRADE (HIGH SCHOOL DIPLOMA OR GED EQUIVALENT)
13 1 YEAR OF TECHNICAL SCHOOL OR COLLEGE
14 2 YEARS OF TECHNICAL SCHOOL OR COLLEGE
15 3 YEARS OF COLLEGE
16 4 YEARS OF COLLEGE/COLLEGE
17 GRADUATE SCHOOL

What is your marital status? (circle number)

1 SINGLE, NEVER MARRIED
2 LIVE WITH LOVER, NOT MARRIED
3 MARRIED
4 WIDOWED
5 SEPARATED
6 DIVORCED

What is your partner's smoking status? (circle number)

1 SMOKER
2 EX-SMOKER
3 NEVER SMOKER
4 NO PARTNER NOW
What is your occupation?  

______________________________  

Are you employed now? (circle number)  

1 FULL TIME  

2 PART TIME  

3 NOT EMPLOYED  

Which category represents your household income for the year? (check one)  

_____ 0 to $4999  

_____ $5000 to 9,999  

_____ $10,000 to 14,999  

_____ $15,000 to 19,999  

_____ $20,000 to 24,999  

_____ $25,000 to 29,999  

_____ $30,000 to 34,999  

_____ $35,000 to 39,999  

_____ $40,000 to 44,999  

_____ $45,000 and up  

What is your weight? ________________ POUNDS  

(If pregnant, what was your weight before you were pregnant?)  

__________________________ POUNDS  

How tall are you? _____ FEET _____ INCHES  

How many years did you smoke cigarettes regularly?  

_____________ YEARS  

On average, during the past week about how many cigarettes a day did you smoke?  

______________ CIGARETTES PER DAY
What is the name brand of the cigarette you usually smoke?

Do you usually smoke a menthol cigarette? (circle number)
1 YES
2 NO

Do you use any other form of tobacco? (Circle number/numbers)
1 SNUFF
2 SMOKELESS TOBACCO
3 CIGAR
4 NICOTINE GUM
5 NO OTHER FORMS OF TOBACCO

How many times have you seriously tried to quit smoking cigarettes?

__________ TIMES

Please list the ages of the people who live with you. Don't include yourself.

<table>
<thead>
<tr>
<th>AGE:</th>
<th>Do they smoke cigarettes?</th>
</tr>
</thead>
<tbody>
<tr>
<td>First person</td>
<td>YES NO</td>
</tr>
<tr>
<td>Second person</td>
<td>YES NO</td>
</tr>
<tr>
<td>Third person</td>
<td>YES NO</td>
</tr>
<tr>
<td>Fourth person</td>
<td>YES NO</td>
</tr>
<tr>
<td>Fifth person</td>
<td>YES NO</td>
</tr>
<tr>
<td>Sixth person</td>
<td>YES NO</td>
</tr>
<tr>
<td></td>
<td>NONE - I LIVE ALONE</td>
</tr>
</tbody>
</table>
How many of your friends smoke regularly?  (circle number)

1  NONE SMOKE
2  ABOUT ONE-FOURTH OF MY FRIENDS SMOKE
3  ABOUT ONE-HALF OF MY FRIENDS SMOKE
4  ABOUT THREE-FOURTHS OF MY FRIENDS SMOKE
5  ALL OF MY FRIENDS SMOKE

How interested are you in stopping smoking?  (circle number)

1  NOT AT ALL INTERESTED
2  INTERESTED VERY LITTLE
3  SOMewhat INTERESTED
4  VERY MUCH INTERESTED

Have you ever attended classes or treatment to help you quit smoking?  (circle number)

1  YES
2  NO

If yes, what kind of classes or treatment did you use?

_________________________________________________________________________

What was the approximate date or dates?

_________________________________________________________________________
Has a doctor ever told you that you have an illness like heart disease, diabetes, high blood pressure or emphysema? (circle number)

1  YES

2  NO

If you circled YES, what is the illness you have?
Appendix C

Positive Outcome Expectancies of Smoking
For the following possible experiences, if an item is always or sometimes true for you, circle true. If the item is rarely or never true for you, circle false. Please answer every question without skipping any.

1. Smoking makes me feel flushed. TRUE FALSE

2. Smoking decreases muscular tension in my body. TRUE FALSE

3. A few cigarettes make me feel less shy. TRUE FALSE

4. Smoking helps me to fall asleep more easily. TRUE FALSE

5. I feel powerful when I smoke, as if I can really influence others to do as I want. TRUE FALSE

6. I am more romantic when I smoke. TRUE FALSE

7. Smoking makes the future seem brighter to me. TRUE FALSE

8. If I have had a few cigarettes it is easier for me to tell someone off. TRUE FALSE

9. Cigarettes can act as an anesthetic for me, that is, it can deaden pain. TRUE FALSE

10. I often feel sexier after I've had a few cigarettes. TRUE FALSE

11. Smoking makes me feel good. TRUE FALSE

12. Some cigarettes have a pleasant, cleansing, tingly taste to me. TRUE FALSE

13. Smoking increases my aggressiveness. TRUE FALSE

14. Cigarettes seem like magic to me. TRUE FALSE

15. I'm a better lover after a few cigarettes. TRUE FALSE

16. When I'm smoking, it is easier to open up and express my feelings. TRUE FALSE

17. Smoking adds a certain warmth to social occasions for me. TRUE FALSE
Positive Outcome Expectancies of Smoking (cont.)

18. If I'm feeling restricted in any way, a few cigarettes make me feel better. TRUE FALSE
19. Having a few cigarettes is a nice way for me to celebrate special occasions. TRUE FALSE
20. Smoking makes me worry less. TRUE FALSE
21. Smoking is pleasurable because it's enjoyable for me to join in with people who are enjoying themselves. TRUE FALSE
22. After a few cigarettes, I am more sexually responsive. TRUE FALSE
23. I feel more coordinated after I smoke. TRUE FALSE
24. I enjoy having sex more if I've had some cigarettes. TRUE FALSE
25. I'm more likely to get into an argument if I've been smoking. TRUE FALSE
26. Smoking helps me sleep better. TRUE FALSE
27. Smoking gives me more confidence in myself. TRUE FALSE
28. After a cigarette it is easier for me to pick a fight. TRUE FALSE
29. A few cigarettes make it easier for me to talk to people. TRUE FALSE
30. If I have a couple of cigarettes it is easier to express my feelings. TRUE FALSE
31. Smoking makes me more interesting. TRUE FALSE
Scoring of Positive Outcome Expectancies

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Items marked true</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global positive</td>
<td>7, 14, 18, 23, 31</td>
</tr>
<tr>
<td>Social and physical pleasure</td>
<td>11, 12, 17, 19, 21</td>
</tr>
<tr>
<td>Sexual enhancement</td>
<td>6, 10, 15, 22, 24</td>
</tr>
<tr>
<td>Power and aggression</td>
<td>1, 5, 8, 13, 25, 28</td>
</tr>
<tr>
<td>Social expression</td>
<td>3, 16, 27, 29, 30</td>
</tr>
<tr>
<td>Tension reduction</td>
<td>2, 4, 9, 20, 26</td>
</tr>
</tbody>
</table>
Appendix D

Smoking to Cope Questionnaire
For each of the items below, circle the number that best describes your smoking in that situation.

0 = not at all
1 = a little
2 = quite a bit
3 = very much so

1. I like a cigarette best when I am having a quiet rest. 0 1 2 3
2. I smoke more when I am worried about something. 0 1 2 3
3. I like smoking while I am busy and working hard. 0 1 2 3
4. I smoke for the pleasure of offering and accepting cigarettes from other people. 0 1 2 3
5. Handling a cigarette is part of the enjoyment of smoking it. 0 1 2 3
6. Smoking helps me to keep going when I'm tired. 0 1 2 3
7. I get a definite pleasure whenever I smoke. 0 1 2 3
8. I smoke more when I am unhappy. 0 1 2 3
9. I feel I look more mature and sophisticated when smoking. 0 1 2 3
10. I smoke for the pleasure of having something to put in my mouth. 0 1 2 3
11. Smoking helps me to think and concentrate. 0 1 2 3
12. I want to smoke most when I am comfortable and relaxed. 0 1 2 3
13. I light up a cigarette when I feel angry about something. 0 1 2 3
14. I get a definite lift and feel more alert when smoking. 0 1 2 3
Smoking to Cope Questionnaire (cont.)

15. It is easier to talk and get on with other people when smoking.  0  1  2  3

16. Part of the enjoyment of smoking comes from the steps I take to light up.  0  1  2  3

17. I feel more attractive to the opposite sex when smoking.  0  1  2  3

18. I smoke when I am rushed and have lots to do.  0  1  2  3

19. I usually smoke only when I can really sit back and enjoy it.  0  1  2  3

20. While smoking I feel more confident with other people.  0  1  2  3

21. Part of the enjoyment of smoking is watching the smoke as I blow it out.  0  1  2  3

22. Smoking cheers me up.  0  1  2  3

23. After meals is the time I most enjoy smoking.  0  1  2  3

24. I smoke because I like the smell so much.  0  1  2  3

25. I smoke more when I am with other people.  0  1  2  3

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indulgent smoking</td>
<td>1, 7, 12, 19, 23</td>
</tr>
<tr>
<td>Sedative smoking</td>
<td>2, 8, 13</td>
</tr>
<tr>
<td>Stimulant smoking</td>
<td>3, 6, 11, 14, 18, 22</td>
</tr>
<tr>
<td>Sensorimotor smoking</td>
<td>5, 10, 16, 21, 24</td>
</tr>
<tr>
<td>Psychosocial smoking</td>
<td>4, 9, 15, 17, 20, 25</td>
</tr>
</tbody>
</table>
Appendix E

Health and Daily Living Coping Response Index
Please think of the most important problem or stressful event you have had during the last 12 months.

WRITE THE NAME OF THIS EVENT:

Please indicate which of each of the following you did in connection with this event? (Circle number)

<table>
<thead>
<tr>
<th></th>
<th>NO</th>
<th>YES, ONCE OR TWICE</th>
<th>YES, SOME TIMES</th>
<th>YES FAIRLY OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tried to find out more about the situation. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Talked with spouse or other relative about the problem. [B]</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Talked with friend about the problem. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Talked with professional person (doctor, lawyer, minister) [B]</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Prayed for guidance and/or strength. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Prepared for the worst. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Didn't worry about it. Figured everything would probably work out. [O]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Took it out on other people when I felt angry or depressed. [A]</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Tried to see the positive side of the situation. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Got busy with other things to keep my mind off the problem. [B]</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Made a plan of action and followed it. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>YES ONCE OR TWICE</td>
<td>YES SOME-TIME</td>
<td>YES FAIRLY OFTEN</td>
</tr>
<tr>
<td>----------------------------------------------------------------</td>
<td>----</td>
<td>------------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Considered several alternatives for handling the problem. [C] 1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Drew on my past experiences; I was in a similar situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>before. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Kept my feelings to myself. [A]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Took things a day at a time, one step at a time. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tried to step back from the situation and be more objective.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Went over the situation in my mind to try to understand it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Tried not to act too hastily or follow my first hunch. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Told myself things that helped me feel better. [C]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Got away from things for a while. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I knew what had to be done and tried harder to make things</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>work. [B]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Avoided being with people in general. [A]</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Made a promise to myself that things would be different next time. [C]</td>
<td>NO</td>
<td>YES ONCE OR TWICE</td>
<td>YES SOMETIMES</td>
<td>YES FAIRLY OFTEN</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>----</td>
<td>------------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Refused to believe that it happened. [A]</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Accepted it; nothing could be done. [C]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Let my feelings out somehow. [B]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sought help from persons or groups with similar experiences. [B]</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Bargained or compromised to get something positive from the situation. [B]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tried to reduce tension by:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking more. [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating more. [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercising more. [B]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking more tranquilizing drugs. [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subscales:

Active Cognitive Coping [C] - 11 items
Active Behavioral Coping [B] - 13 items
Avoidance Coping [A] - 7 items
Appendix F

Dependence Questionnaire
For each of the items below, circle the number that best describes your smoking in that situation.

Responses:

0 = not at all
1 = a little
2 = quite a bit
3 = very much so

1. I get a definite craving to smoke when I have to stop for a while.
   0 1 2 3

2. I light up a cigarette without realizing I still have one burning in the ash tray.
   0 1 2 3

3. I smoke automatically without even being aware of it.
   0 1 2 3

4. When I have run out of cigarettes I find it almost unbearable until I can get them.
   0 1 2 3

5. I find it difficult to go as long as an hour without smoking.
   0 1 2 3

6. I find myself smoking without remembering lighting up.
   0 1 2 3

7. I get a real gnawing hunger to smoke when I haven't smoked for a while.
   0 1 2 3

8. I am very much aware of the fact when I am not smoking.
   0 1 2 3

9. I would find it difficult to go without smoking as long as a week.
   0 1 2 3
Appendix G

Health Promoting Lifestyle Profile
LIFESTYLE PROFILE

DIRECTIONS: This questionnaire contains statements regarding your present way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the regularity with which you engage in each behavior by circling:

N for never, S for sometimes, O for often, or R for routinely.

1. Eat breakfast. N S O R
2. Report any unusual signs or symptoms to a physician. N S O R
3. Like myself. N S O R
4. Perform stretching exercises at least 3 times per week. N S O R
5. Choose foods without preservatives or other additives. N S O R
6. Take some time for relaxation each day. N S O R
7. Have my cholesterol level checked and know the result. N S O R
9. Feel I am growing and changing personally in positive directions. N S O R
10. Discuss personal problems and concerns with persons close to me. N S O R
12. Feel happy and content. N S O R
13. Exercise vigorously for 20-30 minutes at least 3 times per week. N S O R
14. Eat 3 regular meals a day. N S O R
15. Read articles or books about promoting health. N S O R
17. Work toward long-term goals in my life. N S O R
18. Praise other people easily for their accomplishments. N S O R
19. Read labels to identify the nutrients in packaged food. N S O R
20. Question my physician or seek a second opinion when I do not agree with recommendations. N S O R
22. Participate in supervised exercise programs or activities. N S O R
23. Am aware of what is important to me in life. N S O R
24. Enjoy touching and being touched by people close to me.  
25. Maintain meaningful and fulfilling interpersonal relationships.  
26. Include roughage/fiber (whole grains, raw fruits, raw vegetables) in my diet.  
27. Practice relaxation or meditation for 15-20 minutes daily.  
28. Discuss my health care concerns with qualified professionals.  
29. Respect my own accomplishments.  
30. Check my pulse rate when exercising.  
31. Spend time with close friends.  
32. Have my blood pressure checked and know what it is.  
33. Attend educational programs on improving the environment in which we live.  
34. Find each day interesting and challenging.  
35. Plan or select meals to include the "basic four" food groups each day.  
36. Consciously relax muscles before sleep.  
37. Find my living environment pleasant and satisfying.  
38. Engage in recreational physical activities (such as walking, swimming, soccer, bicycling).  
39. Find it easy to express concern, love and warmth to others.  
40. Concentrate on pleasant thoughts at bedtime.  
41. Find constructive ways to express my feelings.  
42. Seek information from health professionals about how to take good care of myself.  
43. Observe my body at least monthly for physical changes/danger signs.  
44. Am realistic about the goals that I set.  
45. Use specific methods to control my stress.  
46. Attend educational programs on personal health care.  
47. Touch and am touched by people I care about.  
48. Believe that my life has purpose.

<table>
<thead>
<tr>
<th></th>
<th>NEVER</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
<th>ROUTINELY</th>
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<tbody>
<tr>
<td>24</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
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<td>48</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
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</tbody>
</table>
Scoring instructions:

A score for the overall health-promoting lifestyle is obtained by calculating a mean of the individual's responses to all 48 items; six subscale scores are obtained similarly by summing the responses to subscale items and dividing by the number of items on the subscale. The use of means rather than sums of scale items is recommended to retain the 1 to 4 metric of item responses and to allow meaningful comparisons of scores across subscales. The items included on each scale are as follows:

Health Promoting Lifestyle  1 to 48

Subscales:

Self-actualization  3,8,9,12,16,17,21,23,29,34,37,44,48
Health responsibility  2,7,15,20,28,32,33,42,43,46
Exercise  4,13,22,30,38
Nutrition  1,5,14,19,26,35
Interpersonal Support  10,18,24,25,31,39,47
Stress Management  6,11,27,36,40,41,45

Note: If more than 5% of the items on an HPLP were unanswered, that questionnaire was not used. When responses to 5% or fewer of the items were omitted, missing values for each item were replaced by median sample values (Walker et al, 1988).
Appendix H  Cotinine Extraction and High Performance Liquid Chromatography Analysis for Saliva Samples
Modified Hariharan et al. (1988) Protocol
Preparation of Tubes

1. Soak 10 ml translucent Teflon tubes and caps in Contrad Solution (100 mL/4L H₂O overnight. (VWR Scientific Oakridge Teflon PEP Nalgene).

2. Rinse tubes and caps 5 times in a) tap H₂O; b) distilled H₂O; c) deionized H₂O; and d) ethanol. Let air dry or bake in 100 degree oven for 10-15 min.

3. Wash all Eppendorf® (Brinkman Instruments, Westbury, NY) tips with ethanol. Let air dry.

Extraction Technique

1. Pipette internal standard into each Teflon tube. 50 microliters N-ethyl normicotine (G.B. Neurath, Hamburg, Germany) which gives a 100 ng peak. To prepare: take 500 microliters internal standard from frozen stock (200 ng/microliter) and add 24.5 deionized water. Mix. Gives a concentration of 4 ng/microliter.

2. Add 1.0 mL 10% TCA.

3. Add 1.0 mL saliva sample. Cap and vortex 10 seconds immediately before going on to next sample.

[4. If plasma sample, ultracentrifuge at 20,000 for 30 minutes. Decant clear supernate into clean teflon tube.]

5. Add 300 microliters 12.5M potassium hydroxide. (This reagent is easily contaminated. Make fresh every 2 weeks.)

6. Add 6.0 methylene chloride. Mix and cap. Do steps 5 and 6 for each sample before going on to the next sample.

7. Shake horizontally for 20 minutes (Eberlach Corp).

8. Centrifuge at 3000 rpm for 5-6 minutes.

9. Aspirate top (aqueous) layer with 9" Pasteur pipet under vacuum. Aspirate sides of tubes also.

10. Add 3.0 mL of 0.5M hydrochloric acid. Mix.

11. Shake again for 10 minutes.
Appendix G (cont.)

12. Centrifuge at 3000 rpm for 5-6 minutes.

13. Aspirate lower layer with Pasteur pipet just until bubbles enter pipet.

14. Add 300 microliters 12.5M potassium hydroxide and 5.0 mL methylene chloride. Mix.

15. Shake for 10 minutes.

16. Centrifuge for 5-6 minutes at 3000 rpm.

17. Aspirate aqueous (top) layer with vacuum. Aspirate sides of tube also.

18. Add 250 microliters methanolic hydrochloric acid (dilution is 1:40). Vortex.

19. Place under nitrogen evaporation in water bath at 45 degrees Centigrade. Stop when half of liquid is evaporated and lower needle. When 1.0 mL is left, vortex then finish evaporation.

20. Store in refrigerator (up to 2 days) until chromatography run.


22. Inject on Hewlett Packard HPLC 6000.
   If manual injections, reconstitute in 100 microliters and inject 50 microliters.
   If auto injections, reconstitute in 150 microliters and inject 100 microliters.

23. Flush HPLC loop with mobile phase between samples and clean syringes with methanol and HPLC grade water.

Appendix G (cont.)

**Mobile Phase Preparation**

5% Acetonitrile Mobile Phase for Cotinine Extraction

1. Weigh 5.2g Potassium Phosphate Dibasic (MW=228)

2. Weigh 6.3g Citric Acid Monobasic (MW=210.14)

3. Weigh 600mg Heptane Sulfonate (MW=220.26)

4. Add 850 mL deionized/HPLC grade water. Stir.

5. Add 5 mL Triethylamine.

6. Add 50 mL Acetonitrile.

7. Add 15 mL Methanol.

8. Add 80 mL HPLC grade water to make 1000 mL.

9. Adjust pH to 4.4 with Citric Acid.

**Preparation of Reagents for Extraction Process**

10% TCA - 10 g TCA in 100 mL deionized water

12.5M KOH - 7.01g/10 mL deionized water

Methanolic HCL - 1 mL of 1.0M HCL in 40 mL Methanol

0.5M HCL 150 mL 1.0M HCL in 150 mL deionized water

1M HCL - 8.18 mL HCL/100 mL deionized water
Appendix I

Summary of Field Test Data
Summary of themes in interviews with 30 women:

**Role cigarettes play** - (positive outcome expectancies).

Major expectation was that of relaxing; calming nerves and managing stress. (23 of 29 identified this).

Others mentioned less often: habit (6); addicted (3); handling (3); bored (3); weight control (2); crutch (1); booster (1); enjoy (2); taste (1); feel older (1).


**What expect when inhale** - (not able to deal with this question - seemed to overlap previous one).

Don't think about it. Or typical responses were: enjoyment; tastes good; habit; physical effect; habit; fills spare time; think about how it makes me look when I smoke - feel older and better able to handle things.

**Ways it is not helpful** -

SOB (8 of 13); lose time (2); really don't like it as much as I used to; makes me tired (2); irritation at lack of control; bad smell; fire hazard.

**What heard about what cigarettes may do to your health** -

Lung problems (bronchitis, emphysema) - 14
Cancer - 13
Heart - 7
Circulation, HTN, arterial disease - 4
Effect on chronic health problems (DM, lupus, ulcers) - 3
Aesthetics - 3
Second hand smoke - 2
Heartburn - 1
Chest hurts - 1
Weight gain when quit - 1
Decreased stamina - 1

Beliefs: If I quit, I'll get cancer. (several)

2 friends who quit smoking, died 6 months after quitting.

ICU patients had heart attacks after they quit smoking.

Smoking is less harmful than crack. Less expensive.
Question the conflicting messages of warnings on packs and advertising to sell cigarettes. (If sell it, must be OK?)

Advice to friend who wanted to quit

(Limited suggestions since participants felt they had not been successful themselves).

Think of cost of cigarettes
Friends/family suffered from smoking
Nicotine gum - tastes bad; nasty; didn't help since she smoked and used the gum.
Go to a program - need help.
Work together with a friend who wants to quit - only smoke a certain number/day and if go over, pay each other.
Hypnosis - don't want anyone messing with my brain.

Relapse r/t weight gain and stress.

Ever consider quitting

Never (only 1/day)
Briefly; once in a while
Quit once - 5 years; 1 day; 17 days in hospital; 4-5 hours;
5 months for Lent; 5 months as New Year's Resolution
with husband; 1 month but turned into a blimp; 7 days
when with nonsmoking boyfriend; 1 week but then child was born; 2 years until pregnant then nerves started; a day; 4 months.
Could have when locked up 21 days generic cigs - didn't.
Thinking about it a lot; trying to figure out a way - never tried before; just recently - never before - job related;
trying to cut down; trying to stop - costs too much.
Rebel against people telling me to quit - I'll smoke more. Thinking about quitting = stress and therefore smoke.

Reasons for considering quitting:

  Grandchildren; doesn't want to miscarriage; pregnancy;
smoking related illness in family members; personal health ulcers; Social pressure - family; try to gain weight (2);
heartburn; limited smoking at work (nurse).

Techniques used or heard about:

Computer - but it costs $60.
Cigaret (2). So bad she (a friend) stopped smoking.
Don't want a substitute - want techniques.
Threw away cigarettes - (mad because they were out in trash).
Lived with a friend who wouldn't let her smoke.
Hid them from myself/out of sight.
Think about $ it costs. (2)
Slept a lot & drank water.
Threw away smoking equipment; cleaned house.
Made no-smoking signs for self to use around house.
Used Tutti-Fruitti spray - satisfy olfactory stimulation.
Peanut butter helps get nicotine out of body.
Make a commitment to quit in my mind.
Religion helps (several). Lent.
Vanish cigarette - a hole in the middle.
Positive role model who quit.
Use suckers, chewing gum.
Thing to stick on end of cigarette.
Once-over cigarette (no $ for that).
Nicotine gum didn't work - hooked on something else.
Just stopped - but they didn't really smoke that much.

Related concerns:

Don't chew gum.
Not lady-like to chew gum.
What to do with my hands?
Audio tape won't work - if you don't want to play it, you won't.

What would it take to quit?

Life threatening; something drastic; Dr. telling me I'm going to die; go to an island; better stress management; get a hobby; get seriously ill with ulcer problem; a lot of counseling.

Preference for group or 1:1 method?

10 for 1:1 and 4 for group - who made a choice.

Reason for 1:1 - can't get out with a new baby; need someone to contact more than at group meetings; in a group I felt like I didn't do good if others did better.

Reasons for group: see why other folks smoke; 4 or 5 people so you get more out of it - not a big group; See methods others use.

Negatives on 1:1 - somebody bugging me - too much pressure.
Responses to literature:

**Dreams** - almost all positive. Eye-catching; this is about my race and we have smoking problems too; black family idea; nice highlighting; good size; more spaces; like the charts; like the statistics; gives me a chance to form my own opinion instead of telling me what it should be; right length (2); liked the self-quiz on nicotine dependence (2); good topics; easy to read; interesting (2). Would read it if she knew support person would be contacting her.

Negatives- testimonials don't help like techniques would (1); keep a while then throw away; look through but not read since not interested; with 4 children no time to read; didn't like the pull at emotional strings re her smoking's effect on family.

Reframe: Decision is yours - a choice and not a reprimand.

Read in bed at night. Last puff and then sleep. Cross-word puzzles (2). - Make one with lung health focus...?

**North Carolina - 4 weekly sheets.**

Mixed review. 16 positive/5 negative.

Main criticism - lack of color. Black and white with red accents was too plain. Would be boring to get the same format 4 weeks in a row. Would use the back of it to write on. Several people said nicotine fading (card #1) did not work for them. They tended to inhale deeper and switched back to regular brand. Knowing I had a "low nicotine cigarette" my brain said to smoke more. Card #1 - "Getting ready to quit" - well, I've been getting ready for 15 years. Use a different title - I liked the idea of nicotine fading after you explained it to me. Title it so people know it is something specific to do to quit. Wouldn't tell family/friends she was quitting -they sabotage you. Make it more interesting - questions to fill in - a crossword puzzle.

Positives - weekly approach would keep it in your mind; serve as a reminder; good idea to put on refrigerator with magnets; writing down goal dates makes it interesting - need to be active. Liked the idea of cutting down via nicotine fading. Drinking water - hadn't thought of that. Weight control card pertinent. Easy to follow. OK on the amount per week.
If I was interested - would be the right amount. Prefer this to a book.

Want a positive role model in addition to reading.

?Add a colorful face sheet - with minimal printing introducing the topic. Include activity to increase involvement.

**Freedom from Smoking for You and Your Family**

Split decision - 8 positive and 8 negative.

Main criticism - too big/ too fat/ too much/ too thick/ too heavy - especially if you get it in the mail. Even for woman who enjoys reading novels. No time to read this much.

One person disliked the blue cover; one person thought the black woman featured in the FFSPYYF looked strung out and tired; children would like it and color in it if they got the mail first. I'd be smoking and reading it. Not even my size- prefers Reader's Digest size. Wouldn't take the time.

Positives - the detailed information (several people). Could use it in various stages. In index find only those sections of interest to you. There are helpful hints. Information-oriented and prefer this to testimonials. Liked section on slip and getting back on track. I read all the time - I'd read it. Good info to have 1-2 weeks before quitting - have a plan. Color & content preferred over NC weekly format.

Really need to want to quit to read all this.

?Send only small sections at a time that correspond to the NC weekly cards. Several people supported this concept.

**Pack Track**

Mostly positive. 14 for/3 negatives.

Positive: Good the week before you quit. To get an idea at the beginning. That's neat. Many said they would do the recording. Liked the boxes to check. That would help my boyfriend too. It would help me keep track of how much I'm smoking - I've increased lately. For a day I would - it would bring it to your attention like in losing weight. It brings it more to reality.
That's fun - I'd do it - moods and all. I'm a record keeper anyway, I'd like this. It would work for me because of where I am - and get a profile of myself.

Negative: Wouldn't do it - depends on how determined you are to quit. I'd probably forget to do this at work - it would be OK for someone at home. I'm not a good record keeper - they can hang it up on me - I'm helter skelter.

As with others - response dependent on level of readiness to quit.

**NHLBI one-pager**

Did not consistently show this one - started with participant #7.

4 negatives/3 positives.

**Positives:** liked the content - but change it to a sticker to put in cigarette case - STOP! THINK! ACT! - instead of looking for a portfolio of papers. Identified with one of the stages in content. Liked the information.

**Negatives:** Boring. It's like what you would see stuck on a wall. Prefer photographs to drawings. Not as much information as Dreams. Got to liven it up. Pep. Needs to be brighter.

Don't use in this format. Put content on small card/sticker to stick in cigarette case or on pack.

**Bank** - received this later in the study with new NC materials.

5 positive/4 negative.

**Positive:** Good idea - used something similar in quit attempt and bought clothes with $ saved; Cigs. cost lots of money; cute - I'd probably rip into the bank; Box is too easy to get into - make it harder to get $ out; sure, I'd use it; I did count up how much I saved - need room for dollar bills - not just coins.

**Negative:** Would use $ saved for something else; No - there really never is extra money - like when I pay off a bill - I should have extra change - that's a myth. That's a guilt cop my children lay on me about throwing money away on cigarettes. Include the bank - but also calculate how much you save.
Thoughts on intervention:

Theme: It's your decision - we're here to help.

Week 1 - Don't let your dreams go up in smoke - pamphlet Pack Track and a pen. (Brief info sheet re pack track).

Week 2 - NC card #1 (fading) and 2 (preparing) & refrigerator magnets.

Develop special face sheet re nicotine fading
FFSFYFF - p. 16-17

Preparing - 4 D's - delay, drink, deep breathe, do something else. (make into a sticker or cigarette case insert.)
FFSFYFF p. 13 - relaxercise
pp. 6 & 7 - reasons to quit

Week 3 - Select a quit day.

NC card #3 - Staying smoke-free (rewards p. 35)
pp. 40-44 exsmoker snacks
pp. 37-40 staying off

Develop material on smoking and stress.
+ self-talk; effects of nicotine.

Packet of aids/substitutes - straws, sugarless candy, crossword puzzles, pencil, fragrance. Bank for $ not spent on cigarettes.

Week 4 - NC card #4 - weight control
Sliding back / being a nonsmoker FFSFYFF p. 47-54.
Info sheet to address myth - quit smoking and get cancer.
ALA mug - re Breathe Easy - daily reminder.
Responses to 3 posters

Main concern - posters are for kids; where would I put them? Maybe in office - probably not the home. Don't know if I'd put it up - but I'd look at it. Those are for businesses - not a home. But my children would like them and I want them to know they shouldn't smoke. Give them away to my teacher who works with pregnant teenagers.

Preferences:

13 liked Mother-Daughter
8 liked Fresh Air
6 liked Doin it Smoother

Mother-Daughter:

Positives - that's deep; gets to you about what are you passing on there; my family is first concern; scares me - would stop and think.

Negatives - that's manipulating people - makes us feel bad instead of helping us (didn't see crayon - thought child was smoking with mother present); don't care for it; Don't make me feel guilty; she's too young to be smoking (pointed out it was a crayon - Oh! Now I like it.).

Office Fresh Air:

Negatives - reminds of nonsmoking policies;

Smoother:

Negatives - smoking has not stopped me from being close; are you telling me I have a hygiene problem??

One person preferred 2 AHA posters because more colorful.

Send all three and select one you prefer - pass others on or alternate each week.

Other posters you would prefer - baby and they have just the words - don't smoke.

Potential materials for diversity/interest:

"Eyecatcher to set around and look at"; Calendar related to health images; pen with pack track; packet of goodies during quit week - sugarless candy, cinnamon sticks, straws, suckers.
Support Person Ideas

In general - encourage don't nag. If not ready to quit - wouldn't help; consider it a nuisance.

Reactions: I'd like it - someone is in support of what I'm trying to do. Gives you a shot in the arm. Someone cares about my health.

I don't think it would help. I would lie on the phone, but not face-to-face. You need to look at the person. If I don't want to listen, I'll just block it out.

Things to avoid:

Harping about it's bad, it's bad.
Criticizing.
Lecturing.
Asking how many I smoked.
Nagging like my mom.
Make me look bad.
Telling me what I should do.
Judgemental.
"You know you shouldn't do that ...bla, bla...and it's bad for your health." I know that.
"You don't care about your baby!" - because I do.
Lecture about statistics and what can happen.

Things to do:

How's your week been?
Keep up the good work. One step at a time. You can do it.
Stay on me and I would try to be honest.
Talk and keep mind off cigarettes.
Concern - how many smoked? pinpoint why? help me think it through.
Positive comments.
Talk about problem times - come up with ways to deal with them.
Rapport; consistency; sincere; concern about my health.
Constructive criticism.
Come to my door 2 -3 x/week for a half hour.
Help me identify activities to keep busy - distraction.
Give me something different to try.
Tell me to suck a peppermint - because when I'm wanting a cigarette I can't think of anything else even if I have them ready.

Concerns: May only be effective for the duration of contact. Then what?
Saliva sac collection device

2 of 30 would not do the test - concern re putting something in mouth. One preferred giving a urine specimen.

8 wanted to know if they could obtain results.

Some wanted to know how this would help the overall study.

Some questioned if it was effective measure since only done once; maybe I didn't smoke that day.

Don't use the word "spit" - reminds me of AIDS. Thought I had to spit in a bag.

I could jiggle it around a couple minutes, but I don't know about 5 minutes.

People on other drugs would refuse to do it.

Concern about drugs on stickers etc.

Some women are suspicious of anything new (strawberry cream cheese example).

People would probably think it was something else.

Give brief explanation before showing the bubble - so they don't think "Now what!"

Could I smoke or drink with it in my mouth?

The sugar will turn brown? - (explain sugar will dissolve and saliva go inside with the sugar).

Suggestions on how to describe:

"It's just to see how much nicotine is in your body from the saliva in your mouth."

"We want to measure how much nicotine is in your system. It's very easy. You only take this little bubble and lay it on your tongue. It tastes good and you only keep it there ___ minutes. Then you take it out and put it in this container."

"It is sort of like a life saver - candy flavored. But you don't eat it. And we can tell how much nicotine you've been exposed to."
Don't use word "float" around in mouth to describe bubble - don't want something floating in my mouth. I'd chew it.

First thing that came to mind - can I have the results?

Make it clear there is no blood to be taken.

Is the stuff inside the bubble going to effect me?

Is it something to help me stop smoking?

Typical information to present: In order to measure the amount of nicotine in your system we will use a sample of saliva from your mouth. The way we get that is to use this bubble with sugar in it. When you put it in your mouth the saliva goes into the bubble - the sugar pulls it in. Nothing comes out of the bubble. The outside has a lemon flavoring to make you have more saliva in your mouth. You don't chew it - just move it around in your mouth like a life-saver for about 5 minutes (8) when it will fill up with saliva. Then you take it out and put it in this plastic container. I'll take it back to the laboratory to do the measuring and you can know your level of nicotine if you want to. It's not a way to quit smoking just a way to measure the level of nicotine you've taken in over the past week.
other:

You find yourself smoking just for the spite of it - even if you want to quit.

What ticks me off is the passive smoker these days - It's just like me telling you - you can't wear your hair like that. To me it's like trying to snatch away one of my rights. Somebody's views are trying to be shoved in your face.

Agree - nicotine is a drug. It's been the hardest thing for me to kick.

Response to 11 yr old son asking mother not to smoke. I told him I get tired of him telling me that all the time. I be fussing and he said well it is bad for your health. I told him, candy's bad for your health too, but I don't get on you all the time. I give you money so you can buy candy. (?? symbolic reward/treat)

If I'm upset when my grandson is there, he'll go find my cigarettes and say, "Now grandma don't you want to sit down and have you a cigarette and chill out?" I'll say yes, but that's not going to stop me from getting on you. He associates me with sitting down and chilling out for a minute or two, I'll get over being mad. -- Even he knows it's a calming effect.
Descriptive information on 24 women who returned questionnaires by mail following field test

**AGE**
- Range: 18 - 62
- Median: 41
- Mean: 39.7

**EDUCATION**
- Range: 10 - 17 years
- Median: 12
- Mean: 12.8
- Mode: 12 (9 women)

**MARITAL**
- Single - 42%
- Live with lover - 13%
- Married - 29%
- Widowed - 8%
- Separated - 8%
- Divorced - None

**PARTNER'S SMOKING STATUS**
- Smoker - 42%
- Exsmoker - 8%
- Never smoker - 20%
- No partner - 29%

**EMPLOYED OUTSIDE HOME**

78% were employed. Occupations included:

- Secretarial - 5
- Administrator in service agency - 4
- Teachers aid - 2
- Social service worker - 2
- Optometric asst - 1
- Real estate - 1
- Office mgr - 1
- Kitchen mgr - 1
- Registered nurse - 1
HOUSEHOLD INCOME

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<td>17</td>
</tr>
<tr>
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<td>4</td>
<td>17</td>
</tr>
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<td>10-14,999</td>
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<td>45,000+</td>
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Median: $15-19,999

PRESENCE OF CHRONIC ILLNESS

35% reported a chronic illness diagnosis

- 6 with hypertension/heart murmur
- 2 with diabetes mellitus
- 1 with lupus
- 1 with gastric ulcers

WEIGHT/HEIGHT

(need to include option to signify pregnant weight)

Ht ranged from 5' to 5'11 1/2"

Wt ranged from 105 to 215 pounds.

8 (33%) women reported weighing > 185 pounds.

NUMBER OF YEARS OF REGULAR SMOKING

Range: 2 - 46 years
Median: 20 years
Mean: 20.5 years

NUMBER OF CIGARETTES PER DAY

Range: 1 - 50 (120 an error?)
Mean: 18
Median: between 15 & 20.
**BRAND NAMES**

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<td>35</td>
</tr>
<tr>
<td>Newport</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>B &amp; H</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Va Slims</td>
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<td></td>
</tr>
<tr>
<td>Pall Mall</td>
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</tr>
<tr>
<td>Camel</td>
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<td></td>
</tr>
<tr>
<td>Capri</td>
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<td></td>
</tr>
<tr>
<td>Saratoga</td>
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<td></td>
</tr>
<tr>
<td>More</td>
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<td></td>
</tr>
</tbody>
</table>

(10 included menthol in naming cigarette brand).

61% smoked high nicotine levels; 39% smoked medium nicotine level; none smoked low nicotine cigarettes.

All women reported no other forms of tobacco were used.

**NUMBER OF TIMES SERIOUSLY TRIED TO QUIT**

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<tr>
<td>1 attempt</td>
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<td>4</td>
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**PERCENT OF PERSONS IN HOUSEHOLD WHO SMOKE**

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<tr>
<td>50% smoke</td>
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<td>19</td>
</tr>
<tr>
<td>33% smoke</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>No other smokers</td>
<td>7</td>
<td>33</td>
</tr>
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</table>

3 women reported living alone and are not included.
PROPORTION OF FRIENDS WHO SMOKE

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<th></th>
<th>n</th>
<th>%</th>
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<td>4</td>
</tr>
<tr>
<td>One-fourth</td>
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<td>38</td>
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<tr>
<td>One-half</td>
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<td>33</td>
</tr>
<tr>
<td>Three-fourths</td>
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<td>17</td>
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<tr>
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</table>

EVER SOUGHT OUT TREATMENT OR PROGRAM TO QUIT SMOKING?

21 (88%) reported no.

Those who sought treatment used: hypnosis (1) FFS clinic (2)

Summary: Sample represents women who have smoked high/medium nicotine level for considerable length of time and have not made serious efforts to quit. Many are exposed to family/friends who smoke.
Appendix J

Investigator Developed Introductory Sheets for 4-Week Mailed Intervention
Week 1  (Cover Page)

Thanks for being part of a study about health and cigarette smoking among black women. You received $10 for joining and will get another $15 at the end -- in about 12 weeks.

It is your decision about cigarette smoking -- we are here to help.

You will get something in the mail to read or do each week for 4 weeks that is about your health and cigarette smoking.

We have an exsmoker who will call you every week to listen and answer questions about smoking and quitting and give you helpful ideas. Her name is Isabel.
This week:

Use the pen and record each cigarette you smoke for 3 days on the white forms. This will give you important information about yourself that you can use.

For example:

I smoke my first cigarette at 7:00 AM and I feel like I really need it and I'm not happy or sad - just kind of bored or blah.

My recording will look like this --

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<th>Time</th>
<th>Need</th>
<th>Mood</th>
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<td>✓</td>
</tr>
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Week 2  (Cover Page)

You learned something about cigarette smoking among Black Americans last week as well as your own smoking habits.

This week:

Since you may be addicted to nicotine, here are some **steps to take** in getting ready to quit.

Deciding

Nicotine Fading

Think of one or two friends who would help you as you quit smoking. Write their names here:

___________________________

___________________________

*** Use the apple magnets to stick cards on your refrigerator ***
Some people think cigarettes & nicotine help their nerves or help them handle stress or chill out.

What nicotine **does** is make your heart beat faster and your blood pressure go up - it does **not** relax your body. The opposite is happening - your body is keyed up.

When your body does not have nicotine from a cigarette you become tense until the body gets another hit of nicotine and it seems like you are relaxing - when really the cigarette is just meeting your body's need for more nicotine.

In this way a cigarette is controlling you. Do you want a cigarette to manipulate you?

Most ex-smokers feel much less nervous just a few weeks after quitting.
Week 3

This is an important week -- we suggest you pick a day that works for you to quit. Circle the day on the calendar. Isabel will ask you which day you chose.

[drawing - calendar & circled date]

(Page 2)

There is a package of substitutes in your envelope for those times when you crave a cigarette ---

Sugarfree mints & suckers
Cinnamon stick
Word Search puzzles & pencil
Fragrant potpourri
Straws
A card with the 4 D's to carry with you.

Put an orange heart sticker on the beige calendar for every day you do not smoke.

There is a new card "The Day Before Your Quit Day" to read & put up on the refrigerator.
The 4 D's

DO SOMETHING ELSE
    (anything to keep busy)

DELAY
    (craving will pass in 3 - 5 minutes)

DRINK WATER
    (up to 8 glasses each day)

DEEP BREATHING
    (breathe out tension and bad feelings)
Week 4  (Cover Page)

Staying Quit is the Hard Part...

**Tips to stay off cigarettes** -

- Don't be discouraged if you slip - read the page on Sliding Back.

  Try again - you are learning a new habit -- not smoking cigarettes.

  It takes time.
  30 million Americans quit each year.
  You can do it too.

- Make sure you reward yourself when you go a day without smoking --- you deserve it -- you worked hard at it.

  Tell yourself you did good - **YOU** are in control not the cigarette.
(Page 2)

- Count the money you have to spend on something else since you're not buying cigarettes.

  1/2 pack a day at $1.75 = $6.13 a week = $24.50 a month.

  1 pack a day at $1.75 = $12.25 a week = $49 a month.

  1 1/2 packs a day at $1.75 = $18.38 a week = $73.50 a month.

  2 packs a day at $1.75 = $25 a week = $100 a month.

You can put the money you used to spend on cigarettes in the red and white bank and watch it grow.

Worried about gaining weight??

See the list of snacks to eat - don't use food instead of a cigarette.

Read the card "Watching Your Weight after You Quit" and put it on your refrigerator.

Get some kind of exercise every day - walking is great and something almost everyone can do.
Some people think they will get cancer after they quit smoking...

The opposite is true... Your body starts to heal itself as soon as you stop smoking. The picture below shows all the parts of your body that are more healthy after you quit cigarettes.

You won't be short of breath. You will have a better sense of taste and smell. Your clothes, hair and home will not smell like smoke. You will feel like you are in control of cigarettes.

When you quit smoking you reduce your chances of:

Stroke
Cancer of mouth, throat
Cancer of voice box
Heart disease
Emphysema
Lung Cancer
Cancer of Pancreas
Stomach Ulcers
Bladder Cancer
Small blood vessel disease

Cancer of the cervix
Low Birthweight Baby
Appendix K

Interview Guide for Intervention Evaluation at 12-week Follow-up Appointment
1. Did you quit smoking cigarettes at any time since our first meeting?

2. I'm interested in your general impressions of the mailings and follow-up phone calls by Isabel.

3. What, if anything, did you read or use?

4. Specific comments regarding each week's packet with your suggestions to keep or delete activities/materials in the future. (Samples of each week were used to refresh the individual's memory about specific items.)

Week 1:
- Don't Let Your Dreams Go Up in Smoke pamphlet
- Pack Tracks
- Purple introduction sheet
- Lay facilitator

Week 2:
- Nicotine Fading - chart with brands
- Quit for Life card
- Quit for Life refrigerator magnets
- Deciding to quit - section from Freedom from Smoking for You and Your Family (FFSFYYF)
- Pink introduction sheet - nicotine as a stimulant not a stress reliever.
- Lay facilitator

Week 3:
- Quit for Life tips on quitting card
- Removing Roadblocks - FFSFYF
- Packet of substitutes
  - sugarfreee mints
  - cinnamon stick
  - straws
  - word search & pencil
  - potpourri
- Quit for Life button
- Card with 4 D's
- Calendar with stickers
- Beige introduction sheet - select a quit date.
- Lay facilitator
Week 4:

Weight control - Quit for Life card
FFSFYYF low calorie snacks
Staying Smokefree - Quit for Life
Rewards for not smoking - FFSFYYF
Bank - for money not spent on cigarettes
Blue introduction sheet - cost savings; tips on
maintenance and slips.
Physical benefits of quitting

General:

Condition of envelopes when they arrived? Sufficient
postage?

Evaluation of timing of mailings? Too far apart, too close
together, about right?

Recommendations to improve the program?

What would it take to get you to quit cigarettes?

Are you seriously planning to quit in the next three months?

Do you have a date set? When?
Appendix L

Letters Sent to Notify Participants of Cotinine Levels in Saliva Sample(s)
Ohio State University
College of Nursing

Some time ago you participated in a survey about cigarette smoking and health among African American women. You also gave a sample of saliva then to measure nicotine in your body.

From your sample, we measured the amount of cotinine - what nicotine breaks down to in the body.

Your amount of cotinine was

___________ nanograms per milliliter.

A person who does not smoke usually has a score of 0 (or less than 9 nanograms per milliliter.)

Several years ago in a survey of black American women, the average cotinine was about 250 nanograms per milliliter and the women smoked an average of 11 cigarettes per day. (For black American men the average cotinine was 245.)

The higher your number is, the more nicotine you are taking into your body.

The best score is 0 - meaning you no longer smoke cigarettes.

If you have questions, you can reach me at 279-1700 or 888-8094.

Thanks for being part of this important work that added to our knowledge about cigarette smoking and health among African American women.

Karen Ahijevych, RN

Ohio State University
College of Nursing
Some time ago you participated in a survey about cigarette smoking and health among African American women. You also gave a sample of saliva then to measure nicotine in your body. We met 3 times over 3 months.

From your samples, we measured the amount of cotinine - what nicotine breaks down to in the body.

Your amount of cotinine was

1st time ___________ nanograms per milliliter

2nd time ___________

3rd time ___________

A person who does not smoke usually has a score of 0 (or less than 9 nanograms per milliliter.)

Several years ago in a survey of black American women, the average cotinine was about 250 nanograms per milliliter and the women smoked an average of 11 cigarettes per day. (For black American men the average cotinine was 245.)

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Thanks for being part of this important work that added to our knowledge about cigarette smoking and health among African American women.

Karen Ahijevych, RN
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