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Impact of a Cognitive-Behavioral Weight Control Program on Body Weight, Diet Quality, and Smoking Cessation in Weight-Concerned Female Smokers

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

IMPACT OF A COGNITIVE-BEHAVIORAL WEIGHT CONTROL PROGRAM
ON BODY WEIGHT, DIET QUALITY, AND SMOKING CESSATION IN WEIGHT-
CONCERNED FEMALE SMOKERS

A dissertation submitted in partial fulfillment of the

requirements for the degree of

DOCTOR OF PHILOSOPHY

in

DIETETICS AND NUTRITION

by

Jennifer Sallit

2008

To: Dean Fernando M. Treviño
Dr. Robert R. Stempel School of Public Health

This dissertation, written by Jennifer Sallit, and entitled Impact of a Cognitive-Behavioral Weight Control Program on Body Weight, Diet Quality, and Smoking Cessation in Weight-Concerned Female Smokers, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Date of Defense: June 06, 2008

This dissertation of Jennifer Sallit is approved.

Dean Fernando M. Treviño
Dr. Robert R. Stempel School of Public Health

Dean George Walker
University Graduate School

Florida International University, 2008

DEDICATION

I dedicate this dissertation to my parents, Fayssal and Siham, who instilled in me the value of education. They are my role models and inspiration. I would also like to dedicate this to my fiancé, Gary Tsalalikhin, who has always stood by my side and believed in me.

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ABSTRACT OF THE DISSERTATION

IMPACT OF A COGNITIVE-BEHAVIORAL WEIGHT CONTROL PROGRAM ON
BODY WEIGHT, DIET QUALITY, AND SMOKING CESSATION IN WEIGHT-
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by

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Florida International University, 2008

Miami, Florida

Professor Michele Ciccazzo, Co-Major Professor

Professor Zisca Dixon, Co-Major Professor

Many people use smoking as a weight control mechanism and do not want to quit because they fear weight gain. These weight-concerned smokers tend to be female, are significantly less likely to stop smoking, are less likely to join smoking cessation programs, and will relapse more often than smokers who are not weight-concerned. Research suggests that a woman's confidence in her ability to control her weight after quitting relates positively with her intention to quit smoking. Likewise, success in smoking cessation has been associated with increased self-efficacy for weight control. It has been shown that success in changing one negative health behavior may trigger success in changing another, causing a synergistic effect. Recently research has focused on interventions for weight-concerned smokers who are ready to quit smoking. The present study investigated the effect of a cognitive based weight control program on self-efficacy for weight control and the effect on smoking behavior for a group of female weight concerned smokers. Two hundred and sixteen subjects who wanted to lose weight

but who were not ready to quit smoking were recruited to participate in a 12-week, cognitive-behavioral weight control program consisting of twelve one-hour sessions. Subjects were randomly assigned to either 1) the weight-control program (intervention group), or 2) the control group. Results of this study demonstrated that subjects in the intervention group increased self-efficacy for weight control, which was associated with improved healthy eating index scores, weight loss, increased self-efficacy for quitting smoking, a decrease in number of cigarettes smoked and triggered positive movement in stage of change towards smoking cessation compared to the control subjects. For these subjects, positive changes in self-efficacy for one behavior (weight control) appeared to have a positive effect on their readiness to change another health behavior (smoking cessation). Further study of the psychological variables that influence weight-concerned female smokers' decisions to initiate changes in these behaviors and their ability to maintain those changes are warranted.

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CHAPTER 1

INTRODUCTION

Cigarette smoking is the leading cause of preventable morbidity and mortality in the U.S., accounting for 438,000 deaths annually (CDC 2005). Currently, 22.8% of adults in the U.S. smoke (NHIS, 2006). People are well aware of the health risks posed by cigarette smoking, yet two thirds of American smokers (25 million) are not presently planning to quit (NHIS, 2006). One factor that has emerged as a potential obstacle to cessation is concern about cessation-related weight gain (Russ et al., 2001). Research has demonstrated that approximately 50% of female smokers and 25% of male smokers perceive that smoking helps to control their body weight (Clark et al., 2006; Garner, 1997; Meyers et al., 1997). These individuals have been identified as being “weight-concerned” smokers (Clark et al., 2004). Female weight-concerned smokers have been shown to be heavy smokers (i.e., number of cigarettes)(Sorensen et al., 1992), have significant body image concerns (Pomerleau, Zucker, & Stewart, 2001), expect a 16-pound weight gain after quitting smoking (Levine, Perkins, & Marcus, 2001), and have low self-efficacy to manage their eating (Copland et al., 2006; Perkins et al., 2001; Pinto et al., 1999).

Smoking initiation and continuation is encouraged by nicotine’s effect on weight suppression in women (Levine et al., 2001; Pomerleau et al., 2001; French et al., 1994; Klesges et al., 1988). Not only is there difficulty in recruiting and retaining individuals in smoking interventions (McIntosh et al., 2000) but those who do join have low long-term success rates (Jeffery et al., 2000; Ockene et al., 2000), especially if they are weight-

concerned smokers. Findings from Copeland et al. (2006), indicate that post-cessation weight gain concerns can preclude even initial steps or plans to quit smoking, in addition to jeopardizing initial cessation and maintained abstinence. Also, a substantial proportion of smokers in the study of Pisinger and Jorgensen (2007) reported that post-cessation weight gain led to an aborted quit attempt.

Various constructs of behavioral theories have been integrated into both weight loss and smoking cessation programs with demonstrated success (Warziski et al., 2007; Clark et al., 2005; Baranowski et al., 2003; Roach et al., 2003; Resnick, 2001; Shin et al., 2001; AbuSabha & Achterberg, 1997; Harris & Murray, 1997; Irwin & Guyton, 1997; Condiotte & Lichtenstein, 1981). In the domain of weight control, self-efficacy has received considerable attention, and investigators have argued that self-efficacy is an important mediator of successful weight loss behaviors and enhanced weight loss program experiences (Palmeira et al. 2007; Wiltink et al. 2007; Byrne, 2002; Brownell & Cohen, 1995; Strecher et al., 1986; Wadden & Letizia, 1992), and a consistent predictor of weight reduction (Teixeira, 2004; Teixeira et al., 2002). Increased self-efficacy for weight control has been shown to improve eating behavior in adults of all ages (Roach, 2003; Perkins, 2001; Senekal, 1999; Borrelli et al., 1998; Perkins, 1997; Sheeska, 1993). Longitudinal research on smoking cessation shows post-treatment self-efficacy to have predictive value in smoking status (Baldwin et al. 2006; Solomon et al., 2006; Sonya et al., 2006; Staring & Breteler, 2004; Gwaltney et al., 2001; Shiffman et al., 2000; Scholte & Breteler, 1997; Gulliver et al., 1995; Haaga et al., 1993). A study by Bowen et al. (2000), found that individuals with greater concern about weight were less confident in their ability to quit smoking. The most common theory of smoking cessation postulates

that readiness to quit begins with changes in attitudes that move the smoker toward behavioral change and eventual cessation. New ways must be found to reach weight-concerned smokers who are not contemplating quitting and who lack the motivation, confidence, or coping skills needed to succeed. For this study, it was hypothesized that a cognitive behavioral weight-control intervention focused on increasing weight-concerned smokers' self-efficacy to control their weight would motivate them to change their smoking behavior.

Research Purpose

The purpose of the study was to determine the relationship between self-efficacy for weight control and smoking behavior in weight-concerned smokers enrolled in a cognitive-behavioral weight control program. The primary aim of this study was to determine if a change in self-efficacy for weight control would result in a change in self-efficacy for quitting smoking, number of cigarettes smoked, cigarette dependence, and stage of change (SOC) for smoking cessation.

Research Problem

One of the fundamental criticisms of traditional smoking cessation programs, according to the transtheoretical model, is that the programs do not address people in the various stages of change. Most programs are oriented toward individuals in the action stage, despite the fact that a vast majority are reportedly in the precontemplation stage (approximately 50-60%) or the contemplation stage (approximately 30-40%) (Prochaska, et al., 1992). Many weight-concerned smokers are not motivated to quit smoking and therefore are not reached through smoking cessation interventions (Prochaska 1996a). These smokers use smoking as a weight control strategy or won't quit smoking due to

fear of weight gain. They may be helped by being taught how to control their weight through behavioral strategies focused on increasing their self-efficacy for weight control instead of depending on cigarette smoking.

Significance

Consistent with ideas from social cognitive (Blair et al., 1985) and diffusion theories (Rogers, 1983), researchers have theorized that when two or more behaviors are targeted simultaneously an increase in the level of motivation to change one behavior produces progressive changes in another behavior (Rhew et al. 2007; Vandelanotte et al. 2007; Persky et al. 2005; Boudreaux et al., 2003; Nigg et al. 2002; King et al. 1996; Abrams et al., 1994; Emmons et al., 1994). Success at changing one behavior could boost self-efficacy for both that behavior and other behaviors.

However, studies exploring the utility of having individuals adopt healthy eating while stopping smoking (Copeland et al., 2006; Clark et al, 2005; Marcus et al., 2005; Persky et al., 2005; Spring et al., 2004; Carlson et al., 2003; Ramirez & Rosen, 2001; Hall et al., 1992; Pirie et al., 1992), and adding weight control techniques to prevent post-cessation weight gain, have shown no appreciable improvement in quit rates for smoking or in weight control. These data suggest that changing multiple risk behaviors simultaneously may overburden an individual and that a more complex sequential process may be needed (Ory et al., 2002; Hall et al., 1992). Individuals motivated to change one behavior have been shown to have an increased readiness to change another behavior. In addition to the timing of the interventions, it is also important to consider the relationship between the behaviors targeted for change. Some behaviors may be more

complementary than others. Changes in diet and exercise, for example, are often recommended simultaneously and it may be that this is an appropriate intervention strategy. The parallels are not so apparent, however, for weight-control and smoking cessation, suggesting the change process may be more discrete for these two behaviors. Since trials that have included interventions focused on changing these two behaviors simultaneously have been unsuccessful, this study focused on changing one behavior (weight control) but also measured the effect it had on another (smoking).

Theoretical Perspective

The transtheoretical or stages of change model (DiClemente & Prochaska, 1985) and social cognitive theory based on the work of Bandura and others (Bandura, 1986; Miller & Rollnick, 1991; Ajzen, 1985) have been extremely useful in both conceptualizing and examining behavioral change. The transtheoretical model comprises five categories or SOC classified as follows: precontemplation (not ready to change), contemplation, preparation, action (making change), and maintenance. In addition, a longitudinal view of successfully maintained change typically involves several attempts at the change process; therefore a cyclical rather than linear conceptualization is more appropriate when considering the change process (Prochaska & DiClemente, 1992).

Social cognitive theory considers that, among additional personal factors, individuals possess self-beliefs that enable them to exert a measure of control over their thoughts, feelings, and actions; in essence “what people think, believe, and feel affects how they behave” (Bandura, 1986). Social cognitive theory can make it easier for the researcher to determine areas in which change should be promoted and provide a more

concrete structure for evaluation of program effectiveness (Stadjkovic & Luthans, 1998; Glanz, Lewis, & Rimer, 1997; Irwin & Guyton, 1997; Cusatis & Shannon, 1996).

The theoretical framework for the present study was grounded in elements of social cognitive theory, specifically using the self-efficacy construct. Self-efficacy has been among the most analyzed psychosocial constructs in both nutrition (Anderson et al., 2007; Linde et al. 2006; Cullen et al. 2001; Fontaine & Cheskin, 1997) and smoking cessation studies (Staring & Breteler 2004; Gwaltney et al, 2001; Shiffman et al, 2000; Scholte & Breteler, 1997; Gulliver et al, 1995; Haaga et al. 1993). The level of self-efficacy represents the degree to which an individual believes he/she can successfully change a particular behavior. Self-efficacy has been shown to successfully predict change in a variety of behaviors and is superior to past performance as a predictor of future behavior (Linde et al. 2006; Wamsteker et al., 2005; Staring & Breteler, 2004; Gwaltney et al., 2001; Shiffman et al., 2000; Velicer et al., 1990; Dennis & Goldberg, 1996; Bandura, 1986; DiClemente et al., 1985; Condiotte & Lichtenstein, 1981).

Many of today's health problems are due, in part, to long-standing behavioral patterns. Patterns of eating and tobacco use contribute to health problems such as diabetes, hypertension, heart disease, stroke, and cancer. An understanding of the factors that permit individual change in health behaviors is critical to developing new interventions that can prevent and ameliorate chronic disease conditions resulting from lifestyle choices. Not only is there a lack of smoking cessation programs tailored for weight-concerned smokers, but this subgroup is also extremely difficult to recruit due to their high preoccupation with body weight, which hinders smoking cessation initiation. Results of the present study provide information on health behavior change and enhance

our practical and theoretical understanding of the psychological variables that influence weight-concerned female smokers' decisions to initiate changes in these behaviors and their ability to maintain those changes.

Research Hypotheses

Hypothesis 1: Participation in a cognitive-behavioral weight-control program will significantly increase self-efficacy for weight control, self-efficacy for quitting smoking, diet quality, stage of change transition towards smoking cessation and will significantly decrease body weight, and number of cigarettes smoked/day, from baseline to 9 month follow-up. (*Evaluated by: Weight Efficacy Life-Style Questionnaire (WELQ), Smoking Self-Efficacy Questionnaire (SSEQ), 3-day food record, Healthy Eating Index (HEI), Smoking: SOC, Detecto scale, self-reported number of cigarettes smoked/day, The Cigarette Dependence Scale (CDS)*).

Hypothesis 2: An increase in self-efficacy for weight control will correlate significantly with a decrease in body weight, an increase in diet quality, and an increase in self-efficacy for quitting smoking from baseline to 9 month follow-up. (*Evaluated by: WELQ, Detecto scale, 3-day food record, HEI, SSEQ*).

Hypothesis 3: An increase in self-efficacy for quitting smoking will be significantly correlated with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 month follow-up. (*Evaluated by: SSEQ, self-reported number of cigarettes smoked/day, CDS*).

Hypothesis 4: An increase in self-efficacy for weight control will be significantly correlated with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 month follow-up. (*Evaluated by: WELQ, self-reported number of cigarettes smoked/day, CDS*).

Hypothesis 5: A positive transition in Stage of Change will be significantly correlated with an increase in self-efficacy for quitting smoking from baseline to 9 month follow-up. (*Evaluated by: Smoking: SOC, SSEQ*).

Research Questions

1. Is there a difference in WELQ scores from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
2. Is there a difference in BMI from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
3. Is there a difference in SSEQ scores from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
4. Is there a difference in HEI scores from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
5. Is there a difference in body weight from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
6. Is there a difference in CDS scores from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
7. Is there a difference in the number of cigarettes smoked/day from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
8. Is there a difference in smoking SOC from baseline to post-intervention, 3 month follow-up, and 9 month follow-up for the intervention and the control groups?
9. Does the change in WELQ correlate with the change in HEI from baseline to 9 month follow-up for the intervention group?
10. Does the change in WELQ correlate with the change in body weight from baseline to 9 month follow-up for the intervention group?

11. Does the change in WELQ correlate with the change in SSEQ from baseline to 9 month follow-up for the intervention group?
12. Does the change in HEI correlate with the change in body weight from baseline to 9 month follow-up for the intervention group?
13. Does the change in SSEQ correlate with the change in number of cigarettes smoked/day from baseline to 9 month follow-up for the intervention group?
14. Does the change in SSEQ correlate with the change in CDS from baseline to 9 month follow-up for the intervention group?
15. Does the change in SSEQ correlate with the change in smoking SOC from baseline to 9 month follow-up for the intervention group?
16. Does the change in number of cigarettes smoked/day correlate with the change in WELQ from baseline to 9 month follow-up for the intervention group?
17. Does the change in number of cigarettes smoked/day correlate with the change in SOC from baseline to 9 month follow-up for the intervention group?
18. Does the change in number of cigarettes smoked/day correlate with the change in CDS from baseline to 9 month follow-up for the intervention group?
19. Does the change in CDS correlate with the change in WELQ from baseline to 9 month follow-up for the intervention group?
20. Does the change in CDS correlate with the change in SOC from baseline to 9 month follow-up for the intervention group?

CHAPTER II

LITERATURE REVIEW

Smoking Demographics & Health Implications

The national health objectives for 2010 include reducing the prevalence of cigarette smoking among adults to 12% and increasing cessation attempts among adult smokers to 75% (USDHHS 2000, Healthy People 2010). In 2006, approximately 22.8% of U.S. adults were current cigarette smokers (NHIS 2006), which has not changed significantly since 1997. According to the National Health Interview Survey, adults aged 18-24 years (23.9%) and 25-44 years (23.5%) have the highest smoking prevalence (NHIS, 2006), and the prevalence is higher among men (23.9%) compared to women (18%). Although fewer women smoke, the percentage difference between women and men has continued to decrease each year. For US women aged 18 years and older, smoking prevalence is highest among those aged 25–44 years (21%), followed by 18–24 years (19.3%), then 45–64 years (18.8%), with those aged 65 years or older (8.3%) having the lowest (NHIS, 2006). Prevalence of cigarette smoking is highest among women who are American Indians or Alaska Natives (29%), followed by whites (19.7%), African Americans (19.2%), Hispanics (10.1%), and Asians (4.6%) (NHIS, 2006). An estimated 18% of pregnant women aged 15–44 years smoke cigarettes, compared with 30% of non-pregnant women of the same age (NHIS, 2006).

Smoking is a major cause of coronary heart disease, oropharynx and bladder cancer, and it increases the risk of developing liver, colorectal, pancreatic, and kidney cancers (USDHHS, 2004). It is also a primary cause of chronic obstructive pulmonary disease. Cigarette smoking kills an estimated 178,000 women in the U.S. annually (CDC

2005, Cigarette Smoking Among Adults—United States; CDC Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Productivity Losses---United States, 1997-2001). In addition to the many negative health consequences associated with smoking for individuals of both genders, women are at higher risk for cancers of the oral cavity, pharynx, larynx, esophagus, pancreas, kidney, bladder, and uterine cervix (USDHHS 2001, Women and Smoking: A Report of the Surgeon General; Kure, Ryberg, Hewer, 1996; Prescott et al., 1998; Zang & Wynder, 1996). Women who smoke double their risk for developing coronary heart disease and increase by more than tenfold their likelihood of dying from chronic obstructive pulmonary disease (USDHHS 2004, Health Consequences of Smoking: A Report of the Surgeon General; USDHHS 2001, Women and Smoking: A Report of the Surgeon General; Novotny & Giovino 1998). Ninety percent of all lung cancer deaths in women smokers are attributable to smoking (USDHHS 2001, Women and Smoking: A Report of the Surgeon General). In 1987 lung cancer surpassed breast cancer as the leading cause of cancer death among U.S. women and remains so today (USDHHS 2004, Health Consequences of Smoking: A Report of the Surgeon General). Cigarette smoking increases the risk for infertility, preterm delivery, stillbirth, low birth weight, and sudden infant death syndrome (USDHHS 2001, Women and Smoking: A Report of the Surgeon General). Compared to female non-smokers, women who smoke have an increased risk for hip fracture and postmenopausal women who smoke have lower bone density (USDHHS 2001, Women and Smoking: A Report of the Surgeon General).

It is predicted that over the next 30 years tobacco-related deaths among women throughout the world will more than double and by the year 2020 over a million adult

women can be expected to die every year from tobacco-related illnesses (USDHHS, 2001; Chollat-Traquet, 1992). The rate of decrease in cigarette smoking among adults is not sufficient to meet the 2010 objective of 12%, and in order to meet a 75% cessation attempt rate effective interventions need to be identified for this population (USDHHS 2000, Healthy People 2010). Identifying why these women smoke is critical in the task of helping them quit. “Women and Smoking,” the second Surgeon General’s report (2001) to focus on tobacco use among women, emphasizes the need to make reducing tobacco use among women one of the highest national priorities for women’s health. Understanding and treating women’s smoking habits is clearly an important public health issue.

Female vs. Male Smokers

Despite public health efforts to influence smoking cessation, women of all ages continue to have significantly lower quit rates compared to men (Cepeda-Benito, Reynoso, & Erath, 2004; Etter et al., 2002; Perkins, Donny, & Caggiula, 1999; Escobedo & Peddicord, 1996; COMMIT Research Group, 1995; Fiore et al., 1989; CDC, 1994c), in both the short term and long term (Bjornson et al., 1995). Klesges et al. (1988) sought to determine the prevalence of smoking as a dieting strategy in a university population (mean age = 21.68, SD= 6.46 years). They asked 1076 students (458 males, 618 females) whether they began smoking or were currently smoking as a weight loss/maintenance strategy. Results indicated that 32.5% (n=209) of all smokers (39% of females, 25% of males) reported using smoking as a weight loss strategy. A small percentage of smokers (10% of males, 5% of females) reported beginning to smoke for weight control.

The reasons suggested for smoking cessation and relapse appear to be different for women and men (Borland, 1990; Gilchrest et al., 1989; Curry, Marlatt, & Gordon, 1987). Perhaps the clearest difference between women and men who smoke is their concern about the weight gain that typically accompanies a quit attempt (Clark et al., 2006; Westmaas & Langsam, 2005; Meyers et al., 1997; French et al., 1995; Pirie et al., 1992; Williamson et al., 1991; USDHHS, 1990; Blitzer et al., 1977). Young women are nearly four times as likely as men to report weight gain as a cause of relapse (Swan et al., 1993). Smokers concerned about cessation-induced weight gain express less intention to quit (Weekley, Klesges, & Relyea, 1992), report greater withdrawal severity upon quitting (Pinto et al., 1999), are more likely to drop out of treatment (Mizes et al., 1998), and have poorer overall cessation outcomes (Jeffery, Hennrikus, Lando, Murray, & Liu, 2000; Meyers et al., 1997) relative to smokers not concerned about weight gain.

Some other possible explanations for lower smoking cessation rates among women include the possibility that women smoke more for affect control (Ockene, 1993), are more concerned about the social aspects of smoking (Murray et al. 1995), are the target of greater marketing efforts by tobacco companies (Pierce et al., 1994), and have poorer response to nicotine replacement (Perkins, 1996). These factors have prompted requests for interventions that promote smoking cessation designed specifically for weight-concerned women (Pomerleau & Saules, 2007; Cavallo et al., 2006; Copeland et al., 2006b; Mckee et al., 2005; Reynoso et al. 2005; Levine et al., 2003; Ockene, 1993, Berman & Gritz, 1991).

Smoking for Fear of Weight Gain

It is generally recognized that women internalize social pressures for thinness more so than men (Bordo, 1993; Wolf, 1991; Chernin, 1981). Chernin (1981) has argued that a “tyranny of slenderness” rules over women in the U.S. Empirical studies (Field et al., 1999; Cash & Henry, 1995) continue to demonstrate that increasing numbers of American women and girls are dissatisfied with their appearance in general and their weight in particular (whether or not they are overweight). Females are subject to pressures to attain an unrealistically thin body (Heinberg & Thompson, 1995), and, as a result, many women internalize extreme beauty standards (Bordo, 1993; Wolf, 1991; Chernin, 1981) and are discontented with their bodies (Field et al., 1999; Cash & Henry, 1995; Rodin, Silberstein, & Striegel-Moore, 1984). There is some variance with regard to ethnicity, however. There is evidence that, among all women, European Americans are least satisfied with their bodies and are the most weight concerned, particularly in comparison to African Americans (Bay-Cheng et al., 2002; Striegel-Moore et al. 1998; Harris, 1994; Fallon, 1990). Because cigarette smoking is widely associated with weight loss or maintenance, some women are vulnerable to using smoking as a weight control mechanism (Zucker et al., 2001; Gerend et al., 1998; Pomerleau, Berman, Gritz, Marks, & Goeters, 1994; Klesges & Klesges, 1988).

The media in general, and the advertising industry in particular, have taken advantage of women’s desires to be thin and created product campaigns that capitalize on this social anxiety (Boyd, Boyd & Greelee, 2003; Boyd, Boyd, & Cash, 1999-2000; Cortese, 1999; Boyd, 1996-1997; Kluger, 1996; Kellner, 1988; Ernster, 1985). For instance, cigarette advertisements aimed at women have used images of weight control

since early in the twentieth century, whereas advertising aimed at men has emphasized images of independence, activity, and the outdoors (Kellner, 1988; Boyd et al., 1999-2000). Although many different advertising tactics have been used to encourage women to smoke, one of the most successful since the 1920s has been the association of smoking with thinness and weight control, particularly exploiting white, middle-class women's concerns with their body appearance and weight (French & Perry, 1996; Berman & Gritz, 1991). For instance, an early Lucky Strike campaign used the slogan "Reach for a Lucky instead (of a sweet)." During the period 1925-1930, this campaign led to a nearly three-fold sales increase and made Lucky Strike the market leader; much of this change can be attributed to capturing the female market (Boyd, 1996-7).

The development of "women's brands" such as Virginia Slims® has created a product that was meant to blatantly emphasize the relationship between smoking and thinness through the product name and advertising. A Virginia Slims® ad pictured a thin woman in a bathing suit stating, "When we're wearing a swimsuit there's no such thing as constructive criticism." Although this woman is not shown smoking or even holding a cigarette, the ad is clearly reminding women that thinness is an important social and personal ideal and implies that tobacco use is a route to thinness (Boyd, Boyd, & Greenlee, 2003). Boyd, Boyd, and Cash (1999-2000) stated that "ultimately, tobacco companies are not selling cigarettes; they are selling the ability to achieve beauty, social success, and feelings of independence." There is a strong correlation between the amount of cigarette advertising that is aimed at women and the prevalence of smoking among women (Sherry et al. 2006; Kluger, 1996; O'Keefe & Pollay, 1996).

Women's' preoccupation with the size and shape of their bodies (Striegel-Moore & Franko, 2002), the societal preference for thin women (Jackson, 2002), and the impact smoking cessation has on body weight (Klesges, Meyers, Klesges, & LaVasque, 1989) have led to research examining the relationship between smoking and weight concerns. Weight-conscious women report that they will continue to smoke unless post-cessation weight gain is eliminated (Weekley, Klesges, & Reylea, 1992). The irrationality of this choice reflects the strong social pressure to be thin in our culture (Schwartz et al., 1982). Attention to body weight and chronic dieting and the belief that smoking controls body weight has been reported to predict smoking status in cross-sectional studies and smoking onset in a longitudinal study (French, Perry, Leon, & Fulkerson, 1994; Camp et al., 1993). Smokers who are concerned about weight are less successful when they try to quit smoking (Clark et al., 2006; Copeland et al., 2006; Pomerleau, Zucker, & Stewart 2001; Mizes et al., 1998; Meyers, Klesges, & Winders, 1997) and are less likely to try to quit in the first place (French, Jeffery, Klesges, & Forster, 1995; Klesges et al., 1989). In a study by Pisinger & Jorgensen (2007), weight gain was cited by respondents as the reason for relapse by 52% of the women and 32% of the men in a previous quit attempt. A total of 48.1% of daily smokers who had tried to quit prior to the study, and 31.8% of those who had tried to quit at the 1-year visit, reported that weight gain was the reason for resuming smoking. Being a woman (OR = 2.53, 95% CI = 2.0–3.2), having a higher age (OR = 1.02, 95% CI 1.0–1.0) and a higher baseline BMI (OR = 1.13, 95% CI = 1.1–1.2) predicted weight gain to be mentioned as a reason for relapse, whereas socio-economic status had no significant influence. It was also found that higher weight concerns predicted dropout in smoking cessation trials (Copeland et al., 2006a). Consequently the

choice to continue smoking may be based, in part, on its perceived weight control benefits and on the fear of post-cessation weight gain (Jeffery et al., 2000; Klesges & Schumaker, 1992; Klesges, Meyers, Klesges, & LaVasque, 1989).

Although even substantial weight gain does not negate the health benefits of smoking cessation, this argument is not persuasive for the many smokers who fear the impact of extra weight on their appearance more than they fear the adverse impact of smoking on their long-term health. Smoking cessation-related weight concerns are present in more than half of all young and middle-aged female smokers (Glasgow et al., 1999; Pirie et al., 1991). Compared with nonsmoking females, smoking females are: twice as likely to be concerned about their weight (Borrelli et al., 2001; Feldman et al., 1985); 2-5 times more likely to use diet pills (Gritz & Crane, 1991); more likely to view their body weight as important to self-esteem; and more likely to be dissatisfied with their weight (Levine et al., 2001; Bruckner et al., 1994). Not surprisingly, young women are 3-4 times as likely as men to report weight gain as a cause of smoking relapse (Pisinger & Jorgensen, 2007; Jeffery et al., 2000; Meyers et al., 1997; Swan et al., 1993). There is an abundance of evidence suggesting that weight-concerned female smokers are uniquely motivated to continue smoking. This overlooked subgroup of the smoking population would stand to benefit from specialized interventions targeted to reach them.

Post-Cessation Weight Gain

Estimates of post-cessation weight gain vary widely. Eisenberg & Quinn (2006) estimated that smokers can gain up to 21 pounds in five years due to cessation. Perkins et al. (2001) suggested that female weight-concerned smokers who maintain smoking abstinence gain between 10 - 15 pounds. Weight gain is greatest from months 1 to 6 and

decelerates thereafter (McBride et al., 1996; Nides et al., 1994; Pirie et al., 1992). Female smokers fall into one of three categories (assuming that they are not taking nicotine replacement or drug therapy): 1. Approximately 20-30% will gain less than 5 pounds, with a few maintaining or losing weight (Nides et al., 1994; Pirie et al., 1992); 2. Approximately 25% will gain more than 15 pounds (Nides et al., 1994), with approximately half of these women gaining more than 30 pounds (Williamson et al., 1991); 3. The remainder (about half) will gain 5-15 pounds, an amount that can be addressed by making changes in patterns of eating.

Prevention of post-cessation weight gain is very difficult (Klesges & DeBon, 1994), but not impossible (Talcott et al., 1995). The Surgeon General's report, "Reducing Tobacco Use," released in August 2000, noted that, "Our lack of greater progress in tobacco control is more the result of our failure to implement proven strategies than it is the lack of knowledge about what to do (USDHHS, 2000)." Increased efforts at finding effective methods for reducing post-cessation weight gain, such as helping weight-control smokers control their weight prior to cessation, should be investigated. A weight control program that results in a successful weight loss attempt may motivate a weight-control smoker to contemplate smoking cessation.

Causes of Post-Cessation Weight Gain

The etiology of post-cessation weight gain is multifactorial. Mechanisms of post-cessation weight gain include increased energy intake, decreased resting metabolic rate, and increased lipoprotein lipase activity (Ferrara et al., 2001; Moffart & Owens, 1991; Perkins et al., 1989; Rodin et al., 1987; Schumaker & Grunberb, 1986; Stamford et al., 1986; Dallosso & James, 1984). Average weight gain following a quit attempt is related

to the amount of smoking, initial body weight, and genetic factors (Ferrara et al., 2004; Filozof et al., 2004). Epidemiologic evidence indicates that smokers weigh, on average, 6.6 to 11 lbs less than non-smokers (Froom et al., 1998; Albanes et al., 1987). Smoking suppresses body weight to a level below that of “normal” and cessation allows body weight to return to normal. Upon cessation, weight increases and then plateaus at the level of non-smokers (Williamson, 1991). Subsequent relapse again lowers body weight to the reduced, pre-cessation level (Stamford et al., 1986). Women have been found to gain more weight than men when they stop smoking (Williamson et al., 1991), and nicotine’s effect on food intake has been found to be more pronounced in women.

One possible mechanism for the inverse relationship between nicotine intake and food consumption is that increased nicotine intake removes unpleasant effects resulting from food deprivation (Perkins et al., 1997). For instance, smoking or nicotine intake may attenuate the negative mood effects of dieting. Similarly, eating may help relieve the discomfort of nicotine withdrawal. Eating highly palatable foods has sometimes been found to attenuate poor mood and relieve subjective stress, particularly in women (Grunberg & Straub, 1992). Eating may therefore attenuate withdrawal and remove negative affect, such as stress and depressed mood, which often prompts smoking relapse (USDHHS, 1990).

Another way to look at the relationship between smoking and eating is to consider them as alternative sources of reinforcement that compete with each other (Vuchinich & Tucker, 1988). Instead of smoking or eating acting to directly relieve the discomfort caused by trying to reduce intake of the other, smoking and eating may each be critical reinforcers in smokers but may not necessarily directly influence each other. When one

source of reinforcement is voluntarily or involuntarily eliminated, consumption of others may increase. For example, animal research has shown that manipulating the availability of sucrose in the food supply can inversely alter consumption of amphetamine (Kanarek & Marks-Kaufman, 1988). In humans, sucrose tablets can reduce tobacco cravings soon after smoking cessation (West et al., 1990). Similarly, increased sugar and carbohydrate intakes have been associated with reduced probability of alcohol relapse following treatment (Yung et al., 1983). These findings may explain poorer smoking cessation rates in subjects provided with weight control treatment since dieting usually involves the removal of highly palatable, sweet tasting foods. Some studies have reported increases in sugar intake (Perkins, 1993; Rodin, 1987), fat intake (Hall, McGee, Duffy, Tunstal, & Benowitz, 1989), and total caloric intake (Stamford et al., 1986) after smoking cessation. In an assessment of changes in energy balance after smoking cessation, Stamford and colleagues (Stamford et al., 1986) reported that mean daily caloric intake increased by 227 kcal among 13 sedentary women who had quit smoking for a 48-day period. No change in physical activity occurred. The increase in caloric consumption accounted for 69% of the average 4.85-lb weight gain found after cessation. Moffart & Owens (1991) reported a significant 5.4% (122 kcal) increase in daily caloric intake after 60 days of smoking cessation. On the other hand, Rodin (1987) found that abstainers from smoking did not consume more calories over 8 weeks despite gaining 1.4 kg of body weight. Ogden (1994) found greater snack food intake during a taste test in 17 smokers abstinent from smoking (but not food) for 24 hours compared with 19 non-abstinent smokers or 20 non-smokers. This effect of smoking was reported as significant only in women, but the small number of men (25% of sample) may have limited power to detect effects in men.

Contrary to the aforementioned studies, smoking and nicotine have generally been shown to have very little acute effect on self-reported hunger or ad lib caloric intake in fasting smokers (Perkins, Sexton, DiMarco, & Fonte 1994; Perkins et al., 1992; Perkins et al., 1991; Grunberg, 1982), indicating that smoking may not have a generalized anorectic effect (Perkins, 1992; Perkins, 1993). There is evidence that smoking may specifically enhance satiety following meal consumption (Perkins et al., 1991), thereby reducing subsequent eating (i.e., between-meal snacks). For example, Gilbert and Pope (1981) found in a controlled in-patient study that food consumption during meals was not reduced during ad lib smoking vs. smoking abstinence days, and in fact tended to be higher on smoking days. However, between meal snack intake was greatly reduced on smoking days, particularly in women, such that total caloric intake was lower during smoking vs. abstinence days. On the other hand, some studies suggest that the effect of smoking on food intake may be most pronounced in a subset of women high in dietary restraint, rather than in all women (i.e., not a broad gender difference).

Some studies report that post-cessation weight gain is partly because of a decrease in resting metabolic rate (Moffart & Owens, 1991; Dallosso & James, 1984). The variability in the mean resting metabolic rate reduction reported is between 4% and 16% and it appears to account for less than 40% of the weight gain. Fat oxidation might also be a critical lipostatic factor that regulates energy balance in smokers (Schutz et al. 1992). Jensen et al. (1995) reported that fat oxidation per kilogram lean mass was positively correlated with 24-h excretion of nicotine, indicating that smokers with a high nicotine uptake use more lipids to sustain fasting resting energy expenditure than non-smokers.

Therefore, if subjects stop smoking and do not modulate their lipid intake, over time, the imbalance in lipid intake and fat oxidation may induce an increase in body fat.

The widespread fear of gaining weight when one stops smoking also has a scientific basis involving peptides and neurotransmitters that regulate food intake and body weight. Nicotine influences the levels and expression of leptin, neuropeptide Y (NPY) and orexins (Li et al., 2000). Leptin, a hormone secreted by fat in proportion to its quantity, is a negative regulator of food intake and a positive regulator of energy expenditure. Two epidemiological studies (Hodge et al., 1997; Wei et al., 1997) with different ethnic groups showed that plasma leptin was significantly lower in smokers than in non-smokers. Significant decreases in plasma leptin concentrations independent of adiposity have also been reported in newborns born to mothers who smoked during pregnancy compared to those born to non-smoking mothers (Mantzoros et al., 1997). It has been suggested that smoking might modulate leptin biosynthesis and consequently reduce body weight. However, other authors found no changes in leptin levels after nicotine abstinence (Perkins & Fonte 2002; Oeser et al. 1999). Some studies report a decrease of NPY expression (stimulator of feeding) by nicotine (Bishop et al. 2002), while laboratory studies reported an increase in NPY mRNA and peptide in the forebrain areas of rats chronically treated with nicotine (Li et al., 2000). However, this excess in NPY levels was accompanied by a down-regulation of the hypothalamic receptors that bind the Y1/Y4/Y5 site ligand. It was suggested that chronic treatment by nicotine could result in up-regulation of NPY in forebrain areas involved in the regulation of feeding, while the NPY receptors could be simultaneously down-regulated (Li et al., 2000). Similar to NPY, orexins are positive regulators of food intake. Therefore, it could be

expected that orexin levels would decrease upon nicotine administration. Paradoxically, a dose-dependent increase in prepro-orexin mRNA production upon chronic nicotine administration was reported but it was associated to a reduced affinity and density of orexin-A binding sites in the anterior hypothalamus of the brain (Kane et al., 2000; Kane et al., 2001).

Nicotine has also been shown to have an effect on neurotransmitters involved with appetite regulation. There is substantial evidence accumulated to demonstrate that noradrenaline stimulates, and dopamine and serotonin inhibit, the ingestion of food (Dryden et al. 1996; Leibowitz 1986). Nicotine, as a general neurotransmitter releasing agent, mainly acts through nicotinic acetylcholine receptors. Nicotine is known to acutely increase the release of neurotransmitters, including noradrenaline, dopamine and serotonin, usually with an acceleration of catecholamine turnover (Miyata et al. 2001; Staley et al. 2001). Nicotine also induces an acute stimulation of the release of pituitary gonadotropins luteinizing hormone, follicle-stimulating hormone and prolactin. The reward properties of nicotine are believed to result from its actions on the mesolimbic dopaminergic system through increasing levels of dopamine in the nucleus accumbens after activation of neurons located within the ventral tegmental area. Ingestive behavior has been linked to this same reward system via lateral hypothalamic stimulation of the dopaminergic neurons in the ventral tegmental area, which results in increased levels of dopamine in the nucleus accumbens (Li et al., 2000). These studies show that nicotine may increase energy intake, decreases resting metabolic rate, and increases lipoprotein lipase activity and also affects many neurotransmitters and hormones involved with body weight regulation.

Characteristics of Weight-Control Smokers

It is important to understand the characteristics of smokers who use smoking as a means to control their body weight or will not quit due to fear of weight gain. Despite decades of health education and prevention efforts, 18% (20 million) of women in the U.S. still smoke (NHIS, 2006). More than half of women report smoking cessation-related weight concerns (Clark et al., 2004; Meyers et al., 1997; Pirie, Murray, & Luepker, 1991; USDHHS, 1990), and nearly 40% claim that they smoke specifically to control their weight (Klesges & Klesges, 1988). A study by Levine et al., (2001) found that weight-control female smokers did not endorse aberrant eating-related attitudes or behaviors but reported considerable intolerance for any weight gain despite concurrent motivation to quit smoking. They found that women smokers who endorsed specific concerns about post-cessation weight gain were likely to gain more weight after quitting than the average smoker. Women who are concerned about post-cessation weight gain report expecting to gain almost 17 pounds upon cessation, but are willing to tolerate a gain of only 5 pounds (Levine et al., 2001). Concerns about shape and weight perpetuate continuance of smoking behavior despite the health implications. Meyers et al. (1997) found that weight-control smokers tended to be female, had higher global levels of concern about dieting and were significantly less likely to stop smoking. In a study of 188 female undergraduate smokers it was found that believing that smoking controls weight, internalizing thinness pressures, and having low levels of feminist consciousness were associated with smoking for weight control (Zucker et al., 2001).

Clark et al. (2006) conducted a 12-week randomized trial of a nicotine inhaler, bupropion, or use of both for smoking cessation. At study entry, 50% of the 1012 female

smokers and 26% of the 680 male smokers were weight-concerned (Clark et al., 2006). In terms of smoking abstinence, at 12 weeks, there was no significant difference between non-weight-concerned smokers and weight-concerned smokers even after adjusting for gender. In terms of the conditions, there was no significant difference in smoking abstinence rates between non-weight-concerned smokers and weight-concerned smokers in the inhaler condition and in the bupropion condition. However, in the inhaler and bupropion combined group, there was a significant difference, with 38% of the non-weight-concerned smokers compared to 29% of weight-concerned smokers ($p = 0.03$) being abstinent. A logistic regression model confirmed that being weight-concerned was associated with lower smoking abstinence rates ($p = 0.06$; odds ratio = 1.28), even after adjusting for other subject characteristics such as age, race, marital status, Fagerström score, treatment condition, and treatment location. Weight concern was prevalent in both genders, but more so in females. In terms of characteristics associated with being weight-concerned, it was found that females with weight concerns were younger, were more likely to be white, had a lower BMI, and reported lower levels of nicotine dependence. Other researchers have also proposed that weight concerns are related to body image issues, rather than being related to weight classification (Clark et al., 2005; King et al., 2005).

Differences among adult women smokers with differing levels of concern about post-cessation weight gain were investigated in a national random-digit-dialing survey (Pomerleau et al., 2001). Respondents were stratified using a single item querying concerning their stated concern about post-cessation weight gain. Thirty-nine percent described themselves as very concerned (VC), 28% as somewhat concerned (SC), and

33% as not concerned (NC). Significant between-groups differences were detected for measures of weight and body image, eating patterns and weight control practices, and nicotine dependence, but not for depression. Differences, primarily between VC and NC, were also detected for several weight-related smoking variables, including importance of weight as a factor in initiation, smoking as a weight control strategy, increased appetite and weight gain as withdrawal symptoms, willingness to gain weight upon quitting, self-efficacy about relapse in the face of weight gain, and readiness to quit smoking. Most differences persisted even after adjusting for body mass index and nicotine dependence. Although the importance of thinness was rated higher by weight-concerned women than those not concerned about weight, the difference did not reach significance. Importance of overall body image differentiated groups, suggesting a larger pattern of preoccupation with body image that may not be captured by queries about weight concerns alone. The authors concluded that weight-concerned women smokers will be especially unlikely to seek treatment or attempt self-quit; and that redirecting attention to other aspects of body image is likely to be more helpful than attempting to divert attention away from body image.

White et al. (2007) investigated whether weight-concerned smokers endorsed exaggerated beliefs in the ability of smoking to suppress body weight. Participants were 385 individuals undergoing treatment for smoking cessation (White et al., 2007). Prior to treatment, participants completed the Smoking Consequences Questionnaire-Adult (SCQ-A), the Dieting and Bingeing Severity Scale, and the Perceived Risks and Benefits Questionnaire (PBRQ). Results indicated that heightened beliefs in the effectiveness of smoking to control weight were related to eating and weight concerns. Specifically

strong associations were observed between SCQ-A Weight Control scores and fear of weight gain, loss of control over eating, and body dissatisfaction. Although SCQ-A Weight Control scores were related to weight gain during a previous quit attempt, scores did not predict actual weight gain over the course of the cessation trial. Reported weight gain at previous attempts was also unrelated to actual weight gain.

Copeland & Carney (2003) examined women's beliefs about the appetite and weight control properties of cigarette smoking, dietary restraint and disinhibition, and smoking status. Dietary restraint and disinhibition predicted appetite and weight control expectancies and smoking rate, in that women higher in dietary restraint and disinhibition reported stronger beliefs in the appetite and weight control properties of cigarettes and were more likely to be smoking than those with low dietary restraint and disinhibition. Smoking expectancies for appetite and weight control predicted smoking status and smoking rate and mediated the relationship between dietary restraint and smoking, and between disinhibition and smoking. The authors concluded that the relationship between smoking and dietary constructs should be considered in smoking cessation and dietary interventions with women. Understanding these characteristics of weight-concerned smokers and the profile of smokers more likely to quit is critical in developing an appropriate intervention targeting these women.

Predictors of Quitting

Demographic predictors of quitting include older age, higher education, employment, and Caucasian race (Ockene et al., 2000). Psychosocial predictors of quitting include high levels of self-efficacy (Borrelli & Mermelstein, 1994; Condiotte & Lichtenstein, 1981), low levels of negative affect (Borrelli et al., 1996; Killen et al.,

1996) and low levels of weight concern (Meyers et al., 1997; Borrelli & Mermelstein, 1998; French et al., 1995). Smoking history has also been shown to consistently predict quitting: low levels of nicotine dependence (Killen et al., 1992) and increased length and number of previous quit attempts (Garvey et al., 1992) are associated with an increased likelihood of quitting.

There is great difficulty in recruiting and retaining individuals in smoking interventions (McIntosh et al., 2000). This appears to be particularly true of weight-concerned individuals, many of whom are unlikely to attempt to quit smoking or tend to abandon their quit attempts early due to post-cessation weight gain concerns (Pomerleau et al., 2000). Brouwer & Pomerleau (2000) demonstrated the significance of weight concerns as a barrier to smoking cessation among women in smoking cessation trials. They found that women with the highest weight concerns dropped out of the trials prior to entering the treatment phase of the studies. They labeled this phenomenon “prequit attrition.” This indicates that weight-concerned smokers are self-selecting out of the studies so early that they are not included in the study outcome data. Therefore, weight concerns may be even more of a hindrance to cessation attempts than is evident from examining treatment outcomes. Predictably, researchers and clinicians have faced difficulties in their attempts to help smokers who choose not to take part in smoking cessation programs. Consequently, smoking cessation intervention studies often only reach those smokers who are “ready” to participate in such programs or are at the “contemplation” or “action” stage of quitting (Orleans et al., 1998; Zhu et al., 1996). Genuine efforts to recruit those who refuse or are not ready to take part in smoking cessation programs due to fear of weight gain are imperative if clinicians are eager to

reach weight-concerned smokers. In an attempt to reach these smokers, smoking cessation programs using a weight control adjunct have been tested.

Smoking Cessation Programs Using a Weight Control Adjunct

Concern about weight gain following smoking cessation has led investigators to try to prevent it, or at least delay it sufficiently to permit smoking cessation to succeed. Tailored interventions for weight-concerned smokers have focused on reducing weight concerns (Perkins et al., 2001), improving body image dissatisfaction (Clark et al., 2005), adding an exercise program (Marcus et al. 2005, Marcus et al. 1999, Kawachi et al. 1996), adding a weight management program (Perkins 1994; Hall et al. 1992; Pirie et al. 1992), and utilizing nicotine replacement therapy (Borrelli et al., 1999). These studies were conducted based on the assumption that preventing post-cessation weight gain would improve smoking abstinence. However, only some of the attempted strategies have improved smoking cessation outcomes.

In a study (Perkins et al., 2001), women smokers concerned about weight gain (N = 219) were randomly assigned to 1 of 3 adjunct treatments accompanying group smoking cessation counseling: (a) behavioral weight control to prevent weight gain (weight control); (b) cognitive-behavioral therapy (CBT) to directly reduce weight concern, in which dieting was discouraged; and (c) standard counseling alone (standard), in which weight gain was not explicitly addressed. Ten sessions were conducted over 7 weeks, and no medication was provided. Continuous abstinence was significantly higher at post-treatment and at 6 and 12 months follow-up for CBT (56%, 28%, and 21%, respectively), but not for weight control (44%, 18%, and 13%, respectively), relative to standard (31%, 12%, and 9%, respectively). Results of this study suggest that CBT to

reduce weight concerns may improve smoking cessation outcome in weight-concerned women.

Danielsson et al. (1999) reported higher rates of success for smoking cessation by combining the smoking cessation program with diet intervention. They conducted an open, randomized study of a smoking cessation program, with nicotine gum and moderate behavioral advice, in combination with a behavioral weight control program and intermittent very-low-energy diet. Two hundred eighty seven women smokers who had previously quit smoking, but who had started again because of weight concerns, participated in the study. A control group was treated with the identical program but without the diet. After 16 weeks, 68/137 (50%) women had stopped smoking in the diet group vs. 53/150 (35%) in the control group ($p = 0.01$). Among these women, weight fell by a mean of 2.1 kg in the diet group but increased by 1.6 kg in the control group ($p < 0.001$). After 1 year, the success rates in the diet and control groups were 38/137 (28%) and 24/150 (16%), respectively ($p < 0.05$), but there was no statistical difference in weight gain.

Pirie et al. (1992) randomly assigned 417 women who wanted to quit smoking and maintain their weights while quitting to one of the following four treatment groups: (a) The American Lung Association's Freedom From Smoking® (FFS) program, (b) FFS plus a behavioral weight control program, (c) FFS plus nicotine gum, or (d) FFS plus a behavioral weight control program and nicotine gum. No significant between-group differences in weight gain were found among continuous abstainers at 1-year follow-up. Those participants who continuously abstained from smoking weighed an average of 10.6 lbs more at 12-month follow-up.

Hall et al. (1992) supplemented a behavioral cessation program (N= 158 smokers) with one of three adjunct conditions: (a) behavioral weight control (consisting of stimulus control of eating behavior, regular exercise, and daily monitoring of weight and caloric reduction contingent on weight); (b) nonspecific weight control (group therapy involving support and information on nutrition and exercise for weight loss); and (c) standard control (information packet on nutrition and exercise). Results showed that abstinence at each follow-up point over a 1-year period was less likely in the two weight control interventions compared with the standard control condition. It is important to note that the subjects were not weight-control smokers. Therefore, a weight control adjunct may not have been relevant or appropriate for this population.

Spring et al. (2004) compared simultaneous versus sequential approaches to multiple health behaviors with change in diet, exercise, and cigarette smoking. Female regular smokers (N=315) were randomly assigned to 1 of 3 conditions: a) Early diet (ED) group received 8 weeks of behavioral weight management concurrent with 8 weeks of behavioral smoking treatment, b) Late diet (LD) group received 8 weeks of behavioral smoking treatment followed by 8 weeks of behavioral weight management, c) standard control (no weight management information). All groups quit smoking at week 5, and were followed for 9 months after quit date. ED lacked lasting effect on weight gain, whereas participants in the LD group initially lacked but gradually acquired a weight-suppression effect that stabilized ($p=.004$). Compared to those treated chiefly for smoking, smokers treated first for cessation and subsequently for weight control showed a reduction in their rate of weight gain. No difference from control was evident at the time of the quit, but, thereafter, LD's rate of weight gain slowed significantly and

progressively, which suppressed the group's overall trajectory of weight gain. In contrast, smokers whose early treatment simultaneously addressed smoking and weight control initially showed weight suppression compared with control. However, their subsequent weight control advantage diminished, and even tended to reverse. There was no significant difference in weight gain at 9 months follow-up between the LD group and the control group. There were no significant differences in smoking status between ED and control ($z = -1.9, p = .282$) or between LD and control ($z = -0.69, p = .611$) and post hoc testing did not detect any differences between LD and ED combined versus control ($z = -0.74, p = .462$). Individual differences in weight concern were not predictive of either smoking status or weight change. In addition, weight concern did not interact with treatment or time to predict either smoking status or weight change. For post-cessation weight control, these findings suggest it is better to address smoking cessation before initiating weight control treatment. It is also important to note that these smokers were not all weight-concerned. Overall, the women showed an average level of smoking-specific weight concern, falling in between the cut-off points for either low or high concern.

Clark et al. (2005) conducted a pilot study of 41 female weight-concerned smokers who were randomly assigned to receive either 12 group sessions of CBT for body image concerns or 12 group sessions for weight management. All subjects received open-label bupropion SR-300 mg daily, exercise instruction, and weekly behavioral counseling for tobacco cessation. At week 12, 7 (35%) of the body image participants had 7-day point prevalence smoking abstinence (defined as no smoking at all in the previous 7 days), compared to 5 (24%) of the participants in the weight management

group ($p=0.505$). These results suggest that CBT group treatment for body image dissatisfaction can improve the body image satisfaction of weight-concerned female smokers. Body image participants also demonstrated significant improvement in their weight-efficacy scores after quitting. Subjects experienced a significant increase in their confidence to manage their weight and eating after quitting smoking. Despite the improvements in body image and self-efficacy, there was no significant differences between groups in 12- and 24-week smoking abstinence rates.

Marcus et al. (2005) examined the efficacy of moderate-intensity exercise as an adjunct to a smoking cessation program. Healthy, sedentary female smokers ($N = 217$) were randomly assigned to an 8-week cognitive-behavioral smoking cessation program plus moderate-intensity exercise (CBT + EX) or to the same cessation program plus equal contact time (CBT). A sub-sample received nicotine replacement therapy. Results indicated that the CBT + EX and CBT groups were equally likely to attain smoking cessation at the end of treatment, as measured by cotinine-verified 7-day point-prevalence abstinence (20.2% for CBT + EX vs. 18.5% for CBT). The CBT + EX group was more likely to report smoking cessation, as measured by 7-day point prevalence at the 3-month follow-up (11.9% vs. 4.6%, $p<.05$), compared with the CBT group. No group differences were found at 12 months by either 7-day point prevalence (7.3% for CBT + EX vs. 8.3% for CBT) or continuous abstinence (0.9% for CBT + EX vs. 0.9% for CBT). Participants in the CBT + EX group with higher adherence to the exercise prescription were significantly more likely to achieve smoking cessation at the end of treatment than participants reporting lower adherence to exercise. This study showed that a change in

one behavior (exercise adherence) may increase the likelihood of change in another behavior (smoking cessation).

Ussher et al. (2007) examined whether physical activity counseling alone increases long-term smoking abstinence and physical activity levels and reduces weight gain. Two hundred ninety nine male and female smokers were randomized to a 7-week smoking cessation program, including nicotine replacement therapy, plus either (a) physical activity counseling (exercise, $N = 154$), or (b) health education advice (control, $N = 145$). There was no significant difference in rates of continuous smoking abstinence between the exercise group and the controls at 12 months following the quit day (9.1% versus 12.4%). Significant increases in physical activity levels observed for the exercise group versus the controls at six weeks were not maintained at 12 months. There was a non-significant tendency for less weight gain in the exercise group versus the controls at 12 months ($p = 0.06$).

Prapavessis et al. (2007) examined individual effects of supervised and intensive exercise as well as the combined effects of exercise and nicotine replacement therapy (NRT) on (a) smoking cessation and reduction rates and (b) psychological and physiological processes during withdrawal. One-hundred and forty-two inactive female smokers were randomized into the following four groups: exercise + nicotine patch; exercise + no nicotine patch; CBT + nicotine patch and CBT + no nicotine patch. Smoking abstinence (verified by saliva cotinine and expired carbon monoxide), cessation self-efficacy, and physical fitness and body weight were assessed at baseline (week 1), quit date (week 6), program termination (week 12), and 3- and 12-month follow-up. There were significant differences in 7-day point prevalence but not continuous

abstinence rates between treatment groups across targeted end points. Consistently higher cessation rates were seen when NRT was added to both treatment programs. Compared with CBT participants, exercise participants had significantly increased functional exercise capacity and had gained significantly less weight during program end points but these differences did not hold at a 12-month follow-up. Compared with exercise participants, CBT participants felt greater cessation efficacy and reported greater knowledge, coping and support resources across all end points. No statistically significant differences were seen in continuous abstinence between the four treatment conditions but the study did not have sufficient power to detect an absolute difference of less than 30% between groups. Exercise combined with NRT facilitated smoking cessation, improved functional exercise capacity, and delayed weight gain in women smokers. It is important to note that these women were highly motivated and interested in quitting smoking at baseline.

The lack of success at smoking cessation and weight control in the aforementioned studies may be due to a number of limitations: 1) General clientele in smoking cessation programs are often not weight-concerned. Offering a weight control program to people who aren't weight-concerned could be counter productive. 2) Combining smoking cessation counseling with any adjunct related to weight control may simply place too great a behavioral burden on individuals trying to quit smoking; being overwhelmed may trigger relapse. 3) Overly restrictive diets used in some studies may hinder compliance with respect to diet and tobacco use. These results indicate that stronger tactics are needed since weight-loss programs in conjunction with smoking-cessation programs can be largely ineffective among this subgroup. To this effect,

nicotine replacement and drug therapy have been tested as an aid to control post-cessation weight gain.

Smoking Cessation Program Using Nicotine Replacement or Drug Therapy Adjunct

The Agency for Health Care Policy and Research Smoking Cessation Clinical Practice Guidelines recommends the use of NRT combined with counseling for smoking cessation. NRT is available as a nicotine skin patch, nicotine inhaler, nicotine gum and nicotine nasal spray. Pharmacotherapies (Allen et al., 2005; Nordstrom et al., 1999; Hurt et al., 1997), as well as indirect serotonin agonists (Spring et al., 1995; Spring et al., 1991), have been shown to inhibit post-cessation weight gain without undermining abstinence. However, weight suppression is short lived because discontinuing pharmacotherapy leads to weight gain (Borrelli et al., 1999; Danielsson et al., 1999; Jorenby et al., 1999; Spring et al., 1995).

Common findings from nicotine replacement, serotonin-enhancing drugs, and bupropion include either promising short-term results or, in longer length studies, modest weight suppression in drug intervention groups, followed by weight rebound, so that by follow-up, weights do not differ between groups (Borelli et al., 1999; Jorenby et al., 1999; Hurt et al., 1997; Jorenby et al., 1996; Spring et al., 1995; Li Wan Po, 1993; Tonnenson et al., 1993; Sutherland et al., 1992; Pomerleau et al., 1991; Spring et al., 1991). At present, the evidence suggests that drug therapy can only blunt post-cessation weight gain for the length of ingestion and is not a permanent solution. Instead, cognitive behavioral therapy has been shown to be more effective in both weight loss and smoking cessation interventions.

Social Cognitive Theory

Social cognitive theory considers that, among additional personal factors, individuals possess self-beliefs that enable them to exert a measure of control over their thoughts, feelings, and actions; in essence “what people think, believe, and feel affects how they behave” (Bandura, 1986). How an individual interprets the results of their own behavior informs and alters their environment and their personality, which, in turn, informs and alters subsequent behavior. This is the basis of Bandura’s formation of reciprocal determinism, the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a triadic reciprocity (Bandura, 1986). Social cognitive theory can make it easier for the researcher to determine areas in which change should be promoted and provide a more concrete structure for evaluation of program effectiveness (Stadjkovic & Luthans, 1998; Glanz et al., 1997; Irwin & Guyton, 1997; Cusatis & Shannon, 1996). The theoretical framework for the present study was grounded in elements of social cognitive theory, specifically implementing the self-efficacy construct.

Self-Efficacy Construct

Self-efficacy is defined as an individual’s confidence in his or her capabilities to organize and execute paths of action required to successfully attain designated types of accomplishments or behavior. Self-efficacy plays a strong role in determining the choices people make, the effort they expend, how long they persist when confronted with obstacles, and the degree of anxiety or confidence they will bring to the task at hand (Baranowski et al., 2003; Bandura, 1986). A higher sense of efficacy leads to greater effort, resilience, and persistence. It would be expected that higher levels of self-efficacy

would lead to more successful long-term weight loss maintenance and smoking cessation. Because expected outcomes are filtered through a person's expectations of being able to perform the behavior, self-efficacy is believed to be the single most important characteristic that determines a person's behavior change. Self-efficacy helps explain why behaviors of people differ greatly, even when they have similar knowledge and skills (Rosenberg et al., 1995).

Self-efficacy beliefs are formed by interpreting information predominantly from four sources: mastery experience, vicarious experience, social persuasion, and physiological states (Bandura, 1977). One way of creating and strengthening self-beliefs of efficacy is through the vicarious experiences provided by social models (Baranowski et al., 2003). Seeing others similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities to master comparable activities successfully (Bandura, 1977). Similarly, observing others fail lowers observers' judgments of their own efficacy and undermines their efforts. The impact of modeling on perceived self-efficacy is strongly influenced by perceived similarity to the models (Baranowski et al., 2003). The greater the assumed similarity, the more persuasive are the models' successes and failures. If people see the models as extremely different from themselves, their perceived self-efficacy is not influenced much by the models' behavior (Baranowski et al., 2003). The most influential of the four sources of self-efficacy information is the interpreted result of one's own previous performance, or mastery experience (Baranowski et al., 2003). For example, after a woman engages in a task or activity, she interprets the results of her actions, uses the interpretations to create beliefs about her capability to participate in subsequent tasks or activities, and acts in accordance

with the beliefs created. Usually, outcomes perceived as successful raise self-efficacy; those interpreted as failures lower it (Baranowski et al., 2003). Typically, people who possess a low sense of efficacy often choose to discount their successes rather than change their self-belief (Bandura, 1986). Thus, a person's positive or negative perceptions of past weight control or smoking cessation efforts will impact their sense of self-efficacy for future efforts. Obviously, it is not only a matter of how capable someone is, but how capable one believes themselves to be (Pajares, 2002).

The interrelated nature of the determinants of human functioning in social cognitive theory makes it possible for effective therapeutic interventions to be directed at personal or behavioral factors. Therefore, this study used a cognitive behavioral intervention focused on increasing self-efficacy to control weight in an effort to increase self-efficacy for quitting smoking.

Self-Efficacy and Smoking Cessation

Longitudinal research on smoking cessation shows post-treatment self-efficacy to have predictive value in long-term success (Staring & Breteler 2004; Gwaltney et al, 2001; Shiffman et al, 2000; Scholte & Breteler, 1997; Gulliver et al, 1995; Haaga et al. 1993). Numerous cross-sectional studies have demonstrated a strong relationship between self-efficacy and smoking cessation (Schnoll et al., 2002; Martinelli, 1999). End of treatment self-efficacy ratings have been found to predict smoking status at 3-month (Borrelli & Mermelstein, 1994; Condiotte & Lichtenstein, 1981) and 6-month follow-ups (Baer et al., 1986a). High self-efficacy was the only predictor of abstinence at a 3-month follow-up, over and above prior smoking status, motivation to quit, stress, and adherence to behavioral assignments found by Borrelli & Mermelstein (1994). Self-efficacy also

mediated the relationship between completion of behavioral assignments and follow-up smoking status. Baldwin et al. (2006) observed that participants' self-efficacy measured just prior to the smoking cessation program quit date positively predicted whether they would quit by the end of the program. In addition, it was consistently observed that for those who were still trying to quit smoking or who had just recently quit (i.e., initiators), perceptions of self-efficacy significantly predicted whether they would remain abstinent at quitting in the future.

Self-efficacy is thought to be important in smoking relapse both as an individual difference and as a dynamic process during a quit attempt. Theory and research suggest that self-efficacy varies dynamically following smoking lapse and that greater decreases in self-efficacy post-lapse can be strong predictors of relapse (Witkiewitz & Marlatt, 2004; Shiffman et al., 2000). Higher levels of self-efficacy to resist smoking have also been associated with weaker levels of craving to smoke (Shadel & Cervone, 2006; Niaura et al., 2002; Shadel et al., 2001), which is important because increased craving has been associated with smoking lapse and relapse (O'Connell et al., 1998; Shiffman et al., 1997). In their prospective examination of the temporal effects of self-efficacy and smoking lapses and relapses, Shiffman et al. (2000) found that daily self-efficacy ratings decreased significantly after a lapse and were also predictive of subsequent relapse. Overall these findings are consistent with prior research examining self-efficacy and/or motivation with quit attempts and relapses (Boardman et al., 2005; Curry et al., 2001; Scholte & Breteler, 1997; Kinnunen et al., 1996; Orleans et al., 1991). Possible ways to increase self-efficacy for quitting smoking in weight concerned smokers need to be identified.

Self-efficacy and Weight Loss

It has been established that self-efficacy beliefs and behavior changes and outcomes are highly correlated, and that self-efficacy is an excellent predictor of behavior. Self-efficacy has explained over 50% of the variability when predicting health behavior (AbuSabha & Achterberg, 1997). In the domain of weight control, self-efficacy has received considerable attention, and investigators have argued that self-efficacy is an important mediator of successful weight loss behaviors and enhanced weight loss program experiences (Byrne, 2002; Brownell & Cohen, 1995; Wadden & Letizia, 1992; Strecher et al., 1986) as well as a consistent predictor of weight reduction (Teixeira, 2004; Teixeira et al., 2002). Increased self-efficacy for weight control has been shown to improve eating behavior in adults of all ages (Roach, 2003; Perkins, 2001; Senekal, 1999; Borrelli et al, 1998; Perkins, 1997; Sheeska, 1993). It is possible that the belief that they can control their weight increases the likelihood that individuals will continue to engage in effective weight control behaviors following weight loss. Other studies show that successful weight maintainers report greater confidence than regainers in their ability to control their weight and their food intake (Jeffery et al., 1984; Gormally et al., 1980). There is also some evidence that, for maintainers, this increase in confidence can permeate other aspects of their lives (Tinker & Tucker, 1997; Colvin & Olson, 1983). Kitsantas (2000) found that self-efficacy is associated with successful weight control both in individuals who are a healthy weight and those who had been overweight in the past. In an Australian population-based study, self-efficacy for preventing weight gain in the future was the variable most strongly associated with BMI, after controlling for confounding variables (Ball & Crawford 2006). Higher weight-loss specific self-efficacy

tends to predict more successful weight loss and maintenance (Richman et al., 2001), and increased self-efficacy has been shown to be related to behaviors associated with weight loss, such as increasing dietary fiber (Hagler et al., 2007; Schwarzer & Renner, 2000), decreasing fat intake (Nelson et al., 2007; Schwarzer & Renner, 2000; Steptoe et al., 2000), and increasing fruit and vegetable consumption (Hagler et al., 2007; Henry et al., 2006; Van Duyn et al., 2001) and to predict the adoption of physical activity (King et al., 1998; McAuley, 1992).

Researchers who have focused on the self-efficacy for health behaviors of specific populations have found positive results for those with high levels of self-efficacy (Clark & Dodge, 1999; Clark & Nothwehr, 1999; Shannon & Kirkley, 1997; Toray & Cooley, 1997; Estabrooks & Carron, 1998). Therefore, interventions aimed at promoting behavior change may be more useful if these interventions incorporate methods of promoting self-efficacy. In a study by Roach et al. (2003), methods used to increase self-efficacy for weight loss were incorporated into a program designed for weight loss promotion in young adults. The weight management intervention consisted of 12 weekly sessions, each lasting approximately one hour. Each session included nutrition education on a topic related to healthy eating patterns and one or more activities intended to promote self-efficacy for weight loss. For example, keeping a food diary can serve as a means of self-observation and self-regulation. The control group participated in 12 weekly standard weight management sessions that were similar to those delivered to the intervention group except that they did not include content and activities to increase self-efficacy. Changes in eating behavior were assessed using a modified version of the Dietary Risk Assessment (DRA), a food frequency questionnaire developed for use in a

cholesterol reduction program (Ammerman et al., 1991). Results indicated that as the self-efficacy improved (intervention group), eating habits improved and weight loss was greater as compared to the control group. This study showed that using CBT to increase self-efficacy for weight control is effective in improving eating behavior. These findings are consistent with other studies on the role of self-efficacy in influencing dietary and health behaviors in young adults as well as older adult populations (Resnick, 2001; Shin, Jang, & Pender, 2001; Sullun et al., 2000; Harris & Murray, 1997; Irwin & Guyton, 1997; DeWolfe & Shannon, 1993; Skinner, 1991;).

Wamsteker et al. (2005) examined whether beliefs about the cause, consequences, time line, and control of obesity are predictors of the amount of weight loss after an 8-week, low-calorie diet consisting of meal replacements. Forty-eight women and 18 men, mean age=45.9 (range=23 to 73 years) years and body mass index between 30 and 50 participated in a weight-loss program. Beliefs were measured at baseline by the Obesity Cognition Questionnaire and by an eating behavior self-efficacy scale. Correlational and regression analyses were performed to examine whether beliefs predicted weight change. Results showed that changes in body mass index, waist circumference, and blood pressure were significant ($p<.001$). Less weight reduction was associated with poor self-efficacy ($r=-0.34$, $p<.01$) and the beliefs that obesity had a physical origin ($r=0.27$, $p=.04$) and was not under behavioral control ($r=-0.25$, $p=.04$). Self-efficacy remained a significant predictor in regression analysis. These results suggest that the outcome of dietary interventions may be improved when adjusting beliefs, especially self-efficacy. Although the low-calorie diet with meal replacements had a favorable effect on weight loss of all obese participants, individual differences in weight loss were predicted by

beliefs at baseline, especially by self-efficacy. The outcome of dietary interventions may therefore be improved when adjusting for self-efficacy beliefs. This study further supports the idea that self-efficacy is a determinant of weight loss.

Warziski et al. (2007) examined self-efficacy specific to changing eating behaviors in the PREFER trial, an 18-month behavioral weight-loss study, to determine if self-efficacy and dietary adherence were associated with weight change, and what impact self-efficacy had on weight change after controlling for adherence. Measurements included the weight efficacy lifestyle (WEL) questionnaire, body weight, self-reported fat gram intake, kilocalorie intake, and adherence to kilocalorie and fat gram goals at baseline, 6, 12, and 18 months. The sample ($N = 170$) was 88.2% female, 70.0% Caucasian, and the mean age was 44.1 years ($SD = 8.8$). Mean weight loss at 18 months was 4.64% ($SD = 6.24$) of baseline body weight and the mean increase in self-efficacy was 11.7% ($SD = 38.61$). Self-efficacy improved significantly over time ($p = 0.04$) and was associated with weight loss ($p = 0.02$). These findings are consistent with others who noted that self-efficacy improved during the course of treatment (Ash et al., 2006; Burke et al. 2004; Clark et al., 1991). Adherence to the fat gram goal was associated with weight loss ($p = 0.0003$), and self-efficacy remained associated with weight loss after controlling for fat gram adherence ($p = 0.0001$). These findings revealed that an increase in self-efficacy was associated with weight loss even after controlling for dietary adherence.

A recent study by Linde et al. (2006), examined the relationships between self-efficacy beliefs, weight control behaviors, and weight change among individuals participating in a weight loss trial ($N = 349$, 87% women). Cross-sectionally, eating and

exercise self-efficacy beliefs were strongly associated with corresponding weight loss behaviors. They found that greater eating self-efficacy prospectively predicted weight-loss behaviors such as higher total days in which participants were adherent to the dietary plan, counted their caloric intake, and consumed less fat. Although, self-efficacy beliefs prospectively predicted weight control behavior and weight change during active treatment, they did not during follow-up.

A study of 54 obese women found that those with the highest self-efficacy beliefs and greatest self-esteem at baseline lost significantly more weight at the end of the intervention than the “disbelievers” (Dennis & Goldberg, 1996). Disbelievers were those who had less confidence in their ability to manage weight and gave up more readily. Palmeira et al. (2007) analyzed how exercise and weight management psychosocial variables, derived from several health behavior change theories, predict weight change. The theories under analysis were the Social Cognitive Theory, the Transtheoretical Model, the Theory of Planned Behavior, and Self-Determination Theory. Subjects were 142 overweight and obese women ($BMI = 30.2 \pm 3.7 \text{ kg/m}^2$; $\text{age} = 38.3 \pm 5.8 \text{ years}$), participating in a 16-week University-based weight control program. Body weight and a comprehensive psychometric battery were assessed at baseline and at the end of the program. Weight decreased significantly ($-3.6 \pm 3.4\%$, $p < .001$) but with great individual variability. Both exercise and weight management psychosocial variables improved during the intervention, with exercise-related variables showing the greatest effect sizes. Weight change was significantly predicted by each of the models under analysis, particularly those including self-efficacy. Bivariate and multivariate analyses results showed that change in variables related to weight management had a stronger

predictive power than exercise-specific predictors and that change in weight management self-efficacy was the strongest individual correlate ($p < .05$). Among exercise predictors, with the exception of self-efficacy, importance/effort and intrinsic motivation towards exercise were the stronger predictors of weight reduction ($p < .05$). The models were able to predict 20–30% of variance in short-term weight loss and changes in weight management self-efficacy accounted for a large share of the predictive power. Exercise variables were only moderately associated with short-term outcomes. Change in eating/weight management self-efficacy was the single best correlate of weight reduction in the study. Conversely, researchers examining 106 overweight or obese African-American women found that higher levels of self-efficacy prior to treatment were associated with less weight loss, suggesting that high initial self-efficacy might actually indicate overconfidence or inexperience with the complexities of losing weight (Martin et al., 2004). Similarly, among 2,311 participants in a Web-based weight-loss program, individuals with higher self-efficacy at baseline were less likely to attend the follow-up assessment at 12 months (Glasgow et al., 2007), which may also have been due to overconfidence. Although the latter studies suggest that high initial self-efficacy is a deterrent, an overwhelming amount of research indicates that increasing one's level of self-efficacy results in positive behavior change.

These studies show that using cognitive-behavioral techniques to improve self-efficacy is effective in weight loss promotion and can produce positive outcomes as compared to the standard weight control programs used in the past. Perhaps being able to adhere to one health behavior regimen boosts self-efficacy and motivation to adhere to behavior change prescriptions in other health domains (Marcus et al., 2000; Emmons et

al., 1994; Epstein & Cluss, 1982). Muraven et al., (1999) suggest that practicing self-control for one behavior strengthens the capacity for future self-control of another behavior, even when the behaviors are unrelated. Zimmerman et al. (1990) reported that persons who were successful at alcohol cessation were more likely to be successful at smoking cessation. Treatment providers must deal with weight concerns of smokers if they are to be successful in helping them quit. The fact that nearly 80% of women smokers relapse following any cessation effort highlights the intractability of smoking among weight-control smokers and signals the need to develop better interventions for this large subgroup of women smokers. In the current study, it is hypothesized that success with weight control will motivate smokers to quit or move towards smoking cessation. Correlational evidence has suggested that a woman's confidence in her ability to control her weight after quitting relates to higher levels of intention to quit smoking (Secker-Walker et al., 1996) and remaining abstinent from smoking has been associated with increased confidence/self-efficacy in preventing weight gain (McBride et al., 1996). It is important, then, to help weight-control smokers increase their self-efficacy for controlling their weight in an attempt to increase their intention to quit smoking. A cognitive-behavioral weight control program that focuses on increasing self-efficacy for weight control may prove to be successful in motivating weight-concerned smokers to quit smoking.

Review of Measures Used

The Eating Attitudes Test

Many studies have been conducted using The Eating Attitudes Test (EAT-26) (Garner et al., 1982) (Appendix A) as a screening tool and are based on the assumption

that early identification of an eating disorder can lead to earlier treatment thereby reducing serious physical and psychological complications or even death. The EAT-26 was selected as the screening instrument used in the 1998 National Eating Disorders Screening Program. Most surveys of adolescents or young adult women using the EAT-26 indicate that about 15% score at or above 20. Of those who score at 20 or above on the EAT-26, interviews have shown that a high proportion have clinically significant eating disorders or "partial syndromes" characterized by some, but not all, of the symptoms required to meet the full diagnostic criteria. Interviews of those who score below 20 on the EAT-26 show that the test produces very few false negatives (i.e. those with low EAT-26 scores who have eating disorders or serious eating concerns on being interviewed). The EAT-26 alone does not yield a specific diagnosis of an eating disorder. Neither the EAT-26, nor any other screening instrument, has been established as highly efficient as the sole means for identifying eating disorders. Scores above 20 indicate that the subject should seek the advice of a qualified mental health professional who has experience with treating eating disorders. The fact that most people provide honest responses means that the EAT-26 usually provides very useful information about the eating symptoms and concerns that are common in eating disorders.

Mintz and O'Halloran (2000) found that the EAT had a 90% accuracy rate and could be "conceptualized as a validated measure of undifferentiated DSM-IV eating disorders." The EAT has a validity coefficient of .87 and an internal consistency coefficient of .79 for anorexic patients and .94 for control subjects (Garner & Garfinkel, 1979).

Cigarette Dependence

The Cigarette Dependence Scale (CDS-12) (Appendix B), a 12 item scale, covers the main components of DSM-IV and ICD-10 definitions of dependence: compulsion, withdrawal symptoms, loss of control, time allocation, neglect of other activities, and persistence despite harm (Etter et al., 2003). Used in this study to measure cigarette dependence, CDS-12 has a high test-retest reliability ($r \geq 0.83$), and a high internal consistency (Cronbach's $\alpha \geq 0.84$) (Etter et al., 2003). CDS-12 scores have been reported to be higher in daily smokers than in occasional smokers (+1.3SD units), and are associated with the strength of the urge to smoke during the last quit attempt (R-square ≥ 0.25) in adults of all ages. CDS-12 is a reliable measure of cigarette dependence which fulfills the criteria of content and construct validity and is sensitive to change over time.

Self-Efficacy

Self-efficacy (Bandura, 1977) conceptualizes a person's perceived ability to perform on a task as a mediator of performance on future tasks. A change in the level of self-efficacy can predict a lasting change in behavior if there are adequate incentives and skills. Self-efficacy questionnaires have been shown to be reliable assessment tools in both smoking cessation and weight control programs (Roach et al., 2003; Borrelli et al., 1998; AbuSabbah et al., 1997; Irwin et al. 1997).

The Smoking Self-Efficacy Questionnaire (SSEQ) (Appendix C) is a 17-item self-report that measures confidence in one's ability to refrain from smoking when facing internal stimuli (e.g. feeling depressed) and external stimuli (e.g. being with smokers). Internal consistency coefficients have been reported to be high ("internal stimuli": $\alpha = 0.95$; "external stimuli": $\alpha = 0.94$) (Colletti et al. 1985). Test-retest intraclass

correlation coefficients were also reported to be high (0.95 and 0.93 for the two scales, respectively) (Colletti et al. 1985). In 529 adult (average age 34 years) smokers, baseline self-efficacy scores predicted smoking cessation at 16-month follow-up (Etter et al., 2000).

The Weight Efficacy Life-Style Questionnaire (WELQ) (Appendix D) is a 20-item self-report measure that assesses an individual's confidence to abstain from eating in a variety of different situations. It is possible to obtain both an overall measure as well as situational self-efficacy based on subscale scores. The WELQ has demonstrated independent cross-validation along with appropriate convergent validity with the Eating Self-Efficacy Scale with a reliability of Cronbach alpha = .70 to .90 in 382 adults (average age 40) (Palmeira et al., 2005; Marcus et al. 2003; Clark et al., 1991). The external validity of the WELQ was also well established in multidisciplinary weight-loss studies (Cargill et al. 1999; Miller et al. 1999; Pinto et al. 1999a, b; Clark et al. 1996; King et al. 1996).

Diet Quality

The 3-day diet record (Appendix E) is a relatively simple and reasonably accurate way to determine dietary intake. A diet record relies less on memory compared to a 24-hour recall, and reports actual intake instead of estimates, which is characteristic of food frequency instruments. In obtaining 3-day diet records, researchers typically provide study participants with verbal and written instructions on how to record dietary intake. The 3-day food record should represent a normal eating pattern. Inclusion of two weekdays and one weekend is recommended. Nutrient intake and diet quality can then be calculated from the food records by software package or food tables. One well known

tool used to analyze food records is the Healthy Eating Index (HEI). It has been used to assess the dietary status of Americans and monitor changes in these patterns. The USDA Center for Nutrition Policy and Promotion developed the HEI based on the work of Kennedy et al., 1995. The HEI is the only index issued by the Federal Government, and computed on a regular basis, that gauges overall diet quality of the population.

According to the American Dietetic Association, the Index is "The most accurate measurement to date on how Americans eat" (ADA, 1995). The HEI consists of 10 components, each representing different aspects of a healthful diet. Components 1 to 5 measure the degree to which a person's diet conforms to the Department of Agriculture's Food Guide Pyramid serving recommendations for the five major food groups: grains, vegetables, fruits, milk products, and meat/meat alternates. Components 6 and 7 measure fat and saturated fat consumption. Components 8 and 9 measure cholesterol intake and sodium intake. Component 10 measures the degree of variety in a person's diet. The overall HEI score ranges from 0-100. An HEI score over 80 implies a "good" diet, an HEI score between 51 and 80 implies a diet that "needs improvement," and an HEI score less than 51 implies a "poor" diet. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts (Bowman et al., 1998).

The HEI has been used in a wide range of applications. It has been used to examine the demographics associated with healthful eating (Variyam et al., 1998), to explore consumers' misperceptions of their diet quality (Variyam et al., 2001), to measure the success of dietary interventions in schools (Dwyer et al., 2002), to assess diet quality and adequacy of older adults (Gaston et al., 2001; Tangney et al., 2001), and to

assess the health and nutrition of popular diets (Kennedy et al., 2001). The HEI and other similar indices are based on dietary intake data gathered using standard instruments such as food records.

Smoking Stage of Change

The transtheoretical model uses several constructs from other health behavior theories, in a model that offers a view of when, how, and why people change their behavior (Prochaska & Velicer, 1997). This model includes the stages of change, which reflect the temporal dimension of the behavior, divided into six consecutive stages. Prochaska & DiClemente (1983) have suggested that motivation to quit smoking can be described as a series of stages of change. The smoking stage of change (Appendix F) provides a framework for organizing and monitoring smoking cessation progress. The model includes five stages: (a) precontemplation--a person has no immediate plan to stop smoking; (b) contemplation--a person is contemplating stopping smoking in the next 6 months; (c) preparation--a person is considering stopping smoking in the next month and has made at least one quit attempt in the past year; (d) action--a person has quit smoking for under 6 months; and (e) maintenance--a person has quit smoking for at least 6 months. Stages of change have been shown to have high reliability and stability (Morera et al., 1998) in 261 female smokers in a general community sample using a quasi-simplex model and high predictive and construct validity (Crittenden et al., 1998).

Detecto scale

Body weight can be measured using the Detecto Manual Physician scale with participants dressed in light clothing (no shoes, sweaters, jackets, or belts) and height can be assessed using a stadiometer with shoes removed.

CHAPTER III

METHODOLOGY

Subject Recruitment

This study was approved by the Institutional Review Board of Florida International University (approval # 042505-01). Female weight-concerned smokers from Philadelphia County, who wanted to lose weight, were invited to participate in a cognitive-behavioral weight control program. They were recruited by posted flyers (Appendix G) in hospitals, stores, universities, libraries, churches, companies, emails, and by word of mouth. They were initially screened by phone to determine eligibility based on the following criteria: female, ≥ 19 years of age, weight-concerned smoker, want to lose weight, not currently seeking any other help or using any medications for weight loss or smoking cessation, Eating Attitudes Test (EAT-26) (Appendix A) score < 20 , (score > 20 indicating possible eating disorder), no diagnosis of type I diabetes or active cancer or any major health problems (self-reported). A program overview was provided and qualified subjects were invited to attend a briefing meeting. Following a detailed explanation of the study procedures and purpose, subjects were provided with a written informed consent according to the standards established by the Institutional Review Board at Florida International University (Appendix H).

Procedure and Measures

Qualified subjects who completed an informed consent were randomly assigned to one of two groups. Group 1 participants were placed in the cognitive-behavioral weight control program (intervention group) and group 2 served as the control. Group 1 met for one hour once each week, for 12 weeks. All sessions of the study were

conducted by the principal investigator in a conference room located in Philadelphia County, PA. The intervention developed for this study was adapted from Roach et al. (2003) and from “The Sensible Weight Loss Program,” developed by Spahn and colleagues (1998) to promote fitness and optimal weight, and by Cooper and colleagues (2003), *Cognitive Behavioral Treatment of Obesity, a Clinician’s Guide*. The program was divided into twelve sessions (Appendix I); each session included nutrition education on a topic related to healthy eating, and one or more activities intended to promote self-efficacy for weight loss through the four sources of self-efficacy information and development: mastery experience, vicarious experience, social persuasion, and physiological states.

The underlying assumption of CBT is that thoughts (cognitions) directly affect feelings which in turn affect behaviors (Beck, 1976). The goal of the CBT component of the intervention was to help people identify and modify behavioral and cognitive habits that contributed to their weight problems. During each session, participants in the intervention group learned to identify maladaptive behaviors and change their responses to them, which in turn allowed them to think differently about their eating behavior. Having the participants think through how they would deal differently with future situations was one of the approaches to increasing their self-efficacy. Participants were also taught how to effectively respond to their sabotaging thoughts. They learned how to set realistic goals, modify their eating habits, and to correct negative thoughts that occur when goals are not met, since these thoughts frequently are associated with negative outcomes.

The CBT strategies included: self-monitoring and goal setting, stimulus control for the modification of eating behavior, cognitive restructuring techniques that focused on challenging and modifying unrealistic or maladaptive thoughts or expectations, stress management, and social support. Stimulus control involved identifying the major barriers that were associated with unhealthy eating habits. Modifying these barriers by controlling environmental stimuli can help a person manage weight-control behaviors. Cognitive restructuring involved learning how to replace unhealthy or negative thoughts and “self-talk” about weight loss with positive affirmations. In order to change their behavior, they applied these six problem solving steps: 1) Identify the problem as early as possible; 2) Specify the problem accurately; 3) Consider as many solutions as possible; 4) Think through the implications of each solution; 5) Choose the best solution or combination of solutions; 6) Act on the solution (Cooper et al., 2003). They were instructed to review the problem-solving process to see if they could identify areas where there was room for improvement.

Participants were taught how to plan meals ahead of time, writing down everything they ate and circling the foods that were eaten immediately after meal completion. They were also instructed to write down the foods they ate that were not planned and how they felt before and after meals. They learned how identify hunger vs. cravings. They weighed themselves at least once a week to monitor and track their weight. During the first session, participants wrote down on an index card the reasons they wanted to lose weight. Throughout the program they added to this card and would read it several times a day for motivation. They also made response cards which addressed their sabotaging thoughts and could be read as needed. At the start of each

session participants were asked to share with the group their program-related experiences from the previous week. Finally, the principal investigator counseled all participants on healthy eating, drawing upon general dietary strategies for weight management, including the incorporation of foods and nutrients that may have been consumed in inadequate quantities during smoking (Subar et al., 1990).

The intervention and control groups completed assessment information at week 1 and week 12, and then at 3 and 9 months follow-up (Table 1). At 6 months post intervention, all subjects were phoned to maintain contact and enhance participation in the 9 month follow-up. Subjects were also reminded that they would be contacted again in 3 months and would receive assessment questionnaires by mail at that time. The subjects were provided a stamped addressed envelope to use when returning the questionnaires. The participants in the control group received \$10 for completion of each assessment point for a total of \$40. The intervention group received \$5 for completion of the two follow-up questionnaires for a total of \$10. In addition to completing a general information questionnaire (age, height, weight, marital status, education, race, household income, cigarette use history and quit attempts) (Appendix J), all participants completed the following questionnaires:

Table 1. Assessment tools used in the study at specified time-points

Instrument	Screening	Baseline	Postintervention	3 m follow-up	9 m follow-up
General Information Questionnaire	X				
Eating Attitudes Test (EAT-26)	X				
Weight Efficacy Life-Style Questionnaire		X	X	X	X
3-day food record		X	X	X	X
Detecto Scale (body weight)		X	X	X	X
Smoking Self-Efficacy Questionnaire		X	X	X	X
Smoking: Stage of Change		X	X	X	X
Cigarette Dependence Scale		X	X	X	X

The Eating Attitudes Test (EAT-26) (Garner et al., 1982) (Appendix A) was used in the study to screen for subjects with potential eating disorders who were excluded from the study. It is a 26 item self-report scale with statements about food and eating to which responses are made on a 6-point scale (never = 0; rarely = 0; sometimes = 0; often = 1; usually = 2; always = 3). Scores above 20 indicate that the subject should seek the advice of a qualified mental health professional who has experience with treating eating disorders. Subjects (n = 11) who scored above 20 on the EAT-26, indicative of an eating disorder, were excluded from the study and encouraged to contact their physician or an eating disorders treatment specialist for a follow-up evaluation.

Weight Efficacy Life-Style Questionnaire (WELQ) (Palmeira et al., 2005; Clarke et al., 1991) (Appendix D) was used as the measure of self-efficacy specific to eating behaviors. Initially, based on the smoking confidence questionnaire by Condiotte and Lichtenstein (1981), the 20-item questionnaire, using a 10-point Likert scale, 0 (not confident) to 9 (very confident), asks participants to rate their confidence in their ability to avoid eating (Clark et al. 1991). The WELQ contains five components - negative emotions ('I can resist eating when I am angry'), availability ('I can control my eating on the weekends'), social pressure ('I can resist eating even when I have to say no to others'), physical discomfort ('I can resist eating when I feel physically run down'), and positive activities ('I can resist eating when I am watching TV'). Scores range from 0 to 180 with higher scores indicating greater levels of self-efficacy. The WELQ score for each participant was derived by totaling the numerical scores from each item.

3-Day Food Records (Appendix E) were used to assess diet quality and the results were analyzed by the HEI. Participants were instructed to provide a detailed record of

everything they ate and drank over a 3-day period. They were asked to record two weekdays and one weekend day. If they ate at a restaurant, they were instructed to provide the restaurant's name and a detailed description of what they ate in the "method of preparation" section. They were asked to attach any recipes, restaurant menus, or nutritional value handouts to their records if available to aid in the accuracy of their diet evaluation.

Smoking Self-Efficacy Questionnaire (SSEQ) (Colletti et al., 1985) (Appendix C) is a 17-item self-report that measures confidence in ability to refrain from smoking when facing internal stimuli (e.g. feeling depressed) and external stimuli (e.g. being with smokers). Participants were asked to rate their confidence in their ability to avoid smoking on a 10-point Likert scale, 0 (not confident) to 9 (very confident) to determine self-efficacy for quitting smoking.

Smoking SOC (DiClemente et al., 1991; Velicer et al., 1995) (Appendix F) was used to assess intention to quit smoking. Participants were asked a series of three questions about their smoking behavior. Based on their response, they were classified as being in one of five stages of smoking cessation accordingly; if participants quit within the last six months (action stage), if they quit more than six months ago (maintenance stage), if they are seriously thinking of quitting within the next thirty days and had at least quit smoking for 24 hours within the last year (preparation stage) or seriously thinking of quitting within the next thirty days and had no 24 hour quit attempt within the last year (contemplation stage), if they were seriously thinking of quitting within the next six months (contemplation stage), and if they were not thinking of quitting (precontemplation stage).

Cigarette Dependence Scale (CDS) (Etter et al., 2003) (Appendix B) is a 12-item scale used to determine level of cigarette dependence. The CDS covers the main components of DSM-IV and ICD-10 definitions of dependence: compulsion, withdrawal symptoms, loss of control, time allocation, neglect of other activities, and persistence despite harm. Scores range from 12-60, where 12 indicates not addicted and 60 indicates extremely addicted.

Statistical Analysis

Differences in baseline demographic, anthropometric, and smoking history between the intervention and control groups were evaluated using t-tests for continuous variables. Wilcoxon rank sum tests for ordinal variables, and Chi-square tests for categorical variables were also performed.

Participants who stayed in the program from baseline to post-intervention only, or from baseline to 3 month follow-up only, were defined as “non-completers,” whereas the participants who stayed in the program from baseline to 9 month follow-up, and completed all four assessment points, were defined as “completers.” A repeated measures analysis of variance was performed for participants’ body weight, BMI, WELQ scores, SSEQ scores, HEI scores, number of cigarettes smoked per day, smoking SOC by group (intervention and control) and time (baseline, post-intervention) for “non-completers”. A second repeated measures analysis of variance was performed on the same variables at baseline, post-intervention, 3 month follow-up, and 9 month follow-up for the “completers”. Follow-up pairwise comparisons were conducted using the Bonferroni method to control for Type I error. Pearson correlations were computed on all pairs of smoking and nutrition related variables from baseline to post-intervention, 3

month and 9 month follow-up for each group separately. Pearson correlations were also computed on all pairs of smoking and nutrition related variables at baseline for both groups combined. Results were declared significant at $p < .05$. Table 2 provides a summary of the hypothesis, tools used to measure, and statistical analysis conducted.

CHAPTER IV

RESULTS

Sample Characteristics

A total of two hundred and sixteen subjects were recruited to participate in this study. Anticipating a higher attrition rate among intervention subjects (greater respondent burden), 125 subjects were randomly assigned to the intervention group at baseline and 91 to the control group. Table 3 provides outcome measures from baseline to postintervention for the intervention (n=92) and control (n=80) groups. Table 4 provides outcome measures from baseline to postintervention, 3 month follow-up, and 9 month follow-up for the intervention (n=70) and control (n=58) groups. Table 5 depicts the attrition rate for both groups across the assessment points of the study. Completion rates, defined as completion of all four assessment points (baseline, post-intervention, 3 month follow-up and 9 month follow-up) were lower than anticipated for both groups with an overall drop rate of 41% (44% for the intervention group and 36% for the control group). In all, 128 subjects completed all four assessment points, 70 subjects in the intervention group and 58 in the control group. Group sample sizes of 70 and 58 achieved 80% power to detect a medium effect size ($f = .3$) using a 2 X 4 repeated measures analysis of variance (Cohen, 1988).

Table 6 provides frequencies, percentages, means, and standard deviations of participants' demographic, anthropometric characteristics, and smoking history at baseline for "completers." Among the "completers," the groups did not differ on demographic and anthropometric characteristics except that age and number of years smoked were significantly different. The intervention group was older (36.09 years vs.

32.52 years), $F(8,126) = .038$, $p < .05$ and therefore, as expected, had smoked longer (13.63 years vs. 10.50 years), $F(7,126) = .014$, $p < .05$, than the control group. However, although the difference in age and number of years smoked between groups was significant, there was no significant correlation between these characteristics and any of the outcome variables. Participants in the intervention group ranged in weight from 124 to 206 pounds (163.39 ± 16.95) compared to control subjects who ranged in weight from 134 to 240 pounds (166.45 ± 19.26). As determined by BMI of 25-29.9, the majority of the participants in the intervention and control groups (83% and 85% respectively) were overweight. In the intervention group, the number of years smoked ranged from 1 to 38 (13.63 ± 7.27). The number of years smoked by control subjects ranged from 1 to 42 (10.50 ± 7.94). The majority of participants in the intervention group were single (51.4%) while 48.3% of participants in the control group were single. In the intervention group, 40.0% were college graduates while in the control group 46.6% had graduated from college. Participants in the intervention and control groups were predominantly Caucasian (71.7% vs. 67.2% respectively). In the intervention group, 41.4% reported a household income between \$20-49,999, while in the control group, 32.8% reported that income. The majority of participants in the intervention and control groups 58.6% reported attempting to quit smoking between 3-5 times. At baseline, the majority of the subjects in the intervention and control groups (81.4% vs. 56.9% respectively) were in the precontemplation stage of change (Table 7).

T-tests and chi square tests were conducted, combining both intervention and control group participants at baseline, for “completers” (N=128) and “non-completers” (N=44), to determine if there were any significant differences in demographic,

anthropometric, smoking, or nutrition related variables. A significant difference ($p < .05$) was found at baseline for weight with the “completers” (164.8 ± 18) weighing more than the “non-completers” (157.4 ± 16). There were no other significant differences between “completers” and “non-completers” and therefore the research questions report the results for “completers” only separated by random group assignment (intervention vs. control).

Also, there were no significant correlations in the combined intervention and control groups at baseline between BMI, number of cigarettes smoked, self-efficacy for quitting smoking, self-efficacy for weight control, cigarette dependence, and healthy eating index score. The correlations ranged from $r = -.17$ (number of cigarettes smoked per day and healthy eating index score) to $r = .09$ (BMI and cigarette dependence score).

Weight, BMI, and Healthy Eating Index

For the four time points, a significant interaction was found by group and time on weight, BMI, and HEI, $F(3,378) = 21.89, p < .001$; $F(3,378) = 20.44, p < .001$; $F(3,378) = 6.95, p < .001$ respectively. At baseline, the mean weight and HEI of the control group was not significantly different from that of the intervention group (Table 4). However, at post-intervention, 3 and 9 month follow-up, the intervention group weighed significantly less and scored significantly higher on HEI than the control group, indicating improvement in diet quality. For the intervention group, mean weight significantly decreased from baseline to all three time points: to post-intervention by 9.9 lbs; to 3 month follow-up by 12.2 lbs, and to 9 month follow-up by 5.8 lbs. Consequently, mean BMI for the intervention group significantly decreased from baseline to all three time points as well by 1.6 kg/m^2 , 2.0 kg/m^2 , and 0.95 kg/m^2 respectively. Mean HEI scores for the intervention group also significantly increased

from baseline to all three time points: by 15.5, 14.6, and 11.4 points respectively. For the control group, mean weight and BMI significantly decreased from baseline to post-intervention by 2.5 lbs and 0.42kg/m² respectively, but changes from baseline to 3 and 9 month follow-up were not significant. Mean HEI for the control group significantly increased from baseline to post-intervention by 6.3 points, from baseline to 3 month follow-up by 5.8 points, but changes from baseline to 9 month follow-up were not significant.

Weight Efficacy Life-style Questionnaire and Smoking Self-Efficacy Questionnaire

For the four time points, a significant interaction was found by group and time on WELQ and SSEQ scores, $F(3,378) = 15.88, p < .001$; $F(3,378) = 3.15, p < .02$ respectively. At baseline, the mean WELQ and SSEQ scores of the control group were not significantly different from that of the intervention group (Table 4). However, at post-intervention, 3 and 9 month follow-up, the intervention group scored significantly higher on WELQ than the control group indicating improvement in self-efficacy to control their weight and smoking behavior. For the intervention group, the mean WELQ scores significantly increased from baseline to all three time points: to post-intervention by 24.3 points; to 3 month follow-up by 25.6 points; and to 9 month follow-up by 15.8 points. Mean SSEQ scores also significantly increased for the intervention group from baseline to all three time points by 5.6, 7.1, and 4.4 points respectively. For the control group, the mean WELQ significantly increased from baseline to post-intervention by 7.1 points, but from baseline to 3 and 9 month follow-up changes were not significant. SSEQ changes from baseline to post-intervention, 3 and 9 month follow-up were also not significant for the control group.

Number of Cigarettes Smoked and Cigarette Dependence Scale

For the four time points, a significant interaction was found by group and time on cigarettes smoked per day and CDS, $F(3,378) = 11.48, p < .001$; $F(3,378) = 6.03, p < .001$ respectively. At baseline, the mean number of cigarettes smoked per day and CDS for the control group were not significantly different from that of the intervention group (Table 4). However, at post-intervention, 3 and 9 month follow-up, the intervention group smoked significantly fewer cigarettes per day than the control group. At post-intervention, the intervention group scored significantly less than the control group on CDS indicating that they were less dependent on cigarettes. At 3 and 9 month follow-up, however, the intervention group's mean CDS scores were not significantly less than the control group's. For the intervention group, the mean number of cigarettes smoked per day significantly decreased from baseline to all three time points: to post-intervention by 6.3 cigarettes; to 3 month follow-up by 7.7 cigarettes; and to 9 month follow-up by 4.9 cigarettes. At 9 month follow-up, 5 subjects from the intervention group and 3 from the control group reported smoking no cigarettes. For the intervention group, there was a significant decrease in CDS scores from baseline to post-intervention of 5.2 points and from baseline to 3 month follow-up of 5.3 points but not from baseline to 9 month follow-up. For the control group, the mean number of cigarettes smoked per day significantly decreased from baseline to post-intervention by only 2.1 cigarettes, but changes at 3 and 9 month follow-up were not significant. Also for the control group, change in mean CDS scores from baseline to all time points were not significant.

Smoking Stage of Change

For the four time points, a significant interaction was found by group and time on SOC, $F(3,378) = 9.76, p < .001$. At baseline, SOC for the intervention group was significantly different from that of the control group with 81% of the intervention group in the precontemplative stage and 57% of the control group in the precontemplative stage (Table 7). At post-intervention, SOC for the intervention group was significantly different from that of the control group with 27% of the intervention group in the preparation and action stages and 6.8% of the control group in the preparation and action stages. At 3 month follow-up, SOC for the intervention group was significantly different from that of the control group with 46% of the intervention group in the preparation and action stages and 22% of the control group in the preparation and action stages. At 9 month follow-up, SOC for the intervention group was not significantly different from that of the control group with 26% of the intervention group in the preparation, action, and maintenance stages and 24% of the control group in the preparation, action, and maintenance stages. At post-intervention, 3 month follow-up, and 9 month follow-up, the intervention group moved more ($p < 0.05$) towards action stage compared to the control group. For the intervention group, participants moved ($p < 0.05$) towards the action stage from baseline to all three time points: post-intervention 68.6% moved; 3 month follow-up 72.9% moved; and 9 month follow-up 57.1% moved. In the control group, 22.4% of participants moved towards the action stage from baseline to post-intervention, but from baseline to 3 month follow-up (44.8%) and baseline to 9 month follow-up (41.4%) significantly moved towards the action stage. From baseline to 9 month follow-up, there

was no significant correlation between the change in SOC and CDS scores and the change in SSEQ scores.

Healthy Eating Index Correlations

From baseline to 9 month follow-up, an increase in HEI scores correlated with a decrease in body weight ($r = 0.433, p < .001$) (Table 8). Larger increases in HEI scores were associated with larger decreases in body weight. As participants' improved the quality of their diet, they lost weight.

Weight Efficacy Life-style Questionnaire Correlations

From baseline to 9 month follow-up, an increase in WELQ scores correlated with an increase in HEI scores ($r = .292, p < .01$); an increase in SSEQ scores ($r = 0.291, p < .014$); a decrease in body weight ($r = 0.582, p < .001$); and a decrease in CDS scores ($r = 0.236, p < .05$) (Table 8). Larger increases in WELQ scores were associated with larger increases in HEI and SSEQ scores and larger decreases in body weight and CDS scores. As participants' self-efficacy for controlling their weight increased, the quality of their diet improved, their self-efficacy for quitting smoking increased, and their body weight and cigarette dependence decreased.

Smoking Self-Efficacy Questionnaire Correlations

From baseline to 9 month follow-up, an increase in SSEQ scores correlated with a decrease in cigarettes smoked per day ($r = 0.546, p < .001$) and a decrease in CDS scores ($r = 0.361, p < .01$) (Table 8). Larger increases in SSEQ were associated with larger decreases in cigarettes smoked per day and CDS scores. As participants' self-efficacy for quitting smoking increased, the number of cigarettes they smoked per day and their cigarette dependence decreased.

Number of Cigarettes Smoked Correlations

From baseline to 9 month follow-up, a decrease in cigarettes smoked per day correlated with an increase in WELQ scores ($r = 0.331, p < .005$), a positive transition in smoking SOC ($r = 0.435, p < .001$), and a decrease in CDS scores ($r = 0.354, p = .003$) (Table 8). Larger decreases in cigarettes smoked per day were associated with larger increases in WELQ scores, greater number of categories moved in smoking SOC (towards action stage), and larger decreases in CDS scores. As the number of cigarettes participants' smoked per day decreased, their cigarette dependence also decreased, and their self-efficacy for controlling their weight increased.

Research Hypotheses

Hypotheses one through four were supported by the results of this study; hypothesis five however was not supported. Results of hypotheses are presented in Table 9 and discussed in chapter five (discussion).

Table 2. Methods Summary

Hypothesis	Tools	Statistical Method
The cognitive-behavioral weight-control program will significantly increase self-efficacy (SE) for weight control, SE for quitting smoking, diet quality, Stage of Change transition towards smoking cessation, and will significantly decrease body weight, number of cigarettes smoked/day, and cigarette dependence from baseline to 9 month follow-up.	WELQ ^a (Clark et al. 1991), SSEQ ^b (Colletti et al. 1985), 3-Day Food Record, Health Eating Index (Garner et al., 1982), Smoking: SOC ^c , Self-reported number of cigarettes smoked/day, Detecto scale, (DiClemente et al. 1991), CDS ^d (Etter et al. 2003)	One-Way Repeated Measures ANOVA
An increase in SE for weight control will correlate significantly with a decrease in body weight, an increase in diet quality, and an increase in SE for quitting smoking from baseline to 9 month follow-up	WELQ ^a , Detecto scale, 3-Day Food Record, Health Eating Index, SSEQ ^b	Pearson correlations
An increase in SE for quitting smoking will be significantly correlated with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 month follow-up.	SSEQ ^b , Self-reported number of cigarettes smoked/day, CDS ^d	Pearson correlations
An increase in SE for weight control will be significantly correlated with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 month follow-up.	WELQ ^a , Self-reported number of cigarettes smoked/day, CDS ^d	Pearson correlations
A positive transition in SOC will be significantly correlated with an increase in SE for quitting smoking from baseline to 9 month follow-up.	Smoking: SOC ^c , SSEQ ^b	Pearson correlations

^aWeight Efficacy Lifestyle Questionnaire, ^bSmoking Self-Efficacy Questionnaire, ^cStage of Change,

^dCigarette Dependence Scale

Table 3. Study outcome measures from baseline to postintervention for the intervention (n=92) and control (n=80) group

Variables	Mean \pm SD ^a	
	Baseline	Postintervention
Weight (lb)		
Intervention	161.98 \pm 17.26 ⁱ	152.93 \pm 15.36 ^g
Control	163.93 \pm 18.40 ⁱ	162.16 \pm 17.63 ^h
BMI ^b		
Intervention	27.49 \pm 2.49 ⁱ	25.99 \pm 2.07 ^g
Control	27.79 \pm 2.63 ⁱ	27.53 \pm 2.54 ^h
HEI ^c		
Intervention	61.37 \pm 13.56 ⁱ	76.74 \pm 9.22 ^g
Control	59.92 \pm 16.83 ⁱ	65.61 \pm 12.96 ^h
WELQ ^d		
Intervention	117.43 \pm 28.70 ⁱ	141.41 \pm 22.43 ^g
Control	119.86 \pm 28.78 ⁱ	126.50 \pm 27.74 ^h
# of Cigarettes Smoked		
Intervention	18.92 \pm 6.03 ⁱ	13.13 \pm 6.77 ^g
Control	17.81 \pm 5.44 ⁱ	15.80 \pm 6.66 ^h
SSEQ ^e		
Intervention	31.34 \pm 9.97 ⁱ	37.32 \pm 7.67 ^g
Control	29.53 \pm 8.24 ⁱ	29.28 \pm 8.29 ⁱ
CDS ^f		
Intervention	43.11 \pm 8.25 ⁱ	38.35 \pm 7.06 ^g
Control	43.75 \pm 8.83 ⁱ	45.21 \pm 8.06 ⁱ

^aSD=standard deviation.

^bBMI=body mass index; calculated as weight in kg/ht in m².

^cHEI=healthy eating index; scores range from 10-100, with scores < 51 indicating a poor diet, 51-80 needs improvement, and >80 a good diet.

^dWELQ=weight-efficacy lifestyle questionnaire; scores range from 0-180, with a high score indicating high self-efficacy.

^eSSEQ=smoking self-efficacy questionnaire; scores range from 12-60, with a high score indicating high self-efficacy.

^fCDS=cigarette dependence scale; scores range from 12-60, with 12 indicating not addicted and 60 indicating extremely addicted.

^{g,h,i}Variable means within a row or column with different superscripts are significantly different using Bonferroni procedure at p < .05.

Table 4. Study outcome measures from baseline to postintervention, 3 month follow-up, and 9 month follow-up for the intervention (n=70) and control (n=58) group

Variables	Mean±SD ^a			
	Baseline	Postintervention	3 Month Follow-up	9 Month Follow-up
Weight (lb)				
Intervention	163.39 ± 16.95 ⁱ	153.43 ± 15.14 ^g	151.23±13.26 ^g	157.54 ± 15.02 ^g
Control	166.45 ± 19.26 ⁱ	163.95 ± 18.82 ^h	164.97 ± 20.48 ⁱ	167.91 ± 21.52 ⁱ
BMI ^b				
Intervention	27.61 ± 2.63 ⁱ	25.97 ± 2.25 ^g	25.6 ± 1.90 ^g	26.66 ± 2.20 ^g
Control	28.09 ± 2.96 ⁱ	27.67 ± 2.89 ^h	27.84 ± 3.13 ⁱ	28.33 ± 3.30 ⁱ
HEI ^c				
Intervention	60.39 ± 13.43 ⁱ	75.86 ± 9.62 ^g	75.04 ± 9.95 ^g	71.8 ± 12.32 ^g
Control	58.46 ± 15.99 ⁱ	64.77 ± 11.67 ^h	64.29 ± 14.04 ^h	59.47 ± 15.45 ⁱ
WELQ ^d				
Intervention	115.74 ± 27.73 ⁱ	140.09 ± 21.39 ^g	141.41 ± 25.43 ^g	131.57 ± 25.57 ^g
Control	116.90 ± 28.93 ⁱ	123.98 ± 27.23 ^h	118.81 ± 26.81 ⁱ	117.12 ± 29.48 ⁱ
# of Cigarettes Smoked				
Intervention	19.00± 6.06 ⁱ	12.66 ± 6.95 ^g	11.33 ± 7.32 ^g	14.07 ± 8.41 ^g
Control	17.86 ± 5.50 ⁱ	15.76 ± 6.72 ^h	15.95 ± 6.98 ⁱ	17.09 ± 8.04 ⁱ
SSEQ ^e				
Intervention	31.69 ± 10.11 ⁱ	37.29 ± 7.89 ^g	38.79 ± 11.36 ^g	36.13 ± 11.70 ^g
Control	29.52 ± 8.19 ⁱ	29.12 ± 8.07 ⁱ	32.24 ± 11.17 ⁱ	31.34 ± 12.66 ⁱ
CDS ^f				
Intervention	43.27 ± 8.34 ⁱ	38.07 ± 6.91 ^g	38.00 ± 11.13 ^{g‡}	40.19 ± 9.48 ⁱ
Control	42.74 ± 8.66 ⁱ	45.03 ± 7.85 ⁱ	40.47 ± 11.24 ^{g‡}	43.26 ± 10.09 ⁱ

^aSD=standard deviation.

^bBMI=body mass index; calculated as weight in kg/ht in m².

^cHEI=healthy eating index; scores range from 10-100, with scores < 51 indicating a poor diet, 51-80 needs improvement, and >80 a good diet.

^dWELQ=weight-efficacy lifestyle questionnaire; scores range from 0-180, with a high score indicating high self-efficacy.

^eSSEQ=smoking self-efficacy questionnaire; scores range from 12-60, with a high score indicating high self-efficacy.

^fCDS=cigarette dependence scale; scores range from 12-60, with 12 indicating not addicted and 60 indicating extremely addicted.

^{g,h,i}Variable means from baseline to the 3 time points and in columns with different subscripts are significantly different at $P < 0.05$ except where denoted by ‡.

Table 5. Number of subjects participating in study at specified time-points and attrition rate from baseline to 9 month follow-up

	Baseline	Postintervention	3 month follow-up	9 month follow-up	Total Attrition
	1-Jul-05	17-Sep-05	15-Dec-05	17-Jun-06	% Drop
Intervention	125	92	79	70	44%
Control	91	80	64	58	36%
Total	216	172	143	128	41%

Table 6. Demographic, anthropometric characteristics, and smoking history of participants

	Intervention (n=70)		Control (n=58)	
	Mean \pm SD ^a	Range	Mean \pm SD	Range
Age (y)	36.09 \pm 7.02 ^b	25 - 58	32.52 \pm 7.57 ^b	21 - 59
Height (cm)	163.90 \pm 4.48	150 - 173	164.16 \pm 5.77	150 - 175
Weight (lbs)	163.39 \pm 16.95	124 - 206	166.45 \pm 19.26	134 - 240
BMI ^c	27.61 \pm 2.63	24 - 34	28.09 \pm 2.96	25 - 43
Years smoked	13.63 \pm 7.27 ^b	1 - 38	10.50 \pm 7.94 ^b	1 - 42
	N (%)		N (%)	
Marital Status				
Single	36 (51.4)		28 (48.3)	
Married	28 (40.0)		23 (39.7)	
Divorced	6 (8.6)		6 (10.3)	
Widowed	0 (.0)		1 (1.7)	
Education				
Some High School	1 (1.4)		1 (1.7)	
High School Grad	7 (10.0)		8 (13.8)	
Technical	5 (7.1)		1 (1.7)	
Some College	8 (11.4)		4 (6.9)	
Associates	13 (18.6)		14 (24.1)	
College Grad	28 (40.0)		27 (46.6)	
MS	6 (8.6)		3 (5.2)	
PHD	2 (2.9)		0 (.0)	
Race				
Asian	0 (.0)		0 (.0)	
Black	5 (7.1)		6 (10.3)	
White	54 (77.1)		39 (67.2)	
Hispanic	6 (8.6)		11 (19.0)	
Other	5 (7.1)		2 (3.4)	
Household Income				
\$ 0 - 19,999	2 (2.9)		5 (8.6)	
\$ 20 - 49,999	29 (41.4)		19 (32.8)	
\$ 50 - 74,999	22 (31.4)		19 (32.8)	
\$ 75 - 99,999	13 (18.6)		11 (19.0)	
\$100 +	4 (5.7)		4 (6.9)	
Quit Attempts				
None	1 (1.4)		0 (.0)	
1 - 2	14 (20.0)		6 (10.3)	
3 - 5	41 (58.6)		34 (58.6)	
> 5	14 (20.0)		18 (31.0)	

^aSD=standard deviation^bP < 0.05^cBMI=body mass index; calculated as kg/m²

Table 7. Smoking Stage of change transition from baseline to post-intervention, 3 month follow-up, and 9 month follow-up in the intervention (n=70) and the control (n=58) group.

	Baseline N (%)	Postintervention N (%)	3 month follow-up N (%)	9 month follow-up N (%)
Precontemplation				
Intervention	57 (81.4)	15 (21.4)	13 (18.6)	22 (31.4)
Control	33 (56.9)	30 (51.7)	26 (44.8)	26 (44.8)
Contemplation				
Intervention	11 (15.7)	36 (51.4)	25 (35.7)	30 (42.9)
Control	23 (39.7)	24 (41.4)	19 (32.8)	18 (31.0)
Preparation & Action				
Intervention	2 (2.9)	19 (27.2)	32 (45.8)	18 (25.7)
Control	2 (3.4)	4 (6.8)	13 (22.4)	14 (24.1)

A significant interaction was found by group and time on SOC, $F(3,378) = 9.76$, $P < 0.001$.

The intervention was significantly different from the control at all times except 9 month follow-up

The intervention significantly moved towards action stage from baseline to all 3 time points

The control significantly moved towards action stage from baseline to postintervention and 3 month follow-up

Table 8. Significant correlations between differences in smoking and nutrition related variables from baseline to 9 month follow-up in the intervention group (n=70).

Questions	Variable 1	Variable 2	r
Does the change in WELQ correlate with the change in Weight?	WELQ 2-WELQ 1	Wt 1-Wt 2	0.582***
Does the change in WELQ correlate with the change in HEI?	WELQ 2-WELQ 1	HEI 2-HEI 1	0.292**
Does the change in WELQ correlate with the change in SSEQ?	WELQ 2-WELQ 1	SSEQ 2-SSEQ 1	0.291**
Does the change in WELQ correlate with the change in #Cig?	WELQ 2-WELQ 1	#Cig 1-#Cig 2	0.331**
Does the change in CDS correlate with the change in WELQ?	CDS 1-CDS 2	WELQ 2-WELQ 1	0.236*
Does the change in SSEQ correlate with the change in #Cig?	SSEQ 2-SSEQ 1	#Cig 1-#Cig 2	0.546***
Does the change in SSEQ correlate with the change in CDS?	SSEQ 2-SSEQ 1	CDS 1-CDS 2	0.361**
Does the change in SSEQ correlate with the change in SOC?	SSEQ 2-SSEQ 1	SOC 2-SOC 1	0.121
Does the change in #Cig correlate with the change in SOC?	#Cig 1-#Cig 2	SOC 2-SOC 1	0.435***
Does the change in #Cig correlate with the change in CDS?	#Cig 1-#Cig 2	CDS 1-CDS 2	0.354**
Does the change in CDS correlate with the change in SOC?	CDS 1-CDS 2	SOC 2-SOC 1	0.229
Does the change in HEI correlate with the change in Wt?	HEI 2-HEI 1	Wt 1-Wt 2	0.433***

WELQ=weight-efficacy lifestyle questionnaire, HEI=healthy eating index, SSEQ=smoking self-efficacy questionnaire,

#Cig=number of cigarettes smoked/day, CDS=cigarette dependence scale, smoking SOC=stage of change

2= 9 month post, 1= Baseline

*p<.05, ** p<.01, ***p<.001.

Table 9. Results of Hypothesis Testing

HYPOTHESES

H₁: The cognitive-behavioral weight-control program (CBWCP) will significantly increase self-efficacy (SE) for weight control, SE for quitting smoking, diet quality, SOC transition towards smoking cessation and significantly decrease body weight, number of cigarettes smoked/day, and cigarette dependence from baseline to 9 month follow-up.

H₂: An increase in SE for weight control will correlate significantly with a decrease in body weight, an increase in diet quality, and an increase in SE for quitting smoking from baseline to 9 month follow-up.

H₃: An increase in SE for quitting smoking will be significantly correlated with a decrease in number of cigarettes smoked/day and CDS from baseline to 9 month follow-up.

H₄: An increase in SE for weight control will be significantly correlated with a decrease in number of cigarettes smoked/day, and a decrease in cigarette dependence, from baseline to 9 month follow-up.

H₅: A positive transition in SOC with be significantly correlated with an increase in SE for quitting smoking from baseline to 9 month follow-up.

RESULTS

Subjects in the CBWCP significantly increased SE for weight control ($p < 0.001$), SE for quitting smoking ($p < 0.02$), diet quality ($p < 0.001$), SOC transition towards smoking cessation ($p < 0.001$) and significantly decreased body weight ($p < 0.001$), number of cigarettes smoked/day ($p < 0.001$), and cigarette dependence ($p < 0.001$) from baseline to 9 month follow-up. Hypothesis 1 is supported by the findings of this study.

An increase in SE for weight control scores significantly correlated with a decrease in body weight ($r = 0.582$, $p < 0.001$), an increase in diet quality ($r = 0.292$, $p < 0.01$), and an increase in SE for quitting smoking ($r = 0.291$, $p = 0.014$) from baseline to 9 month follow-up. Hypothesis 2 is supported by the findings of this study.

An increase in SE for quitting smoking significantly correlated with a decrease in number of cigarettes smoked/day ($r = 0.546$, $p < 0.001$) and CDS ($r = 0.361$, $p < 0.01$) from baseline to 9 month follow-up. Hypothesis 3 is supported by the findings of this study.

An increase in SE for weight control scores correlated with a decrease in number of cigarettes smoked/day ($r = 0.331$, $p < 0.005$), and CDS ($r = 0.354$, $p = 0.003$) from baseline to 9 month follow-up. Hypothesis 4 is supported by the findings of this study.

There was no significant correlation between the transition in SOC and the change in SE for quitting smoking from baseline to 9 month follow-up. Hypothesis 5 is not supported by the findings of this study.

CHAPTER V

DISCUSSION

For many smokers a fear of weight gain resulting from smoking cessation is greater than the fear of the potential negative health consequences of continuing to smoke. Researchers have identified smokers who smoke to control their weight as “weight-concerned smokers.” These smokers tend to be female, smoke more cigarettes, have greater difficulty in quitting, and are less likely to join smoking cessation programs than smokers who are not weight concerned. Women who are concerned about post-cessation weight gain report expecting to gain almost 17 pounds upon cessation, but are willing to tolerate a gain of only 5 pounds (Levine et al., 2001). Since weight gain among these smokers has been associated with relapse upon cessation, researchers have tested intervention programs addressing these weight concerns. Such programs have included the addition of a weight loss component to smoking cessation programs, which have had limited success (Clark et al., 2005; Spring et al., 2004; Hall et al. 1992; Pirie et al., 1992) and the addition of exercise programs, which have had mixed results (Prapavessis et al. 2007; Ussher et al. 2007; Marcus et al. 2005). A smoking cessation program that included cognitive behavioral therapy (CBT) to reduce weight concerns, focusing on helping women accept weight gain, has shown some success (Perkins et al., 2001).

Smoking cessation intervention programs are often targeted for those smokers who are in the “preparation” stage of quitting, despite reports that the majority of smokers are in the precontemplation or contemplation stages (Prochaska, et al., 1992). It is important to undertake efforts to assist weight concerned smokers whose fear of weight

gain prevents them from being ready to take part in smoking cessation programs. In an attempt to reach this subgroup of female smokers, this study offered a 12-week CBT weight control program to determine if weight-concerned women who gained self-efficacy for their ability to control their eating habits and body weight would also increase their self efficacy to quit smoking.

Participants in the intervention group were predominantly single (51.4%), Caucasian (71.7%), college graduates (40%), with a mean age of 36 years, and had been smoking for a mean of 13.6 years. There was a 26.4% attrition rate for the intervention group from baseline to post-intervention, which is consistent with research on CBT programs that show approximately 80% of patients who begin treatment complete it, yielding an average attrition rate of 20% (Wadden & Foster, 2000).

The findings of this study offer new information regarding the relationship between self-efficacy for weight control and self-efficacy for quitting smoking in weight-concerned smokers in the precontemplation stage of change for smoking cessation. The results will be discussed in terms of the five main hypotheses and their implications.

The first hypothesis, that participation in the CBT weight-control program would significantly increase self-efficacy for weight control, self-efficacy for quitting smoking, diet quality, stage of change transition towards smoking cessation, and would significantly decrease body weight and number of cigarettes smoked per day from baseline to 9 month follow-up, was supported. Participants in the intervention program lost more weight, improved the quality of their diet, increased confidence in their ability to control their weight and smoking behavior, and were in a higher stage of change for smoking cessation as compared to the control group. Participants in the intervention

group lost an average of 5.8 pounds ($p < .001$) and decreased their cigarette intake by an average of 4.92 cigarettes a day ($p < .001$) at 9 month follow-up. The control group showed no significant changes in either variable for the same time period. Although the control subjects showed significant improvement in diet quality, self-efficacy for weight control, and decreased their body weight and number of cigarettes smoked at post-intervention, this change was significantly less than that for the intervention group and was not sustained at 3 and 9 month follow-up. Since the participants assigned to the control group, as well as the intervention group, initially signed up for a weight control program, they may have already been motivated to lose weight. Thus being selected for the control group did not deter them in their weight loss efforts. It can be hypothesized that because the control group was not enrolled in a weight control program that provided them the tools, reinforcement, and support necessary for success, they were unable to sustain this weight loss or improve in any other outcome measures at subsequent time points. Losing some weight by post-intervention could have boosted their self-efficacy for weight control through “enactive attainment” (mastery experience). This in turn could have caused them to rely less on smoking to control their weight, resulting in a decreased number of cigarettes smoked at post-intervention.

From baseline to post-intervention, the intervention group’s cigarette dependence scores significantly decreased by a mean of 5.2 points; there was no significant difference noted for the control group. From post-intervention to 3 month follow-up, there was no significant difference in cigarette dependence for the intervention group, while the control group exhibited a significant difference of 4.56 points. This decrease in cigarette dependence by the control group could have been caused by external factors, such as the

use of nicotine replacement therapy or drug therapy initiated after baseline screening. From baseline to 9 month follow-up, there was no significant difference in cigarette dependence observed for either group. The lowest cigarette dependence scores for the intervention group occurred at 3 month follow-up and coincided with their lowest body weight, their highest levels of self-efficacy for weight control, and quitting smoking. From 3 month to 9 month follow-up, there was a regression in all outcome measures though the only one reaching baseline levels was cigarette dependence. A possible explanation is that as the participants' body weight increased, they may have felt more dependent on cigarettes to control their weight.

The intervention for this study focused on increasing self-efficacy for weight control through four sources: enactive attainment (mastery experience), vicarious experience, social persuasion, and physiological states. In the beginning of each session participants were asked to share with the group their experiences of the previous week. This discussion could have provided social support and impacted self-efficacy by vicarious learning and also by verbal and social persuasion from both instructor and group members. A possible explanation is that as participants were losing weight, they improved their self-efficacy towards weight loss behaviors by means of enhanced mastery experiences, positive emotional activation as a result of nearing their goals, and vicarious experiences observing other group members lose weight. By the end of the trial, the overall increase from baseline in self-efficacy for weight control was 13.7% and self-efficacy for quitting smoking was 14%, a finding that is consistent with others who noted that self-efficacy improved during the course of treatment (Clark et al. 1991; Ash et al. 2006; Burke et al. 2004). Roach et al. (2003) found similar results in a 12-week

cognitive behavioral weight loss program that focused on increasing self-efficacy for weight loss. Results indicated that as the self-efficacy improved, eating habits improved, and weight loss was greater as compared to the control group. The results of the current study showed that using cognitive behavioral therapy to increase self-efficacy for weight control may be effective in improving diet quality.

The National Institutes of Health guidelines recommend an initial weight loss of 10% of body weight achieved over 6 months for individuals with a BMI ≥ 30 kg/m² and for individuals with a BMI > 25 kg/m² who have 2 or more obesity-related risk factors (NHBLI, 1998; Pi-Sunyer, 1998). Being overweight puts smokers at even greater risk for disease. Participants in this study had an average BMI of 27.61 for the intervention group, classifying them as overweight. The intervention group lost an average of 7.4% of their initial body weight at 6 months from study entry. This is lower than other studies in which patients treated with a group cognitive-behavioral approach lost an average of 9% of initial body weight in 20-26 weeks of treatment (Foreyt & Goodrick, 1993; Wadden & Foster, 2000; Wing, 2002). However, at 9 month follow-up (1 year from study entry) the intervention group had regained almost 50% of their weight loss. Studies suggest that over 80% of individuals who lose weight will gradually regain it (Expert Panel on the Identification, 1998; Wing & Hill, 2001). Although 10% of initial body weight is the recommendation over 6 months, most overweight people desire a 20%-35% reduction (Foster, Wadden, Vogt, & Brewer, 1997; O'Neil, Smith, Foster & Anderson, 2000). The failure to achieve unrealistic weight loss expectations may discourage some individuals and cause them to abandon their behavior changes, reverting back to their previous eating habits. To prevent this disconnect from occurring, participants in the intervention group

were instructed from the beginning to set realistic, attainable goals and it was emphasized that a sustained weight loss of 5-15% of initial body weight has demonstrated positive health benefits and reduced obesity-related health conditions. In the past, emphasis has been placed on total weight loss, however, it is now understood that prevention of further weight gain, promotion of weight loss, and improving overall health status are more essential goals. In this study the greatest weight loss was observed 3 months after completion of the 12 sessions. This may have been due to the subjects having enough time for the practice of their newly learned behaviors to have an effect on their weight. The rebound in weight observed at 9 month follow-up may have been due to lack of the continued reinforcement. It may therefore be beneficial for future programs to include booster sessions at 3, 6, and 9 month follow-up to provide the necessary reinforcement to prevent relapse. Once participants in the intervention group were able to change their eating behavior, evidenced by their weight loss and improvement in diet quality, maintenance of the new behavior became a question of the desire, rather than the ability, to do so. The decision to maintain the new behavior is guided by the participants' satisfaction with the outcome and expectations about the benefits and costs. It is possible that for those participants who were satisfied with the outcome resulting from their new behavior, this was enough motivation for them to continue in their efforts. Conversely, those who were unsatisfied with the amount of weight they lost may have found it difficult to remain motivated and reverted back to their previous habits. Others may have perceived the "cost" (change in eating habits) to be less than the benefits received (weight loss).

Smokers interested in losing weight typically hold higher expectations for the benefits of weight loss than they do for quitting smoking (Jeffery et al., 1998). As such, they are more likely to initiate new weight loss plans than to attempt smoking cessation. In this study, participants who successfully changed their eating behavior and lost weight may have been motivated toward changing their smoking behavior as well. The results indicate that an intervention focused on weight control and targeted to female weight-concerned smokers not planning to quit smoking may have a positive impact on body weight, diet quality and may also have a positive effect on self-efficacy for smoking cessation.

The second hypothesis stated that an increase in self-efficacy for weight control will be significantly correlated with a decrease in body weight, an increase in diet quality, and an increase in self-efficacy for quitting smoking from baseline to 9 months follow-up was supported. As participants' self-efficacy for controlling their weight increased, their body weight decreased, the quality of their diet improved, and their self-efficacy for quitting smoking increased. At baseline, post-intervention, 3 month, and 9 month follow-up, the changes in mean self-efficacy for weight control mirrored changes in weight among the intervention group. As the greatest increase in self-efficacy occurred from baseline to 3 month follow-up (25.63 points), it coincided with the greatest weight loss (12.15 pounds). This is consistent with the literature that analyzed change in self-efficacy as a predictor of weight loss and found that greater improvements in self-efficacy led to greater weight loss (Dennis & Goldberg 1996; Martin et al., 2004; Jeffery 2004; Warziski et al. 2007; Kitsantas 2000). These results also indicate that as

participants gained more confidence in their ability to control their weight they also became more confident in their ability to control their smoking.

The third hypothesis, that an increase in self-efficacy for quitting smoking will significantly correlate with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 month follow-up, was supported. As participants' self-efficacy for quitting smoking increased, the number of cigarettes they smoked decreased along with their cigarette dependence. At baseline, post-intervention, 3 month, and 9 month follow-up, the changes in self-efficacy for quitting smoking mirrored changes in the number of cigarettes smoked in the intervention group. As the greatest increase in self-efficacy for quitting smoking occurred from baseline to 3 month follow-up (7.10 points), the greatest decrease in number of cigarettes smoked (7.67 cigarettes) was also noted. These results are similar to other cross-sectional studies which have demonstrated a strong relationship between self-efficacy and smoking cessation (Schnoll et al., 2002; Martinelli, 1999). End of treatment self-efficacy ratings have been found to predict smoking status at 3-month (Borrelli & Mermelstein, 1994b; Condiotte & Lichtenstein, 1981) and 6-month follow-ups (Baer et al., 1986a). Borrelli & Mermelstein (1994b) found that high self-efficacy was the only predictor of abstinence at a 3-month follow-up, over and above prior smoking status, motivation to quit, stress, and adherence to behavioral assignments. Self-efficacy also mediated the relationship between completion of behavioral assignments and follow-up smoking status. Baldwin et al. (2006) observed that the participants' self-efficacy measured just prior to the smoking cessation program quit date positively predicted whether they would quit by the end of the program. In addition, it was consistently observed that for those who were still trying

to quit smoking or who had just recently quit, perceptions of self-efficacy significantly predicted whether they would remain abstinent from smoking in the future. The results of this study add to the growing body of evidence that support the relationship between self-efficacy and smoking behavior.

The fourth hypothesis, that an increase in self-efficacy for weight control will be significantly correlated with a decrease in number of cigarettes smoked/day and a decrease in cigarette dependence from baseline to 9 months follow-up, was supported. As participants' self-efficacy for controlling their weight increased, the number of cigarettes they smoked decreased along with their cigarette dependence. The goal of the intervention in this study was to help participants identify and modify behavioral and cognitive habits that contributed to their weight problem. The ability to regulate one's own behavior can strongly influence self-efficacy (Bandura, 1986). Bandura states that self-observation can influence the behavior being noted and that one must be aware of behavior in order to exert influence over it. Participants learned to identify the factors that triggered and enforced their maladaptive behaviors as well as to set goals in terms of new behaviors. Self-efficacy can be improved through goal setting, leading to greater achievement in regard to health behavior change (Strecher & Seijts, 1995). Participants in the intervention group set goals and learned how to improve the quality of their diet and change their eating behavior as evidenced post-intervention by the increase in healthy eating index scores and weight loss. The satisfaction stemming from the outcomes of their behavioral changes could have boosted the participants' self-efficacy for controlling their weight. By having increased confidence that they could control their weight through these behavior modifications, participants may have felt an increased confidence

in their ability to quit smoking, which in turn resulted in a decrease in cigarette dependence and fewer cigarettes smoked. Change in smoking behavior is a multi-stage process, and these results suggest that this intervention was successful at moving smokers toward cessation (which was the primary goal of the intervention), even if the outcome was not immediate cessation.

The fifth hypothesis, that a positive transition in stage of change will be significantly correlated with an increase in self-efficacy for quitting smoking from baseline to 9 months follow-up was not supported by the results of the study. These results are inconsistent with published data on the relationship between self-efficacy and stage of change. High self-efficacy has been associated with being in a higher stage of change (Arnsten et al. 2004; De Vries et al. 1998; Schumann et al. 2005; Velicer et al., 1990). Warnecke et al. (2001) found that an intervention addressed to motivating behavior change enhanced readiness to change among female smokers. According to Bandura (1986), enhanced readiness to change will in turn increase the smoker's sense of self-efficacy regarding further change. Research shows that self-efficacy scores tend to be low among precontemplators and much higher as the smoker acts and maintains abstinence (DiClemente, 1985). These stages appear to be quite stable indicators of change and hence, appropriate intermediate outcome measures (Morera et al. 1998). Although stage of change did not correlate with self-efficacy for quitting smoking in this study, it did correlate with the number of cigarettes smoked and diet quality. Participants who decreased the number of cigarettes they smoked and improved the quality of their diet also had greater transitions in stage of change toward smoking cessation. It could be that participants who changed their eating behavior to improve the quality of their diet

felt that they did not need to rely as much on cigarettes to control their weight, further increasing their desire to quit smoking.

Limitations

All outcome measures obtained were self-reported without objective measures of biochemical validation. It may be useful to include objective measures of smoking and food intake in future studies. Physical activity was not promoted, discussed, or assessed. Adding an exercise component to the intervention may help accelerate weight loss, aid in weight maintenance, and encourage smoking behavior change. A further limitation was the lack of in-person contact with the participants at the follow-up points. Having a booster sessions at 3, 6, and 9 months follow-up may prove to be advantageous since this is when participants began regressing. The knowledge that they would see the other participants and the instructor at follow-up may have served as an incentive and provided motivation to continue with the behavior change. Although the use of nicotine replacement therapy was an exclusion criterion prior to the study and was measured at baseline, there were no assessments of its use at subsequent follow-up points.

Conclusion

An estimated 66% of U.S. adults are either overweight or obese (2003-2004 NHANES). Data from two NHANES surveys show that among adults aged 20–74 years the prevalence of obesity increased from 15% (in the 1976–1980 survey) to 33% (in the 2003–2004 survey). One of the national health objectives for 2010 is to reduce the prevalence of obesity among adults to less than 12%. Given these statistics, helping people who are overweight and obese appears to be a monumental task and should be a given high priority. CBT has been shown to be a very effective approach not only in

aiding weight loss but also in preventing future weight regain. The goal of CBT is to help people identify and modify behavioral and cognitive habits that contribute to their problem. Participants in the intervention group learned to identify maladaptive behaviors and change their responses to them which allowed them to think differently about their eating behavior. Throughout the program, the importance of giving themselves credit for engaging in helpful eating behaviors was emphasized to the participants. Doing so assisted them in staying positive and increased their self-efficacy for changing their eating behavior. CBT is comprised of multiple components and all were essential in making the program effective. These included: goal-setting, self monitoring, nutrition education, stimulus control, problem solving, cognitive restructuring, and social support. A key part of the program was systematically learning how to solve problems. Having the participants think through how they would deal differently with situations in the future increased their self-efficacy and gave them hope. By learning how to respond automatically to sabotaging thoughts, understanding the difference between hunger and cravings, learning how to deal with cravings, and planning healthy meals, participants became successful in their weight loss efforts. The most challenging part of the intervention was helping people set realistic weight loss goals. Many participants wanted to lose a large amount of weight in a short period of time. Helping them to see that the program was about a lifestyle change and not quick weight loss was difficult. Once they realized that approaching weight loss this way in the past contributed to their unsuccessful attempts, participants were able to put more trust in a program that focused on teaching them the skills to lose weight slowly but to be able to maintain the loss.

Results of this study highlight the need for further research in the field of smoking

cessation for weight concerned female smokers. This study excluded smokers with eating disorders and people under 18 years of age. The approach of addressing weight concerns prior to smoking cessation should be tested on these populations as well. While this study was limited to women, Clark et al. (2004) examined characteristics associated with weight concerns in 72 male smokers enrolled in a controlled trial for smoking cessation. Motivation to quit smoking was found to be significantly lower in those with weight concerns. Given the prevalence of weight concerns in both genders, future research should include men as well. As the study population was predominately white (77%), replication of the study across other ethnic groups is recommended. An additional important area of focus for future research is in assessing how strongly body image concerns affect continuation of smoking behavior. Addressing body image concerns in a preliminary treatment approach before participants even begin a CBT weight control program may be efficacious. Along with the measurements utilized in this study, future research would benefit from assessing dietary restraint and depression in weight-concerned smokers to better understand this subgroup. This study showed that CBT for weight control is effective in motivating weight concerned smokers to contemplate smoking cessation. However, to achieve complete cessation, they may need the aid of a smoking cessation program or nicotine replacement therapy to combat the physical nicotine addiction. Further testing is needed to determine how soon after completion of a CBT weight control program would be the optimal time to commence a smoking cessation program.

The results of this study are consistent with research that shows success in changing one's health behavior may boost self-efficacy for improving that behavior as

well as other behaviors. Participants in the intervention group who improved the quality of their diet and lost weight significantly increased their self-efficacy for weight control. This in turn was associated with an increase in self-efficacy for quitting smoking which may have caused the decreases in number of cigarettes smoked and cigarette dependence. Identifying factors that allow individual change in eating and smoking behavior is crucial to developing interventions that can prevent chronic diseases. Results of the present study further advance research on the use of CBT for increasing self-efficacy for weight control and the potential impact it has on self-efficacy for quitting smoking among weight-concerned female smokers. The findings of this study support the notion that CBT focused on weight control may impact not only body weight and diet quality but also motivate weight-concerned female smokers toward achieving smoking cessation.

REFERENCES

- Abrams, D. B., Orleans, C. T., Niaura, R. N., Goldstein, M. G., Velicer, W. F., & Prochaska, J. O. (1994). Smoking treatment issues: Towards a stepped care approach. *Tobacco Control*, 2 (Suppl.), 517-537.
- AbuSabha, R., & Achterberg, G. (1997). Review of self-efficacy and locus of control for nutrition- and health-related behavior. *Journal of the American Dietetic Association*, 1122-1132.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Albanes, D., Jones, Y., Micozzi, M. S., & Mattson, M. E. (1987). Associations between smoking and body weight in the U.S. Population: Analysis of NHANES II. *American Journal of Public Health*, 77, 439-444.
- Allen, S. S., Hatsukami, D., Brintnell, D. M., & Bade, T. (2005). Effect of nicotine replacement therapy on post-cessation weight gain and nutrient intake: A randomized controlled trial of postmenopausal female smokers. *Addictive Behaviors*, 30(7), 1273-1280.
- American Dietetic Association. (1995). Nutrition experts respond to new government report card on American diet. News Release.
- Ammerman, A. S., Haines, P. S., DeVellis, R. F., Strogatz, D. S., Keyseding, T. C., Simpson, R. J., et al. (1991). A brief dietary assessment to guide cholesterol reduction in low-income individuals: Design and validation. *Journal of the American Dietetic Association*, 91, 1385-1390.
- Anderson, E. S., Winett, R. A., & Wojcik, J. R. (2007). Self-regulation, self-efficacy, outcome expectations, and social support: social cognitive theory and nutrition behavior. *Annals of Behavioral Medicine*, 34(3), 304-312.
- Arnsten, J. H., Reid, K., Bierer, M., & Rigotti, N. (2004). Smoking behavior and interest in quitting among homeless smokers. *Addictive Behaviors*, 29, 1155-1161.
- Ash, S., Reeves, M., Bauer, J., Dover, T., Vivanti, A., Leong, C., et al. (2006). A randomized control trial comparing lifestyle groups, individual counseling and written information in the management of weight and health outcomes over 12 months. *International Journal of Obesity*, 30, 1557-1564.
- Baer, J. S., Holt, C. S., & Lichtenstein, E. (1986). Self-efficacy and smoking reexamined: Construct validity and clinical utility. *Journal of Consulting and Clinical Psychology*, 54, 846-852.

- Baer, J. S., & Lichtenstein, E. (1988). Cognitive assessment. In D. M. Donovan & G. A. Marlatt (Eds.). *Assessment of addictive behaviors* (pp. 189-213). New York: Guilford Press.
- Baldwin, A. S., Rothman, A. J., Hertel, A. W., Linde, J. A., Jeffery, R. W., Finch, E. A., et al. (2006). Specifying the determinants of the initiation and maintenance of behavior change: an examination of self-efficacy, satisfaction, and smoking cessation. *Health Psychology, 25*(5), 626-634.
- Ball, K., & Crawford, D. (2006). An investigation of psychological, social and environmental correlates of obesity and weight gain in young women. *International Journal of Obesity, 30*(8), 1240-1249.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1986). *Social foundations of thought & action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2003). Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obesity Research, 11* (Suppl.), 23S-43S.
- Bay-Cheng, L. Y., Zucker, A. N., Stewart, A. J., & Pomerleau, C. S. (2002). Linking femininity, weight concern, and mental health among latina, black, and white women. *Psychology of Women Quarterly, 26*, 36-45.
- Beck, A. T. (1976). *Cognitive Therapy and the Emotional Disorders*. New York: International Universities Press.
- Berman, B. A., & Gritz, E. R. (1991). Women and smoking: current trends and issues for the 1990s. *Journal of Substance Abuse, 3*, 221-238.
- Bishop, C., Parker, G. C., & Coscina, D. V. (2002). Nicotine and its withdrawal alter feeding induced by paraventricular hypothalamic injections of neuropeptide Y in Sprague-Dawley rats. *Psychopharmacology, 162*, 265-272.
- Bjornson, W., Rand, C., Connett, J. E., Lindgren, P., Nides, M., Pope, F., et al. (1995). Gender differences in smoking cessation after 3 years in the Lung Health Study. (For the Lung Health Study Research Group). *American Journal of Public Health, 85*, 223-230.
- Blair, S. N., Jacobs, D. R. Jr., & Powell, K. E. (1985). Relationship between exercise or physical activity and other health behaviors. *Public Health Reports, 100*(2), 172-180.

- Blitzer, P. H., Rimm, A. A., & Giefer, E. E. (1977). The effect of cessation of smoking on body weight in 57032 women: Cross-sectional and longitudinal analyses. *Journal of Chronic Disease*, 30, 415-429.
- Boardman, T., Catley, D., Mayo, M. S., & Ahluwalia, J. S. (2005). Self-efficacy and motivation to quit during participation in a smoking cessation program. *International Journal of Behavioral Medicine*, 12(4), 266-272.
- Bordo, S. (1993). *Unbearable weight: Feminism, Western culture and the body*. Berkeley, CA: University of California Press
- Borland, R. (1990). Slip-ups and relapse in attempts to quit smoking. *Addictive Behaviors*, 15, 235-245.
- Borrelli, B., & Mermelstein, R. (1994). Goal setting and behavior change in a smoking cessation program. *Cognitive Therapy and Research*, 18, 69-83.
- Borrelli, B., Bock, B., King, T., Pinto, B., & Marcus, B. (1996). The impact of depression on smoking cessation in women. *American Journal of Preventive Medicine*, 12, 378-387.
- Borrelli, B., & Mermelstein, R. M. (1998). The role of weight concern and self-efficacy in smoking cessation and weight gain among smokers in a clinic-based cessation program. *Addictive Behaviors*, 23, 609-622.
- Borrelli, B., Spring, B., Niaura, R., Kristeller, J., Ockene, J. K., & Keuthen, N. J. (1999). Weight suppression and weight rebound in ex-smokers treated with fluoxetine. *Journal of Consulting and Clinical Psychology*, 67, 124-131.
- Borrelli, B., Spring, B., Niaura, R., Hitsman, B., & Papandonatos, G. (2001). Influences of gender and weight gain on short-term relapse to smoking in a cessation trial. *Journal of Consulting and Clinical Psychology*, 69, 511-515.
- Boudreaux, E. D., Francis, J. L., Carmack Taylor, C. L., Scarinci, I. C., & Brantley, P. J. (2003). Changing multiple health behaviors: smoking and exercise. *Preventive Medicine*, 36(4), 471-478.
- Bowen, D.J., McTiernan, M.D., Powers, D., Feng, Z. (2000). Recruiting Women into a Smoking Cessation Program: Who Might Quit? *Women & Health*, 31(4), 41-58.
- Bowman, S.A., Lino, M., Gerrior, S.A., & Basiotis, P.P. (1998). *The Healthy Eating Index: 1994-96* (CNPP-5). U.S. Department of Agriculture, Center for Nutrition Policy and Promotion.
- Boyd, C. J. (1996-7). Smoke and the "F" word: Women and health. *Michigan Feminist Studies*, 11, 25-37.

- Boyd, C. J., Boyd, T. C., & Cash, J. L. (1999-2000). Why is Virginia slim? Women and cigarette advertising. *The International Quarterly of Community Health Education*, 19, 19-31.
- Boyd, T. C., Boyd, C. J., & Greenlee, T. B. (2003). A means to an end: Slim Hopes and Cigarette Advertising. *Health Promotion Practice*, 4, 266-277.
- Brouwer, R. J., & Pomerleau, C. S. (2002). "Prequit attrition" among weight-concerned women smokers. *Eating Behaviors*, 2, 145-151.
- Brownell, K. D., & Cohen, L. R. (1995). Adherence to dietary regimens 2: Components of effective interventions. *Behavioral Medicine*, 20, 155-164.
- Bruckner, E., Spring, B., & Pingitore, R. (1994). Weight consciousness and food intake during smoking cessation. *Annals of Behavioral Medicine*, 16 (Suppl.), S118.
- Burke, V., Giangulio, N., Gillam, H. F., Beilin, L. J., & Houghton, S. (2004). Changes in cognitive measures in a randomized controlled trial of a health promotion program for couples targeting diet and physical activity. *American Journal of Health Promotion*, 18(4), 300-311.
- Byrne, S. (2002). Psychological aspects of weight maintenance and relapse in obesity. *Journal of Psychosomatic Research*, 53, 1029-1036.
- Camp, D. E., Klesges, R. C. & Relyea, G. (1993). The relationship between body weight concerns and adolescent smoking. *Health Psychology*, 12, 24-32.
- Cargill, B. R., Clark, M. M., Pera, V., Niaura, R. S., & Abrams, D. B. (1999). Binge eating, body image, depression, and self-efficacy in an obese clinical population. *Obesity Research*, 7(4), 379-386.
- Predictive value of aspects of the Transtheoretical Model on smoking cessation in a community based, large group cognitive behavioral program. *Addictive Behaviors*, 28, 725-740.
- Cash, T. F., & Henry, P. E. (1995). Women's body images: the results of a national survey in the U.S.A. *Sex Roles: A Journal of Research*, 33, 19-28.
- Cavallo D. A., Duhig, A. M., McKee, S., & Krishnan-Sarin, S. (2006). Gender and weight concerns in adolescent smokers. *Addictive Behaviors*, 31(11), 2140-2146.
- Centers for Disease Control. (1994c). Health objectives for the nation: Cigarette smoking among adults--U.S., 1993. *Morbidity and Mortality Weekly Report*, 43, 925-930.
- Centers for Disease Control. (2005). Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Productivity Losses — United States, 1997-2001. *Morbidity and Mortality Weekly Report*, 54(25), 625-628.

- Centers for Disease Control. (2005). Cigarette smoking among adults—United States, 2004. *Morbidity and Mortality Weekly Report*, 54(44), 121-1124.
- Cepeda-Benito, A., Reynoso, J. T., & Erath, S. (2004). Meta-analysis of the efficacy of nicotine replacement therapy for smoking cessation: Differences between men and women. *Journal of Consulting and Clinical Psychology*, 72, 712-722.
- Chernin, K. (1981). *The obsession: Reflections on the tyranny of slenderness*. New York: Harper.
- Chollat-Traquet, C. (1992). *Women and Tobacco*. World Health Organization, Geneva.
- Clark, D. O., & Nothwehr, F. (1999). Exercise self-efficacy and its correlates among socioeconomically disadvantaged older adults. *Health Education and Behavior*, 26 (4), 535-546.
- Clark, M. M., Abrams, D. B., Niaura, R. S., Eaton, C. A., & Rossi, J. S. (1991). Self-efficacy in weight management. *Journal of Consulting and Clinical Psychology*, 59, 739-744.
- Clark, M. M., Cargill, B. R., Medeiros, M. L., & Pera, V. (1996). Changes in self-efficacy following obesity treatment. *Obesity Research*, 4(2), 179-181.
- Clark, M. M., Decker, P.A., Offord, K. P., Patten, C. A., Vickers, K.S., Croghan, I.T., et al. (2004). Weight concerns among male smokers. *Addictive Behaviors*, 29 (8), 1637-1641.
- Clark, M. M., Hays, J.T., Vickers, K.S., Patten, C. A., Croghan, I.T., Berg, E., et al. (2005). Body image treatment for weight concerned smokers: A pilot study. *Addictive Behaviors*, 30(6), 1236-1240.
- Clark, M. M., Hurt, R., Croghan, I. T., Patten, C. A., Novotny, P., Sloan, J. A., et al. (2006). The prevalence of weight concerns in a smoking abstinence clinical trial. *Addictive Behaviors*, 31(7), 1144-1152.
- Clark, N. M., & Dodge, J. A. (1999). Exploring of self-efficacy as a predictor of disease management. *Health Education and Behavior*, 26(1), 72-89.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ.
- Colletti, G., Supnick, J. A., & Payne, T. J. (1985). The Smoking Self-Efficacy Questionnaire (SSEQ): Preliminary scale development and validation. *Behavioral Assessment*, 7, 249-260.

- Colvin, R. H., & Olson, S.B. (1983). A descriptive analysis of men and women who have lost significant weight and are highly successful at maintaining the loss. *Addictive Behaviors*, 8(3), 287-295.
- COMMIT Research Group. (1995). Community Intervention Trial for Smoking Cessation (COMMIT): 1. Cohort results from a four-year community intervention. *American Journal of Public Health*, 85, 183-192.
- Condiotte, M. M., & Lichtenstein, E. (1981). Self-efficacy and relapse in smoking cessation programs. *Journal of Consulting and Clinical Psychology*, 49, 648-658.
- Cooper, Z., Fairburn, C. G., & Hawker, D. M. (2003). *Cognitive-Behavioral Treatment of Obesity A Clinician's Guide*. New York : The Guilford press.
- Copeland, A. L., & Carney, C. E. (2003). Smoking expectancies as mediators between dietary restraint and disinhibition and smoking in college women. *Experimental and Clinical Psychopharmacology*, 11 (3), 247-251.
- Copeland, A. L., Martin, P. D., Geiselman, P. J., Rash, C. J., & Kendzor, D. E. (2006). Smoking cessation for weight-concerned women: group vs. individually tailored, dietary, and weight-control follow-up sessions. *Addictive Behaviors*, 31, 115-271.
- Copeland, A. L., Martin, P. D., Geiselman, P. J., Rash, C. J., & Kendzor, D. E. (2006). Predictors of pretreatment attrition from smoking cessation among pre- and postmenopausal, weight-concerned women. *Eating Behaviors*, 7, 243-251.
- Copeland, A. L., Martin, P. D., Geiselman, P. J., Rash, C. J., & Kendzor, D. E. (2006b). Smoking cessation for weight-concerned women: Group vs. individually tailored, dietary, and weight-control follow-up sessions, *Addictive Behaviors*, 31 (1), 115-127.
- Cortese, A. J. (1999). *Provocateur: Images of women and minorities in advertising*. Lanham, MD: Rowman & Littlefield Publishers, Inc.
- Crittenden, K. S., Manfredi, R. B., Warnecke, R., Cho, Y. I., & Parsons, J. A. (1998). Measuring readiness and motivation to quit smoking among women in public health clinics: predictive validity. *Addictive Behaviors*, 23, 191-199.
- Cullen, K. W., Baranowski, T., & Smith, S. P. (2001). Using goal setting as a strategy for dietary behavior change. *Journal of the American Dietetic Association*, 101, 562-566.
- Curry, S., Marlatt, G. A., & Gordon, J. R. (1987). Abstinence violation effect: validation of an attributional construct with smoking cessation. *Journal of Consulting and Clinical Psychology*, 55, 145-149.

- Curry, S. J., McBride, C., Grothaus, L., Lando, H., & Pirie, P. (2001). Motivation for smoking cessation among pregnant women. *Psychology of Addictive Behaviors*, 15, 126-132.
- Cusatis, D. C., & Shannon, B. M. (1996). Influences on adolescent eating behavior. *Journal of Adolescent Health*, 18, 27-34.
- Dallosso, H. M., & James, W. P. (1984). The role of smoking in the regulation of energy balance. *International Journal of Obesity*, 8, 365-375.
- Danielsson, T., Rossner, S., & Westin, A. (1999). Open randomised trial of very low energy diet together with nicotine gum for stopping smoking in women who gained weight in previous attempts to quit. *British Medical Journal*, 319, 490-494.
- Dennis, K. E., & Goldberg, A. P. (1996). Weight control self-efficacy types and transitions affect weight-loss outcomes in obese women. *Addictive Behaviors*, 21(1), 103-116.
- De Vries, H., Mudde, A. N., Dijkstra, S., & Willemsen, M. C. (1998). Differential beliefs, perceived social influences, and self-efficacy expectations among smokers in various motivational phases. *Preventive Medicine*, 27, 681-689.
- DeWolfe, J. A., & Shannon, B. M. (1993). Factors affecting fat consumption of university students: Testing a model to predict eating behaviour change. *Journal of the Canadian Dietetic Association (Canada)*, 54(3), 132-137.
- DiClemente, C. C., Prochaska, J. O., & Brandenburg, N. (1985). A decisional balance measure for predicting smoking cessation. *Journal of Personality and Social Psychology*, 48, 1279-1289.
- DiClemente, C. C., Prochaska, J. O., & Gibertini, M. (1985). Self-efficacy and Stages of Self-change of Smoking. *Cognitive Therapy and Research*, 9, 181-200.
- DiClemente, C. C., Prochaska, J. O., et al. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*, 59, 295-304.
- Dryden, S., Wang, Q., Frankish, H. M., & Williams, G. (1996). Differential effects of the 5-HT 1B/2C receptor agonist mCPP and the 5-HT1A agonist flesinoxan on hypothalamic neuropeptide Y in the rat: evidence that NPY may mediate serotonin's effects on food intake. *Peptides*, 17, 943-949.
- Dwyer, J., Cosentino, C., Li, D., Feldman, H., Garceau, A., Stevens, M., et al. (2002). Evaluating school-based interventions using the healthy eating index. *Journal of the American Dietetic Association*, 102, 257-259.

- Eisenberg, D., & Quinn, B.C. (2006). Estimating the Effect of Smoking Cessation on Weight Gain: An Instrumental Variable Approach. *Health Services Research*, 41 (6), 2255-2266.
- Emmons, K. M., Marcus, B. H., Linnan, L., Rossi, J. S., & Abrams, D. B. (1994). Mechanisms in multiple risk factor interventions: smoking, physical activity, and dietary fat intake among manufacturing workers. *Preventive Medicine*, 23, 481-489.
- Epstein, L. H., & Cluss, P. A. (1982). A behavioral medicine perspective on adherence to long-term medical regimens. *Journal of Consulting and Clinical Psychology*, 50, 950-971.
- Ernster, V. L. (1985). Mixed messages for women: A social history of cigarette smoking and advertising. *New York State Journal of Medicine*, 1985, 335-341.
- Escobedo, L. G., & Peddicord, J. P. (1996). Smoking prevalence in US birth cohorts: the influence of gender and education. *American Journal of Public Health*, 86, 231-236.
- Estabrooks, P. A. & Carron, A. V. (1998). The conceptualization and effect of control beliefs on exercise in the elderly. *Journal of Aging and Health*, 10, 441-457.
- Etter, J. F., Bergman, M. M., & Perneger, T.V. (2000). Development and validation of a scale measuring self-efficacy of current and former smokers. *Addiction*, 95, 901-913.
- Etter, J. F., Prokhorov, A.V., & Perneger, T. V. (2002). Gender differences in the psychological determinants of cigarette smoking. *Addiction*, 97, 733-743.
- Etter, J. F., Le Houezec, J., & Perneger, T. V. (2003). A self-administered questionnaire to measure dependence on cigarettes: the cigarette dependence scale. *Neuropsychopharmacology : Official Publication of the American College of Neuropsychopharmacology*. 28(2), 359-370.
- National Heart, Lung, and Blood Institute. *Obesity Education Initiative-Expert Panel on Identification and Treatment of Overweight and Obesity in Adults*. (1998). National Institutes of Health (NIH), Bethesda, MD, 98-4083, 42-43.
- Fallon, A. Culture in the mirror: Sociocultural determinants of body image. In T.F. Cash and T. Pruzinsky (Eds.) (1990). *Body images: Development, deviance, and change* (pp. 80-109). New York: The Guilford Press.
- Feldman, W., Hodgson, C., & Corber, S. (1985). Relationship between higher prevalence of smoking and weight concern amongst adolescent girls. *Canadian Journal of Public Health*, 76, 205-206.

- Ferrara, C. M., Kumar, M., Nicklas, B., McCrone, S., & Goldberg, A. P. (2001). Weight gain and adipose tissue metabolism after smoking cessation in women. *International Journal of Obesity and Related Metabolic Disorders*, 25 (9), 1322-1326.
- Ferrara, C. M., McCrone, S. H., Brendle, D., Ryan, A. S., & Goldberg, A. P. (2004). Metabolic effects of the addition of resistive to aerobic exercise in older men. *International Journal of Sport Nutrition and Exercise Metabolism*, 14 (1), 73-80.
- Field, A. E., Cheung, L., Wolf, A. M., Herzog, D. B., Gortmaker, S. L., & Colditz, G. A. (1999). Exposure to the mass media and weight concerns among girls. *Pediatrics*, 103, E361-E365.
- Filozof, C., Fernández Pinilla, M. C., & Fernández-Cruz, A. (2004). Smoking cessation and weight gain. *Obesity Reviews : an Official Journal of the International Association for the Study of Obesity*, 5(2), 95-103.
- Fiore, M. C., Novotny, T. E., Pierce, J. P., Hatziandreu, E. J., Patel, K. M. & Davis, R. M. (1989). Trends in cigarette smoking in the United States: the changing influence of gender and race. *Journal of the American Medical Association*, 261, 49-55.
- Fontaine, K. R., & Cheskin, L. J. (1997). Self-efficacy, attendance, and weight loss in obesity treatment. *Addictive Behaviors*, 22(4), 567-570.
- Foreyt, J. P., & Goodrick, G. K. (1993). Evidence for success of behavior modification in weight loss and control. *Annals of Internal Medicine*, 119 (7-2), 698-701.
- Foster, G. D., Wadden, T. A., Vogt, R. A., & Brewer, G. (1997). What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *Journal of Consulting and Clinical Psychology*, 65, 79-85.
- French, S. A., Perry, C. L., Leon, G. R., & Fulkerson, J. A. (1994). Weight concerns, dieting behavior, and smoking initiation among adolescents: A prospective study. *American Journal of Public Health*, 84, 1818-1820.
- French, S. A., & Jeffery, R. W. (1994). Consequences of dieting to lose weight: effects on physical and mental health. *Health Psychology*, 13, 195-212.
- French, S. A., Jeffery, R. W., Klesges, L. M., & Forster, J. L. (1995). Weight concerns and change in smoking behavior over two years in a working population. *American Journal of Public Health*, 85, 720-722.
- French, S. A., & Jeffery, R. W. (1995). Weight concerns and smoking: A literature review. *Annals of Behavioral Medicine*, 17, 234-244.
- French, S. A., & Perry, C. (1996). Smoking among adolescent girls: Prevalence and etiology. *Journal of the American Medical Women's Association*, 51, 25-29.

- Froom, P., Melamed, S., & Benbassat, J. (1998). Smoking cessation and weight gain. *The Journal of Family Practice*, 46, 460-464.
- Garner, D., Olmstead, M., Bohr, M., & Garfinkle, P. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878.
- Garner, D. M., & Bemis, K. M. (1982). A cognitive-behavioral approach to anorexia-nervosa. *Cognitive Therapy and Research* 6 (2), 123-150.
- Garner, D. M. (1997). The 1997 Body image survey results. *Psychology Today*, 30-84.
- Garvey, A. J., Bliss, R. E., Hitchcock, J. L., Heinold, J. W., & Rosner, B. (1992). Predictors of smoking relapse among self-quitters: A report from the Normative Aging Study. *Addictive Behaviors*, 17, 367-377.
- Gaston, N. W., Mardis, A., Gerrior, S. A., Sahyoun, N., & Anand, R. S. (2001). A focus on nutrition for the elderly: It's time to take a closer look. *Family Economics and Nutrition Review*, 13, 95-97.
- Gerend, M. A., Boyle, R. G., Peterson, C. B., & Hatsukami, D. K. (1998). Eating behavior and weight control among women using smokeless tobacco, cigarettes, and normal controls. *Addictive Behaviors*, 23, 171-178.
- Gilbert, D. G., & Pope, M. A. (1982). Early effects of quitting smoking. *Psychopharmacology*, 78, 121-127.
- Gilchrest, L. D., Schinke, S. P. and Nurius, P. (1989). Reducing onset of habitual smoking among women. *Preventive Medicine*, 18, 235-248.
- Glanz, K., Lewis, F. M., & Rimer, B. K. (1997). *Health behavior and health education, theory research and practice*. San Francisco: Jossey-Bass.
- Glasgow, R., Strycker, L., Eakin, E., Boles, S., & Whitlock, E. (1999). Concern about weight gain associated with quitting smoking: Prevalence and association with outcome in a sample of young female smokers. *Journal of Consulting and Clinical Psychology*, 67(6), 1009-1011.
- Glasgow, R. E., Nelson, C. C., Kearney, K. A., Reid, R., Ritzwoller, D. P., Strecher, V. J., et al. (2007). Reach, engagement, and retention in an Internet-based weight loss program in a multi-site randomized controlled trial. *Journal of Medical Internet Research*, 9(2), e11.
- Gormally, J., Rardin, D., & Black, S. (1980). Correlates of successful response to a behavioral weight control clinic. *Journal of Counseling Psychology*, 27(2), 179-191.

- Gritz, E. R., & Crane, L. A. (1991). Use of diet pills and amphetamines to lose weight among smoking and nonsmoking high school seniors. *Health Psychology, 10*, 330-335.
- Grunberg, N. E. (1982). The effects of nicotine and cigarette smoking on food consumption and taste preferences. *Addictive Behaviors, 7*, 317-331.
- Grunberg, N. E., & Straub, R. O. (1992). The role of gender and taste class in the effects of stress on eating. *Health Psychology, 11*, 97-100.
- Gulliver, S. B., Hughes, J. R., Solomon, L. J., & Dey, A. N. (1995). An investigation of self-efficacy, partner support, and daily stresses as predictors of relapse to smoking in self-quitters. *Addiction, 90*, 767-772.
- Gwaltney, C. J., Shiffman, S., Norman, G. J., Paty, J. A., Kassel, J. D., Gnys, M., et al. (2001). Does smoking abstinence self-efficacy vary across situations? Identifying context-specificity within the relapse situation efficacy questionnaire. *Journal of Consulting and Clinical Psychology, 69*, 516-527.
- Haaga, D. A. F., Davison, G. C., McDermut, W., Hillis, S. L., & Twomey, H. B. (1993). "States-of-mind" analyses of the articulated thoughts of ex-smokers. *Cognitive Therapy and Research, 17*, 427-439.
- Hagler, A. S., Norman, G. J., Zabinski, M. F., Sallis, J. F., Calfus, K. J., & Patrick, K. (2007). Psychosocial correlates of dietary intake among overweight and obese men. *American Journal of Health Behavior, 31*(1), 3-12.
- Hall, S. M., McGee, R., Tunstall, C., Duffy, J., & Benowitz, N. (1989). Changes in food intake and activity after quitting smoking. *Journal of Consulting and Clinical Psychology, 57*, 81-86.
- Hall, S. M., Tunstall, C. D., Vila, K. L., & Duffy, J. (1992). Weight gain prevention and smoking cessation: cautionary findings. *American Journal of Public Health, 82*, 799-803.
- Harris, S. M. (1994). Racial differences in predictors of college women's body image attitudes. *Women and Health, 21*, 89-104.
- Harris, J. E., & Murray, L. (1997). The relationship between social cognitive model variables and fruit and vegetable consumption among college students. *American Journal of Health Studies, 13*, 133-140.
- Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social and Clinical Psychology, 14*, 325-338.

- Henry, H., Reimer, K., Smith, C., & Reicks, M. (2006). Associations of decisional balance, processes of change, and self-efficacy with stages of change for increased fruit and vegetable intake among low-income, African-American mothers. *Journal of the American Dietetic Association*, 106, 841-849.
- Hodge, A. M., Westerman, R. A., de Courten, M. P., Collier, G. R., Zimmet, P. Z., & Alberti, K. G. (1997). Is leptin sensitivity the link between smoking cessation and weight gain? *International Journal of Obesity*, 1, 50-53.
- Hurt, R. D., Sachs, D. P., Glover, E. D., Offord, K. P., Johnston, J. A., Khayrallah, M. A., et al. (1997). A comparison of sustained-release bupropion and placebo for smoking cessation. *New England Journal of Medicine*, 337, 1195-1202.
- Irwin, C., & Guyton, R. (1997). Eating self-efficacy among college students in a behavioral-based weight control program. *American Journal of Health Studies*, 13, 141-151.
- Jackson, L. A. Physical attractiveness: A sociocultural perspective. (2002). In: Cash, T. F., & Pruzinsky, T. (Eds). *Body image: A handbook of theory, research, and clinical practice*, New York, NY: The Guilford Press, pp. 13-21.
- Jeffery, R. W., Bjornson-Benson, W. M., Rosenthal, B. S., Lindquist, R. A., Kurth, C. L., & Johnson, S. L. (1984). Correlates of weight loss and its maintenance over two years of follow-up among middle-aged men. *Preventive Medicine*, 13(2), 155-168.
- Jeffrey, R. W., Wing, R. R. & Mayer, R. R. (1998). Are smaller weight losses or more achievable weight loss goals better in the long term for obese patients? *Journal of Consulting and Clinical Psychology*, 66, 641-645.
- Jeffery, R. W., Drewnowski, A., Epstein, L. H., Stunkard, A. J., Wilson, G. T., Wing, R. R., & Hill, D. R. (2000). Long-term maintenance of weight loss: Current status. *Health Psychology*, 19(Suppl. 1), 5-16.
- Jeffery, R. W., Hennrikus, D. J., Lando, H. A., Murray, D.M., & Liu, J.W. (2000). Reconciling conflicting findings regarding postcessation weight concerns and success in smoking cessation. *Health Psychology*, 19, 242-246.
- Jeffery, R. W. (2004). How can health behavior theory be made more useful for intervention research? *International Journal of Behavioral Nutrition and Physical Activity*, 1, 10-14.
- Jensen, E. X., Fusch, C., Jaeger, P., Peheim, E., & Horber, F. F. (1995). Impact of chronic cigarette smoking on fuel metabolism. *Journal of Clinical Endocrinology and Metabolism*, 80, 2181-2185.

- Jorenby, D. E., Hatsukami, D. K., Smith, S. S., Fiore, M. C., Allen, S., Jensen, J., et al. (1996). Characterization of tobacco withdrawal symptoms: Transdermal nicotine reduces hunger and weight gain. *Psychopharmacology*, 128, 130-138.
- Jorenby, D. E., Leischow, S. J., Nides, M. A., Rennard, S. I., Johnston, J. A., Hughes, A. R., et al. (1999). A controlled clinical trial of sustained-release bupropion, a nicotine patch, or both for smoking cessation. *New England Journal of Medicine*, 340, 685-691.
- Kanarek, R. B., & Marks-Kaufman, R. (1988). Dietary modulation of oral amphetamine intake in rats. *Physiology & Behavior*, 44, 501-505.
- Kane, J. K., Parker, S. L., Matta, S. G., FuY, Sharp, B. M., & Li, M. D. (2000). Nicotine up-regulates expression of orexin and its receptors in rat brain. *Endocrinology*, 141, 3623-3629.
- Kane, J. K., Parker, S. L., & Li, M. D. (2001). Hypothalamic orexin-A binding sites are downregulated by chronic treatment in the rat. *Neuroscience Letters*, 298, 1-4.
- Kawachi, I., Troisi, R. J., Rotnitzky, A. G., Coakley, E. H., & Colditz, G. A. (1996). Can physical activity minimise weight gain in women after smoking cessation? *American Journal of Public Health*, 86, 999-1004.
- Kellner, D. (1988). Reading images critically: Toward a postmodern pedagogy. *Journal of Education*, 10, 31-52.
- Kennedy, E. T., Ohls, J., Carlson, S., & Fleming, K. (1995). The Healthy Eating Index: Design and applications. *Journal of the American Dietetic Association*, 95, 1103-1108.
- Kennedy, E. T., Bowman, S. A., Spence, J. T., Freedman, M., & King, J. (2001). Popular diets: Correlation to health, nutrition, and obesity. *Journal of the American Dietetic Association*, 101, 411-420.
- Killen, J. D., Fortmann, S. P., Kraemer, H. C., Varady, A., & Newman, B. (1992). Who will relapse? Symptoms of nicotine dependence predict long-term relapse after smoking cessation. *Journal of Consulting and Clinical Psychology*, 60, 797-801.
- Killen, J. D., Fortmann, S. P., Kraemer, H. C., Varady, A. N., Davis, L., & Newman, B. (1996). Interactive effects of depression symptoms, nicotine dependence, and weight change on late smoking relapse. *Journal of Consulting and Clinical Psychology*, 64, 1060-1067.
- King, T. K., Clark, M. M., & Pera, V. (1996). History of sexual abuse and obesity treatment outcome. *Addictive Behaviors*, 21, 283-290.

- King, A. C., Rejeski, W. J., & Buchner, D. M. (1998). Physical activity interventions targeting older adults. A critical review and recommendations. *American Journal of Preventive Medicine*, 15(4), 316-333.
- King, T. K., Matacin, M., White, K. S., & Marcus, B. H. (2005). A prospective examination of body image and smoking cessation in women, *Body Image: An International Journal of Research* 2, 19-28.
- Kinnunen, T., Doherty, K., Militello, F. S., & Garvey, A. J. (1996). Depression and smoking cessation: Characteristics of depressed smokers and effects of nicotine replacement. *Journal of Consulting and Clinical Psychology*, 64, 791-798.
- Kitsantas, A. (2000). The role of self-regulation strategies and self-efficacy perceptions in successful weight loss maintenance. *Psychology and Health*, 15, 811-820.
- Klesges, R. C., & Klesges, L. M. (1988). Cigarette smoking as a dieting strategy in a university population. *International Journal of Eating Disorders*, 7, 413-419.
- Klesges, R. C., Brown, K., Pascale, R. W., Murphy, M., Williams, E., & Cigrang, J. (1988). Factors associated with participation, attrition, and outcome in a smoking cessation program at the workplace. *Health Psychology*, 7, 575-589.
- Klesges, R. C., Meyers, A. W., Klesges, L. M., & LaVasque, M. E. (1989). Smoking, body weight, and their effects on smoking behavior: a comprehensive review of the literature. *Journal of Behavioral Medicine*, 106, 204-230.
- Klesges, R. C., Klem, M. L., & Bene, C. R. (1989). Effects of dietary restraint, obesity, and gender on holiday eating behavior and weight gain. *Journal of Abnormal Psychology*, 98, 499-503.
- Klesges, R. C., & Schumaker, S. A. (1992). Understanding the relations between smoking and body weight and their importance to smoking cessation and relapse. *Health Psychology*, 11, 1-3.
- Klesges, R. C., & DeBon, M. (1994). *How women can finally quit smoking*. Alameda, CA: Hunter House.
- Kluger, R. (1996). Ashes to ashes: America's hundred-year cigarette war, the public health, and the unabashed triumph of Philip Morris. New York: Alfred A. Knopf.
- Kure, E. H., Ryberg, D., Hewer, A., Phillips, D. H., Skaug, V., Baera, R., & Haugen, A. (1996). Mutations in lung tumors: Relationship to gender and lung DNA adduct levels. *Carcinogenesis*, 17, 2201-2205.
- Leibowitz, S. F. (1986). Brain monoamines and peptides: role in the control of eating behavior. *Federation Proceedings*, 45, 1396-1403.

- Levine, M. D., Perkins, K. A., & Marcus, M. D. (2001). The characteristics of women smokers concerned about post cessation weight gain. *Addictive Behaviors*, 26, 749-756.
- Levine, M. D., Marcus, M. D., & Perkins, K. A. (2003). Women, weight, and smoking: A cognitive-behavioral approach to women's concerns about weight gain following smoking cessation. *Cognitive and Behavioral Practice*, 10, 105-111.
- Li, M. D., Kane, J. K., Parker, S. L., Mcallen, K., Matta, S. G., & Sharp, B. M. (2000). Nicotine administration enhances NPY expression in the rat hypothalamus. *Brain Research*, 67, 157-164.
- Li Wan Po, A. (1993). Transdermal nicotine in smoking cessation: A meta-analysis. *European Journal of Clinical Pharmacology*, 45, 519-528.
- Linde, J. A., Rothman, A. J., Baldwin, A. S., & Jeffery, R. W. (2006). The impact of self-efficacy on behavior change and weight change among overweight participants in a weight loss trial. *Health and Psychology*, 25(3), 282-291.
- Mantzoros, C. S., Varvarigou, A., Kaklamani, V. G., Beratis, N. G., & Flier, J. S. (1997). Effect of birth weight and maternal smoking on cord blood leptin concentrations of full-term and preterm newborns. *Journal of Clinical Endocrinology and Metabolism*, 82, 2856-2861.
- Marcus, B. H., Albrecht, A. E., King, T. K., Parisi, A. F., Pinto, B. M., Roberts, et al. (1999). The efficacy of exercise as an aid for smoking cessation in women. *Archives of Internal Medicine*, 159, 1229-1234.
- Marcus, B. H., Forsyth, L. H., Stone, E. J., Dubbert, P. M., McKenzie, T. L., Dunn, A. L., et al. (2000). Physical activity behavior change: Issues in adoption and maintenance. *Health Psychology*, 19(Suppl. 1), 32-41.
- Marcus, B. H., Lewis, B. A., King, T. K., Albrecht, A. E., Hogan, J., Bock, B., et al. (2003). Rationale, design, and baseline data for Commit to Quit II: An evaluation of the efficacy of moderate-intensity physical activity as an aid to smoking cessation in women. *Preventive Medicine*, 36, 479-492.
- Marcus, B. H., Lewis, B. A., Hogan, J., King, T. K., Albrecht, A. E., Bock, B., et al. (2005). The efficacy of moderate-intensity exercise as an aid for smoking cessation in women: A randomized controlled trial. *Nicotine & Tobacco Research*, 7(6), 871-880.
- Martin, P. D., Dutton, G. R., & Brantley, P. J. (2004). Self-efficacy as a predictor of weight change in African-American women. *Obesity Research*, 12(4), 646-651.

- Martinelli, A. M. (1999). An explanatory model of variables influencing health promotion behaviors in smoking and nonsmoking college students. *Public Health Nursing*, 16, 263-269.
- McAuley, E. (1992). Self-efficacy and the maintenance of exercise participation in older adults. *Journal of Behavioral Medicine*, 16(1), 103-113.
- McBride, C. M., French, S. A., Pirie, P. L. & Jeffery, R. W. (1996). Changes over time in weight concerns among women smokers engaged in the cessation process. *Annals of Behavioral Medicine*, 18, 273-279.
- McIntosh, S., Ossip-Klein, D. H., Spada, J., & Burton K. (2000). Recruitment strategies and success in a multi-county smoking cessation study. *Nicotine & Tobacco Research*, 2, 281-284.
- McKee, A. S., Nhean, S., Hinson, R., Mase, T. (2006). Smoking for weight control: Effect of priming for body image in female restrained eaters. *Addictive Behaviors*, 31, 2319-2323.
- Meyers, A. W., Klesges, R. C., Winders, S. E., Ward, K. D., Peterson, B. A., & Eck, L. H. (1997). Are weight concerns predictive of smoking cessation? A prospective analysis. *Journal of Consulting and Clinical Psychology*, 65, 448-452.
- Miller, W.R., & Rollnick, S. *Motivational interviewing: Preparing people to change addictive behavior*. New York: Guilford Press, 1991.
- Miller, P. M., Watkins, J. A., Sargent, R. G., & Rickert, E. J. (1999). Self-efficacy in overweight individuals with binge eating disorder. *Obesity Research*, 7(6), 552-555.
- Mintz, L. B., & O'Halloran, S. M., (2000). The eating attitudes test: Validation with DSM-IV eating disorder criteria. *Journal of Personality Assessment*, 74 (3), 489-503.
- Miyata, G., Meguid, M. M., Varma, M., Fetissov, S. O., & Kin, H. (2001). Nicotine alters the usual reciprocity between meal size and meal number in female rat. *Physiology and Behavior*, 74, 169-176.
- Mizes, J. S., Sloan, D. M., Segraves, K., Spring, B., Pingitore, R., & Kristeller, J. (1998). The influence of weight related variables on smoking cessation. *Behavior Therapy*, 29, 371-385.
- Moffart, R., & Owens, S. (1991). Cessation from cigarette smoking: changes in body weight, body composition, resting metabolism, and energy consumption. *Metabolism*, 40, 465-470.

- Morera, O. F., Crittenden, K. S., Flay, B. R., Freels, S. A., Johnson, T. P., Parsons, J. R., et al. (1998). The measure of stage of readiness to change: some psychometric considerations. *Psychological Assessment*, 10, 182-186.
- Muraven, M., Baumeister, R. F., & Tice, T. M. (1999). Longitudinal improvement of self-regulation through practice: Building self-control strength through repeated exercise. *Journal of Social Psychology*, 139(4), 446-457.
- Murray, R. P., Johnston, J. J., Dolce, J. J., Lee, W. W., & O'Hara, P. (1995). Social support for smoking cessation and abstinence: the Lung Health Study. *Addictive Behaviors*, 20, 159-170.
- Nelson, K. M., McFarland, L., & Relber, G. (2007). Factors influencing disease self-management among veterans with diabetes and poor glycemic control. *Journal of General Internal Medicine*, 22, 442-447.
- Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults.* (1998). National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda, MD.
- National Center for Health Statistics Centers for Disease Control and Prevention. National Health Interview Survey. Available at: <http://www.cdc.gov/nchs/nhis.htm>. Accessed November 6, 2007.
- Niaura, R., Shadel, W. G., Britt, D., & Abrams, D. B. (2002). Responses to social stress, urge to smoke, and smoking cessation. *Addictive Behaviors*, 27, 241-250.
- Niaura, R., & Abrams, D. (2002). Smoking cessation: Progress, priorities, and prospectus. *Journal of Consulting and Clinical Psychology*, 70, 494-509.
- Nides, M., Rand, C., Dolce, J., Murray, R., O'Hara, P., Voelker, H. & Connett, J. (1994). Weight gain as a function of smoking cessation and 2-mg nicotine gum use among middle-aged smokers with mild lung impairment in the first two years of the Lung Health Study. *Health Psychology*, 13, 354-361.
- Nigg, C. R., Allegrante, J. P., & Ory, M. (2002). Theory-comparison and multiple-behavior research: common themes advancing health behavior research. *Health Education Research*, 17(5), 670-679.
- Nordstrom, B. L., Kinnunen, T., Utman, C. H., & Garvey, A. J. (1999). Long-term effects of nicotine gum on weight gain after smoking cessation. *Nicotine & Tobacco Research*, 1, 259-268.
- Norman, S. B., Norman, G. J., Rossi, J. S., & Prochaska, J. O. (2006). Identifying high- and low-success smoking cessation subgroups using signal detection analysis. *Addictive Behaviors*, 31(1), 31-41.

- Novotny, T. E., & Giovino, G. E. (1998). Tobacco Use. In: Brownson, R. C., Remington, P. L., Davis, J. R. (eds). *Chronic Disease Epidemiology and Control*, 2nd ed. Washington, DC: American Public Health Association, 117-148 [cited 2006 Nov 6].
- O'Keefe, A., & Pollay, R. (1996). Deadly targeting of women in promoting cigarettes. *Journal of the American Medical Women's Association*, 51, 67-69.
- Ockene, J. K. (1993). Smoking among women across the lifespan: Prevalence, interventions, and implications for cessation research. *Annals of Behavioral Medicine*, 15, 135-148.
- Ockene, J. K., Emmons, K. M., Mermelstein, R. J., Perkins, K. A., Bonollo, D. S., Voorhees, C. C., et al. (2000). Relapse and maintenance issues for smoking cessation. *Health Psychology*, 19, 17-31. (Suppl.)
- O'Neil, P. M., Smith, C. F., Foster, G. D., & Anderson, D. A. (2000) The perceived relative worth of reaching and maintaining goal weight *International Journal of Obesity and Related Metabolic Disorders*, 24, 1069-1076.
- O'Connell, K. A., Gerkovich, M. M., Cook, M. R., Shiffman, S., Hickcox, M., & Kakolewski, K. E. (1998). Coping in real time: Using ecological momentary assessment techniques to assess coping with the urge to smoke. *Research in Nursing and Health*, 21, 487-497.
- Oeser, A., Goffaux, J., Snead, W., & Carlson, M. G. (1999). Plasma leptin concentrations and lipid profiles during nicotine abstinence. *American Journal of Medical Science*, 318, 152-157.
- Ogden, J. (1994). Effects of smoking cessation, restrained eating, and motivational states on food intake in the laboratory. *Health Psychology*, 13, 114-121.
- Orleans, C. T., Schoenbach, V. J., Wagner, E. H., Quade, D., Salmon, M. A., Pearson, D. C., et al. (1991). Self-help quit smoking interventions: Effects of self-help materials, social support instructions, and telephone counseling. *Journal of Consulting and Clinical Psychology*, 59, 439-448.
- Orleans, C. T., Boyd, N. R., Bingler, R., Sutton, C., Fairclough, D., Heller, D., et al. (1998). A self-help intervention for African American smokers: Tailoring cancer information service counseling for a special population. *Preventive Medicine*, 27, S61-S70.
- Ory, M. G., Jordan, P. J., & Bazzarre, T. (2002). The Behavior Change Consortium: Setting the stage for a new century of health behavior change research. *Health Education Research*, 17, 500-511.

- Pajares, F. (2002). Gender and perceived self-efficacy in self-regulated learning. *Theory into Practice*, 41(2), 116-125.
- Palmeira, A. L., Teixeira, P., Branco, T. L., Martins, S. S., Minderico, C. M., Barata, J. T., et al. (2005). *Prediction of 16-month weight change in women using variables derived from different behavior change theoretical models*: Amsterdam. Oenema, A., Willemieke, K., & Brug, J. (Eds.), p. 146.
- Palmeira A. L., Teixeira, P. J., Branco, T. L., Martins, S. S., Minderico, C. S., Barata, J. T., et al. (2007). Predicting short-term weight loss using four leading health behavior change theories. *International Journal of Behavioral Nutrition and Physical Activity*, 4, 14.
- Perkins, K. A., Epstein, L. H., Marks, B. L., Stiller, R. L., & Jacob, R. G. (1989). The effect of nicotine on energy expenditure during light physical activity. *New England Journal of Medicine*, 320, 898-903.
- Perkins, K. A., Epstein, L. H., Stiller, R. L., Marks, B. L. & Jacob, R. G. (1989). The acute effects of nicotine on resting metabolic rate in cigarette smokers. *American Journal of Clinical Nutrition*, 50, 545-550.
- Perkins, K. A., Epstein, L. H., Stiller, R. L., Fernstrom, M. H., Sexton, J. E., Jacob, R. G., et al. (1991). Acute effects of nicotine on hunger and caloric intake in smokers and nonsmokers. *Psychopharmacology (Berlin)*, 103, 103-109.
- Perkins, K. A. (1993). Weight gain following smoking cessation. *Journal of Consulting and Clinical Psychology*, 61, 768-777.
- Perkins, K. A., Sexton, J. E., DiMarco, A., & Fonte, C. (1994). Acute effects of tobacco smoking on hunger and eating in male and female smokers. *Appetite*, 22, 149-158.
- Perkins, K. A. (1994). Issues In the prevention of weight gain after smoking cessation. *Annals of Behavioral Medicine*, 16, 46-52.
- Perkins, K. A. (1996). Sex differences in nicotine versus non-nicotine reinforcement as determinants of tobacco smoking. *Experimental and Clinical Psychopharmacology*, 4, 166-177.
- Perkins, K.A. (1997). Combined effects of nicotine and alcohol on subjective, behavioral and physiological responses in humans. *Addiction Biology*, 2, 255-268.
- Perkins, K. A., Levine, M. D., Marcus, M. D., & Shiffman, S. (1997). Addressing women's concerns about weight gain due to smoking cessation. *Journal of Substance Abuse Treatment*, 14, 173-182.

- Perkins, K. A., Donny, E., & Caggiula, A. R. (1999). Sex differences in nicotine effects and self-administration: Review of human and animal evidence. *Nicotine and Tobacco Research*, 1, 301-315.
- Perkins, K. A. (2001). Smoking cessation in women. Special considerations. *CNS Drugs*, 15 (5), 391-411.
- Perkins, K. A., Marcus, M. D, Levine, M. D., D'Amico, D., Miller, A., Brogge, M., et al. (2001). Cognitive-behavioural therapy to reduce weight concerns improves smoking cessation outcome in weight-concerned women. *Journal of Consulting and Clinical Psychology*, 69, 604-613.
- Perkins, K. A., & Fonte, C. (2002). Effects of smoking status and smoking cessation on leptin levels. *Nicotine and Tobacco Research*, 4, 459-466.
- Persky, I., Spring, B., Vander Wal, J., Pagoto, S. & Hedeker, D. (2005). Adherence across behavioral domains in treatment promoting smoking cessation plus weight control. *Health Psychology*, 24(2), 153-160.
- Pi-Sunyer, F. X. (1998). NHLBI Obesity Education Initiative Expert Panel on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report. *Obesity Research*, 6, 51S-209S.
- Pierce, J. P., Lee, L., & Gilpin, E. A. (1994). Smoking Initiation by adolescent girls, 1944 through 1988: an association with targeted advertising. *Journal of the American Medical Association*, 271, 608-611.
- Pinto, B. M., Borrelli, B., King, T. K., Bock, B. C., Clark, M. M., Roberts, M., et al. (1999). Weight control smoking among sedentary women. *Addictive Behaviors*, 24, 75-86.
- Pinto, B. M., Clark, M. M., Cruess, D. G., Syzmanski, L., & Pera, V. (1999b). Changes in self-efficacy and decisional balance for exercise among obese women in a weight management program. *Obesity Research*, 7(3), 288-292.
- Pirie, P. L., Murray, D. M., & Luepker, R. B. (1991). Gender differences in cigarette smoking and quitting in a cohort of young adults. *American Journal of Public Health*, 81, 324-327.
- Pirie, P. L., McBride, C. M., Hellerstedt, W., Jeffery, R. W., Hatsukami, D., Allen, S., et al. (1992). Smoking cessation in women concerned about weight. *American Journal of Public Health*, 82, 1238-1243.
- Pirie, P. L., Murray, D. M., & Luepker, R.V. (1991). Smoking and quitting in a cohort of young adults. *American Journal of Public Health*, 81, 324-327.

- Pisinger, C., & Jorgensen, T. (2007). Weight concerns and smoking in a general population: The Inter99 Study. *Preventive Medicine*, 44(4), 283-289.
- Pomerleau, O. F., Pomerleau, C. S., Morrell, E. M., & Lowenbergh, J. M. (1991). Effects of fluoxetine on weight gain and food intake in smokers who reduce nicotine intake. *Psychoneuroendocrinology*, 16, 433-440.
- Pomerleau, C. S., Berman, B. A., Gritz, E. R., Marks, J. L., & Goeters, S. (1994). Why women smoke. In R. R. Watson (Ed.), *Drug and alcohol abuse reviews, Addictive behaviors in women* (pp. 39-70). Totowa, NJ: Humana Press, Inc.
- Pomerleau, C. S., Pomerleau, O. F., Namenek, R. J., & Mehringer, A. M. (2000). Short-term weight gain in abstaining women smokers. *Journal of Substance Abuse Treatment*, 18, 339-342.
- Pomerleau, C. S., Zucker, A. N., & Stewart, A. J. (2001). Characterizing concerns about post-cessation weight gain: Results from a national survey of women smokers. *Nicotine & Tobacco Research*, 3(1), 51-60.
- Pomerleau, C. S., Zucker, A. N., Brouwer, R. J., Pomerleau, O. F., & Stewart, A. J. (2001). Race differences in weight concerns among women smokers: Results from two independent samples. *Addictive Behaviors*, 26, 651-663.
- Pomerleau, C. S., & Saules, K. (2007). Body image, body satisfaction, and eating patterns in normal-weight and overweight/obese women current smokers and never-smokers. *Addictive Behaviors*, 32(10), 2329-2334.
- Prapavessis, H., Cameron, L., Baldi, J. C, Robinson, S., Borrie, K., Harper, T., et al. (2007). The effects of exercise and nicotine replacement therapy on smoking rates in women. *Addictive Behaviors*, 32, 1416-1432.
- Prescott, E., Hippe, M., Schnohr, P., Hein, H. O., & Vestbo, J. (1998). Smoking and risk of myocardial infarction in women and men: Longitudinal population study. *British Medical Journal*, 316, 1043-1047.
- Prochaska, J. O, & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390-395.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, 47, 1102-1114.
- Prochaska, J. O. (1996). A stage paradigm for integrating clinical and public health approaches to smoking cessation. *Addictive Behaviors*, 21(6), 721-732.

- Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12, 38-48.
- Ramirez, E. M., & Rosen, J. C. (2001). A comparison of weight control and weight control plus body image therapy for obese men and women. *Journal of Consulting and Clinical Psychology*, 69, 440-446.
- Resnick, B. (2001). Testing a model of exercise behavior in older adults. *Research in Nursing & Health*, 24, 8392.
- Reynoso, J., Susabda, A., & Cepeda-Benito, A. (2005). Gender Differences in Smoking Cessation. *Journal of Psychopathology and Behavioral Assessment*, 27(3), 227-234.
- Rhew, I., Yasuim Y., Sorensenm B., Ulrich, C. M., Neuhouser, M. L., Tworoger, S. S., et al. (2007). Effects of an exercise intervention on other health behaviors in overweight/obese post-menopausal women. *Contemporary Clinical Trials*, 28(4), 472-481.
- Richman, R. M., Loughnan, G. T., Droulers, A. M., Steinbeck, K. S., & Caterson, I. D. (2001). Self-efficacy in relation to eating behaviour among obese and non-obese women. *International Journal of Obesity*, 25(6), 907-913.
- Roach, J. B., Yadrick, M. K., Johnson, J. T., Boudreaux, L. J., Forsythe, W. A., & Billon, W. (2003). Using self-efficacy to predict weight loss among young adults. *Journal of the American Dietetic Association*, 103(10), 1357-1359.
- Rodin, J., Silberstein, L., & Striegel-Moore, R. (1984). Women and weight: A normative discontent. *Nebraska Symposium on Motivation*, 32, 267-307.
- Rodin, J. (1987). Weight change following smoking cessation: The role of food intake and exercise. *Addictive Behaviors*, 12, 303-317.
- Rodin, J., Slochower, J., & Fleming, J. (1987). Effects of degree of obesity, age of onset and weight less on responsiveness to sensory and external stimuli. *Journal of Comparative Physiology and Psychology*, 91, 586-597.
- Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo & R. E. Petty (Eds.), *Social Psychophysiology* (pp. 153-176). New York, NY: Guilford.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: difference concepts, different outcomes. *American Sociological Review*, 60, 141-156.

- Russ, C. R., Fonseca, V. P., Peterson, A. L., Blackman, L. R., & Robbins, A. S. (2001). Weight gain as a barrier to smoking cessation among military personnel. *American Journal of Health Promotion*, 16, 79-84.
- Schnoll, R. A., Malstrom, M., James, C., Rothman, R. L., Miller, S. M., Ridge, J. A., et al. (2002). Correlates of tobacco use among smokers and recent quitters diagnosed with cancer. *Patient Education and Counseling*, 46, 137-145.
- Scholte, R. H. J., & Breteler, M. H. M. (1997). Withdrawal symptoms and previous attempts to quit smoking: Associations with self-efficacy. *Substance Use & Misuse*, 32, 133-148.
- Schumaker, S. A., & Grunberb, N. (1986). Proceedings of the national working conference on smoking relapse. *Health Psychology*, 5, 1-99.
- Schumann, A., Meyer, C., Rumpf, H-J., Hannöver, W., Hapke, U., & John, U. (2005, March). Stage of change transitions and processes of change, decisional balance, and self-efficacy in smokers: a transtheoretical model validation using longitudinal data. *Psychology of Addictive Behaviors*, 1(19), 1, 3-9.
- Schutz, Y., Tremblay, A., Weinsier, R. L. & Nelson, K. M. (1992). Role of fat oxidation in the long-term stabilization of body weight in obese women. *American Journal of Clinical Nutrition*, 55, 670-674.
- Schwartz, D., Thompson, M., & Johnson, C. (1982). Anorexia and Bulimia: The sociocultural context. *International Journal of Eating Disorders*, 1, 25-35.
- Schwarzer, R., & Renner, B. (2000). Social-cognitive predictors of health behavior: Action self-efficacy and coping self-efficacy. *Health Psychology*, 19, 487-495.
- Secker-Walker, R. H., Flynn, B. S., Solomon, L. J., Vacek, P. M., Dorwaldt, A. L., Geller, B. M., et al. (1996). Helping women quit smoking: baseline observations for a community health education project. *American Journal of Preventive Medicine*, 12, 367-377.
- Senekal, M., Albertse, E. C., Moberg, D. J., Groenewald, C. J., & Visser, E. M. (1999). A multidimensional weight-management program for women. *Journal of the American Dietetic Association*, 99, 1257-1264.
- Shadel, W. G., Niaura, R., Goldstein, M. G., & Abrams, D. B. (2001). Cognitive avoidance as a method of coping with a provocative smoking cue: The moderating effect of nicotine dependence. *Journal of Behavioral Medicine*, 24, 169-182.
- Shadel, W. G., & Cervone, D. (2006). Evaluating social-cognitive mechanisms that regulate self-efficacy in response to provocative smoking cues: an experimental investigation. *Psychology of Addictive Behaviours*, 20(1), 91-96.

- Shannon, J., Kirkley, B., Ammerman, A., Keyserling, T., Kelsey, K., DeVellis, R., & Simpson, R. J. (1997). Self-efficacy as a Predictor of Dietary Change in a Low Socioeconomic-Status Southern Adult Population. *Health Education and Behavior*, 24, 357-368.
- Sheeshka, J. D., Woolcott, D. M., & Mackinnon, N. J. (1993). Social cognitive theory as a framework to explain intentions to proactive healthy eating behaviors. *Journal of Applied Social Psychology*, 23, 1547-1573.
- Shiffman, S., Johnston, A., Khayrallah, M., Elash, C. A., Gwaltney, C. J., Paty, J. A., et al. (2000). The effect of bupropion on nicotine craving and withdrawal. *Psychopharmacology*, 148, 33-40.
- Shiffman, S. S., Balabanis, M. H., Paty, J. A., Engberg, J., Gwaltney, C. J., Liu, K. S., et al. (2000). Dynamic effects of self-efficacy on smoking lapse and relapse. *Health Psychology*, 19, 315-323.
- Shiffman, S., Engberg, J., Paty, J., Perz, W., Gnys, M., Kassel, J., et al. (1997). A day at a time: Predicting smoking lapse from daily urge. *Journal of Abnormal Psychology*, 106, 133-152.
- Shin, Y. H., Jang, H. J., & Pender, N. J. (2001). Psychometric evaluation of the exercise self-efficacy scale among Korean adults with chronic diseases. *Research in Nursing & Health*, 24(1), 68-76.
- Skinner, J. D. (1991). Changes in students' dietary behavior during a college nutrition course. *Journal Nutrition Education*, 23, 72-75.
- Solomon, L. J., Bunn, J. Y., Pirie, P. L., Worden, J. K., & Flynn, B. S. (2006). Self-efficacy and outcome expectations for quitting among adolescent smokers. *Addictive Behaviors*, 31(7), 1122-1132.
- Sorensen, G., Goldberg, R., Ockene, J., Klar, J., Tannenbaum, T. & Lemeshow, S. (1992). Heavy smoking among a sample of employed women. *American Journal of Preventive Medicine*, 8, 207-214.
- Spahn, J. M., Harback, M. O., Schuette, L. K., Lockhart, D. A., & Furlong, A. E. (2003). The Sensible Weigh Leader's Guide (1998).
- Spring, B., Wurtman, J., Gleason, R., Wurtman, R., & Kessler, K. (1991). Weight gain and withdrawal symptoms after smoking cessation: A preventive intervention using d-fenfluramine. *Health Psychology*, 10, 216-223.
- Spring, B., Wurtman, J., Wurtman, R., El-Khoury, A., Goldberg, H., Mc-Dermott, J., & Pingitore, R. (1995). Efficacies of dexfenfluramine and fluoxetine in preventing weight gain after smoking cessation. *American Journal of Clinical Nutrition*, 62, 1181-1187.

- Spring, B., Doran, N., Pagoto, S., Schneider, K., Pingitore, R. & Hedeker, D. (2004). Randomized controlled trial for behavioral smoking and weight control treatment: effect of concurrent versus sequential intervention. *Journal of Consulting and Clinical Psychology*, 72(5), 785-796.
- Stadjkovic, A. D., & Luthans, F. (1998). Social Cognitive Theory and Self-Efficacy: Going Beyond Traditional Motivational and Behaviorial Approaches. *Organizational Dynamics*, 26(4), 0090-2616.
- Staley, J. K., Krishnan-Sarin, S., Zoghbi, S., Tamagnan, G., Fujita, M., Seibyl, J. P., et al. (2001). Sex difference in (123I) beta-CIT SPECT measures of dopamine and serotonin transporter availability in healthy smokers. *Synapse*, 15, 275-284.
- Stamford, B. A., Matter, S., Fell, R. D., & Papanck, P. (1986). Effects of smoking cessation on weight gain, metabolic rate, caloric consumption and blood lipids. *American Journal of Clinical Nutrition*, 43, 486-494.
- Staring, A., & Breteler, M. (2004). Decline in smoking cessation rate associated with high self-efficacy scores. *Preventive Medicine*, 39, 863-868.
- Steptoe, A., Doherty, S., Kerry, S., Rink, E., & Hilton, S. (2000). Sociodemographic and psychological predictors of changes in dietary fat consumption in adults with high blood cholesterol following counseling in primary care. *Health and Psychology*, 19(5), 411-419.
- Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, 13, 73-92.
- Strecher, V. J., Seijts, G. H., Kok, G. J., Latham, G. P., Glasgow, R., DeVellis, B. M., Meertens, R., & Bulger, D. (1995). Goal setting as a strategy for health behavior change. *Health Education Quarterly*, 22(2), 212-222.
- Striegel-Moore, R. H., Silberstein, L. R., & Rodin, J. (1998). Toward an understanding of risk factors for bulimia. In Clinchy, B. M., & Norem, J. K. (Eds.). *The Gender and Psychology Reader* (pp.573-609). New York: New York University Press.
- Striegel-Moore, R.H., & Franko, D.L. (2002). Body image issues among girls and women. In: Cash, T.F. & Pruzinsky, T. (Eds). *Body image: A handbook of theory, research, and clinical practice*, The Guilford Press, New York, NY, pp. 183-191.
- Subar, A. F., Harlan, L. C., & Mattson, M. E. (1990). Food and nutrient intake differences between smokers and non-smokers in the US. *American Journal of Public Health*, 80, 1323-1329.
- Sullun, J., Clark, M. M., & King, T. K. (2000). Predictors of exercise relapse in a college population. *Journal of American College Health*, 48, 175-180.

- Sutherland, G., Stapleton, J. A., Russell, M. A. H., Jarvis, M. J., Hajek, P., Belcher, M. & Feyerabend, C. (1992). Randomised controlled trial of nasal nicotine spray in smoking cessation. *The Lancet*, 340, 324-329.
- Swan, G. E., Ward, M. N., Carmelli, D., & Jack, L. M. (1993). Differential rates of relapse in subgroups of male and female smokers. *Journal of Clinical Epidemiology*, 46, 1041-1053.
- Talcott, G. W., Fiedler, E. R., Peterson, A. L., Pascale, R. W., Klesges, R. C., & Johnson, R. S. (1995). Is weight gain after smoking cessation inevitable? *Journal of Consulting and Clinical Psychology*, 63, 313-316.
- Tangney, C. C., Evans, D. A., Bienias, J. L., & Morris, M. C. (2001). Healthy eating index of black and white older adults. *Nutritional Research*, 21, 1411-1423.
- Teixeira, P. J., Going, S. B., Houtkooper, L. B., Cussler, E. C., Martin, C. J., Metcalfe L. L., et al. (2002). Weight loss readiness in middle-aged women: Psychosocial predictors of success for behavioral weight reduction. *Journal of Behavioral Medicine*, 25, 499-523.
- Teixeira, P. J., Going, S. B., Houtkooper, L. B., Cussler, E. C., Metcalfe L. L., Blew, R. M., et al. (2004) Pretreatment predictors of attrition and successful weight management in women. *International Journal of Obesity and Related Metabolic Disorders*, 28, 1124-1133.
- Tinker, J. E., & Tucker, J. A. (1997). Environmental events surrounding natural recovery from obesity. *Addictive Behaviors*, 22(4), 571-575.
- Tonnenson, P., Norregaard, J., Mikkelsen, K., Jorgensen, S., & Nilsson, F. (1993). A double blind trial of a nicotine inhaler for smoking cessation. *Journal of the American Medical Association*, 269, 1268-1271.
- Toray, T. & Cooley, E. (1997). Bulimic Symptoms and Self-Efficacy in Weight Fluctuations. *The Journal of Psychology*, 31, 383-394.
- US Department of Health and Human Services. *The health benefits of smoking cessation: a report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services, CDC, 1990.
- US Department of Health and Human Services. *Healthy people 2010: understanding and improving health*. 2nd ed. Washington, DC: US Department of Health and Human Services, 2000.
- US Department of Health and Human Services. *Reducing tobacco use: A report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.

- U.S. Department of Health and Human Services. *Women and Smoking: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2001.
- U.S. Department of Health and Human Services. *The Health Consequences of Smoking: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004.
- Ussher, M., West, R., McEwen, A., Taylor, A., & Steptoe, A. (2007). Randomized controlled trial of physical activity counseling as an aid to smoking cessation: 12 month follow-up. *Addictive Behaviors*, 32, 3060-3064.
- Van Duyn, M. A., Kristal, A. R., Dodd, K., Campbell, M. K., Subar, A. F., Stables, G., et al. (2001) Association of awareness, intrapersonal and interpersonal factors and stage of dietary change with fruit and vegetable consumption: a national survey. *American Journal of Health Promotion*, 16, 69-78.
- Vandelanotte, C., Reeves, M. M., Brug, J., & De Bourdeaudhuij, I. (2008). A randomized trial of sequential and simultaneous multiple behavior change interventions for physical activity and fat intake. *Preventive Medicine*, 46, 232-237.
- Variyam, J. N., Blaylock, J., Smallwood, D., & Basiotis, P. P. (1998). *USDA's Healthy Eating Index and Nutrition Information*, Economic Research Service, US Dept of Agriculture, Washington, DC 1998. Technical Bulletin No. 1866.
- Variyam, J. N., Shim, Y., & Blaylock, J. (2001). Consumer misperceptions of diet quality. *Journal of Nutritional Education*, 33, 314-321.
- Velicer, W. F., DiClemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors*, 15, 271-283.
- Velicer, W. F., F., Prochaska, J.O., Abrams, D.B., Emmons, K.M., & Pierce, J. (1995). Distribution of smokers by stage in three representative samples. *Preventive Medicine*, 24, 401-411.
- Velicer, W. F., Prochaska, J. O., Bellis, J. M., DiClemente, C. C., Rossi, J. S., Fava, J. L., et al. (1995b). An expert system intervention for smoking cessation. *Addictive Behaviors*, 18, 269-290.
- Vuchinich, R. E., & Tucker, J. A. (1988). Contributions from behavioral theories of choice to an analysis of alcohol abuse. *Journal of Abnormal Psychology*, 97, 181-195.

- Wadden, T. A., & Letizia, K. A. (1992). Predictors of attrition and weight loss in patients treated by moderate and severe caloric restriction. In T. A. Wadden & T. B. VanItallie (Eds.), *Treatment of the seriously obese patient* (pp. 383-410). New York: Guilford Press.
- Wadden, T. A., & Foster, G. D. (2000) Behavioral treatment of obesity. *Medical Clinics Of North America*, 84, 441-461.
- Wamsteker, E. W., Geenen, R., Iesra, J., Larsen, J. K., Zelissen, P. M., & van Staveren, W. A. (2005). Obesity-related beliefs predict weight loss after an 8-week low-calorie diet. *Journal of the American Dietetic Association*, 105(3), 441-444.
- Warnecke, R. B., Morera, O., Turner, L., Mermelstein, R., Johnson, T. P., Parsons, J., et al. (2001). Changes in self-efficacy and readiness for smoking cessation among women with high school or less education. *Journal of Health and Social Behavior*, 42(1), 97-110.
- Warziski, M., Sereika, S., Styn, M., Music, E., & Burke, L. (2008). Changes in self-efficacy and dietary adherence: the impact on weight loss in the PREFER study. *Journal of Behavioral Medicine*, 31, 81-92.
- Weekley, C. K., Klesges, R. C., & Relyea, G. (1992). Smoking as a weight-control strategy and its relationship to smoking status. *Addictive Behaviors*, 17, 259-271.
- Wei, M., Stern, M. P., & Haffner, S. M. (1997). Serum leptin levels in Mexican Americans and non-Hispanic whites: association with body mass index and cigarette smoking. *Annals of Epidemiology*, 7, 81-86.
- West, R. J., Hajek, P., & Burrows, S. (1990). Effect of glucose tablets on craving for cigarettes. *Psychopharmacology*, 101, 555-559.
- Westmaas, J. L., & Langsam, K. (2005). Unaided smoking cessation and predictors of failure to quit in a community sample: Effects of gender. *Addictive Behaviors*, 30 (7), 1405-1424.
- White, M. A., & Grilo, C. M. (2007). Symptom severity in obese women with binge eating disorder as a function of smoking history. *The International Journal of Eating Disorders*, 40 (1), 77-81.
- Williamson, D. F., Madans, J., Anda, R. F., Kleinman, J. C., Giovino, G. A., & Byers, T. (1991). Smoking cessation and severity of weight gain in a national cohort. *New England Journal of Medicine*, 324, 739-745.
- Wiltink, J., Dippel, A., Szczepanski, M., Thiede, R., Alt, C., & Beutel, M. E. (2007). A Long-term weight loss maintenance after inpatient psychotherapy of severely obese patients based on a randomized study: Predictors and maintaining factors of health behavior. *Journal of Psychosomatic Research*, 62(6), 691-698.

- Wing, R. R. (2002). Behavioral weight control. In T. A. Wadden & A. J. Stunkard (Eds.), *Handbook of obesity treatment*. New York: Guilford Press.
- Witkiewitz, K., & Marlatt, G. A. (2004). Relapse prevention for alcohol and drug problems: That was zen, this is zao. *American Psychologist*, 59, 224-235.
- Wolf, N. (1991). *The beauty myth*. London: Chatto & Windus.
- Yung, L., Gordis, E., & Holt, J. (1983). Dietary choices and likelihood of abstinence among alcoholic patients in an outpatient clinic. *Drug and Alcohol Dependence*, 12, 355-362.
- Zang, E. A., & Wynder, E. L. (1996). Differences in lung cancer risk between men and women: Examination of the evidence. *Journal of the National Cancer Institute*, 88, 183-192.
- Zhu, S. H., Tedeschi, G. J., Anderson, C. M., & Pierce, J.P. (1996). Telephone counseling for smoking cessation: What's in a call? *Journal of Counseling and Development*, 75, 93-102.
- Zimmerman, R.S., Warheit, G.J., Ulbrich, P.A., & Auth, J. B. (1990). The relationship between alcohol use and attempts and success at smoking cessation. *Addictive Behaviors*, 15, 197-207.
- Zucker, A. N., Harrell, Z. A., Miner-Rubino, K., Stewart, A. J., Pomerleau, C. S., Boyd, C. J. (2001, September). Smoking in college women: The role of thinness pressures, media exposure, and critical consciousness. *Psychology of Women Quarterly*, 25(3), 233-241.

Appendix A

EATING APTITUDE TEST

Please Circle a Response for Each of the Following Statements:

Question	Always	Usually	Often	Sometimes	Rarely	Never
1. Am terrified about being overweight	3	2	1	0	0	0
2. Avoid eating when I am hungry.	3	2	1	0	0	0
3. Find myself preoccupied with food.	3	2	1	0	0	0
4. Have gone on eating binges where I feel I may not be able to stop.	3	2	1	0	0	0
5. Cut my food into small pieces.	3	2	1	0	0	0
6. Aware of the calorie content of foods I eat.	3	2	1	0	0	0
7. Particularly avoid food with a high carbohydrate content (bread, rice, potatoes, etc.)	3	2	1	0	0	0
8. Feel that others would prefer if I ate more.	3	2	1	0	0	0
9. Vomit after I have eaten.	3	2	1	0	0	0
10. Feel extremely guilty after eating.	3	2	1	0	0	0
11. Am preoccupied with a desire to be thinner.	3	2	1	0	0	0
12. Think about burning up calories when I exercise.	3	2	1	0	0	0
13. Other people think I'm too thin.	3	2	1	0	0	0
14. Am preoccupied with the thought of having fat on my body.	3	2	1	0	0	0
15. Take longer than others to eat my meals.	3	2	1	0	0	0
16. Avoid foods with sugar.	3	2	1	0	0	0
17. Eat diet foods.	3	2	1	0	0	0
18. Feel that food controls my life.	3	2	1	0	0	0

19. Display self-control around food.	3	2	1	0	0	0
20. Feel that others pressure me to eat.	3	2	1	0	0	0
21. Give too much time and thought to food.	3	2	1	0	0	0
22. Feel uncomfortable after eating sweets.	3	2	1	0	0	0
23. Engage in dieting behavior.	3	2	1	0	0	0
24. Like my stomach to be empty.	3	2	1	0	0	0
25. Have the impulse to vomit after meals.	3	2	1	0	0	0
26. Enjoy trying new rich foods.	0	0	0	1	2	3

Garner, D., Olmstead, M., Bohr, M., & Garfinkle, P. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878.

Appendix B

THE CIGARETTE DEPENDENCE SCALE

Questions	Response options
1. Please rate your addiction to cigarettes on a scale of 0 to 100: - I am NOT addicted to cigarettes at all = 0 - I am extremely addicted to cigarettes = 100	___ Addiction
2. On average, how many cigarettes do you smoke per day?	___ Cigarettes / day
3. Usually, how soon after waking up do you smoke your first cigarette?	___ Minutes
4. For you, quitting smoking for good would be:	Impossible = 5 Very difficult = 4 Fairly difficult = 3 Fairly easy = 2 Very easy = 1
<i>Please indicate whether you agree with each of the following statements:</i>	
5. After a few hours without smoking, I feel an irresistible urge to smoke	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5
6. The idea of not having any cigarettes causes me stress	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5
7. Before going out, I always make sure that I have cigarettes with me	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5
8. I am a prisoner of cigarettes	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5

9. I smoke too much	Totally disagree	= 1
	Somewhat disagree	= 2
	Neither agree nor disagree	= 3
	Somewhat agree	= 4
	Fully agree	= 5
10. Sometimes I drop everything to go out and buy cigarettes	Totally disagree	= 1
	Somewhat disagree	= 2
	Neither agree nor disagree	= 3
	Somewhat agree	= 4
	Fully agree	= 5
11. I smoke all the time	Totally disagree	= 1
	Somewhat disagree	= 2
	Neither agree nor disagree	= 3
	Somewhat agree	= 4
	Fully agree	= 5
12. I smoke despite the risks to my health	Totally disagree	= 1
	Somewhat disagree	= 2
	Neither agree nor disagree	= 3
	Somewhat agree	= 4
	Fully agree	= 5

Etter, J. F., Le Houezec, J., & Perneger, T. V. (2003). A self-administered questionnaire to measure dependence on cigarettes: the cigarette dependence scale. *Neuropsychopharmacology*. 28(2), 359-70

Appendix C

SMOKING SELF-EFFICACY QUESTIONNAIRE

Instructions: The following measure describes various situations that may trigger smoking. We would like to know How Confident you are that you would not smoke in each situation.

Circle the number that best describes your feelings of **confidence to not smoke** in each situation according to the following scale:

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

1. Poor performance on an exam.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

2. Stood up by a date; feeling disappointed.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

3. Fight with spouse, boy/girlfriend; angry and upset.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

4. Feeling relaxed at the end of an evening.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

5. Finished dinner in a restaurant with friends; coffee served; others light up.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

6. Out with friends who are smoking; don't want others to know of participation in a smoking program.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

7. Difficult day at school/work.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

8. In a bad mood; thinking about failures in life.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

9. Watching TV.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

10. Studying.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

11. Reading a novel/magazine.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

12. Attending sports/entertainment event.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

13. On phone.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

14. Drinking coffee/nonalcoholic beverages.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

15. After a meal.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

16. Talking/socializing.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

17. Playing cards.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

Colletti, G., Supnick, J. A., & Payne, T. J. (1985). The Smoking Self-Efficacy Questionnaire (SSEQ): Preliminary scale development and validation. *Behavioral Assessment*, 7, 249–260.

Appendix D

Weight Efficacy Life-Style Questionnaire

Listed below are a number of situations that lead some people to eat. We would like to know How Confident you are that you would not eat in each situation.

Circle the number that best describes your feelings of **confidence to not eat food** in each situation according to the following scale:

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

1. I can resist eating when I am nervous.

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

2. I can control my eating on the weekends.

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

3. I can resist eating even when I have to say "NO" to others.

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

4. I can resist eating when I feel physically run down.

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

5. I can resist eating when I am watching TV.

0	1	2	3	4	5	6	7	8	9	10
Not Confident						Very Confident				

6. I can resist eating when I am depressed (or down).

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

7. I can resist eating when there are many different kinds of food available.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

8. I can resist eating even when I feel it's impolite to refuse a second helping.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

9. I can resist eating even when I have a headache.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

10. I can resist eating when I am reading.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

11. I can resist eating when I am angry (or irritable).

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

12. I can resist eating even when I am at a party.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

13. I can resist eating even when others are pressuring me to eat.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

14. I can resist eating when I am in pain.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

15. I can resist eating just before going to bed.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

16. I can resist eating when I have experienced failure.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

17. I can resist eating even when high-calorie foods are available.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

18. I can resist eating even when I think others will be upset if I don't eat.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

19. I can resist eating when I feel uncomfortable.

0 1 2 3 4 5 6 7 8 9 10

Not Confident

Very Confident

20. I can resist eating when I am happy.

0	1	2	3	4	5	6	7	8	9	10
Not Confident					Very Confident					

Clark, M. M., Abrams, D. B., Niaura, R. S., Eaton, C. A., & Rossi, J. S. (1991). Self-efficacy in weight management. *Journal of Consulting and Clinical Psychology*, 59, 739-744

Appendix E

3- DAY FOOD RECORD

In order to assist you in reaching your goals with respect to nutrient intake, it is important for me to know your current eating patterns. Please use the attached forms to provide a detailed record of everything you eat and/or drink over a 3-day period. Try to record food and drink intake for Two Weekdays and One Weekend Day. If your meals or snacks are from a restaurant, please provide the restaurant's name and a detailed description of what you ate in the Method of Preparation section. Feel free to attach any recipes, restaurant menus, or nutritional value handouts to this form. Be as specific as possible when listing food and drink items, amounts, and any additional ingredients (i.e. condiments, seasonings, or toppings). Do not try to change your eating habits during the days of record keeping.

The result of your 3-Day is only as accurate as your measurements.

Date: _____

	Food Item	Amount (cups,pieces,oz..)	Method of Preparation
Breakfast			
Lunch			
Dinner			

Snacks					

Appendix F

SMOKING: STAGE OF CHANGE

Please Circle a Response for Each of the Following Questions:

Are you currently a smoker?

- Yes, I currently smoke
- No, I quit within the last 6 months
- No, I quit more than 6 months ago
- No, I have never smoked

In the last year, how many times have you quit smoking for at least 24 hours? _____

Are you seriously thinking of quitting smoking?

- Yes, within the next 30 days
- Yes, within the next 6 months
- No, not thinking of quitting

DiClemente, C. C., Prochaska, J. O., et al. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*, 59, 295-304.

Velicer, W. F., F., Prochaska, J.O., Abrams, D.B., Emmons, K.M., & Pierce, J. (1995). Distribution of smokers by stage in three representative samples. *Preventive Medicine*, 24,401-411.

Appendix G

FLYER

Do you smoke to keep your weight down or won't quit due to fear of weight gain?

Do you want to lose weight?

You may be eligible to participate in a
Weight-Control Program

- ✓ 12-1hour sessions, once a week
- ✓ Small classes of 25-30 participants
- ✓ Conducted by a Nutritionist

Call Jennifer at (305) 724-3146

Appendix H

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Title: The Impact of a Cognitive-Behavioral Weight Control Program on Smoking Cessation in Weight-Concerned Female Smokers.

You are being asked to be in a research study. We are looking at the effects of the weight-control program on diet quality, body weight, your feeling about weight management and how this may affect your smoking behavior. The Principal Investigator of this study is Jennifer Sallit, a doctoral student at FIU. You will be randomly assigned to either the intervention group or the control group. Seventy-five females will be assigned to the intervention group and 75 to the control group. If you are assigned to the intervention group you will be placed in a group with about 20 other weight-concerned female smokers and participate in a weight control program. The intervention will require you to attend a total of 12-1 hour meetings, scheduled once a week, for twelve weeks, on a designated day and time. If you are assigned to the control group, you will only need report to the office to fill out the assessment information at all 4 assessment points, for which you will receive \$10 per each attended point. The assessment points will be during week 1, week 12, week 24, and week 36 from the start of the study.

Both groups will be asked to complete assessment information, which will include: 1) General Information Questionnaire, 2) Weight-efficacy Life-Style Questionnaire, 3) 3-day food record, 4) Smoking Questionnaire, 5) Cigarette Dependence Scale, 6) a questionnaire on readiness to quit smoking, and 7) Body weight and height. You may skip any questions you do not want to answer. You will be instructed on how

to complete all the questionnaires. On average, each questionnaire will take 5 minutes to complete.

If you are assigned to the intervention group, the study will benefit you by providing information, counseling, and techniques to help you make appropriate food choices. This study also offers group support through interaction with other program participants facing similar obstacles. Your participation in the study will assist the researcher in gathering knowledge to improve the weight control program.

Information including your informed consent, background, and all questionnaires results will be stored in a locked filing cabinet and only the Principal Investigator and her faculty supervisor will have access. Your data will be entered in the computer using assigned numbers to each subject in order to secure confidentiality. Responses or results of tests will be used only for research purposes and will be reported only as group data. Once all data have been collected, the list that identifies the number assigned to each person will be destroyed. Your records will be confidential to the extent permitted by law. Results of the study will be reported for groups; individuals will not be identified in any way.

We do not expect any harm to you by being in the study. There is no cost to you as a subject. You may withdraw your consent and discontinue participation in this research project at any time with no negative consequences.

If you would like more information about this research after you are done, you can contact Jennifer Sallit at (215) 779-0410 or my faculty supervisor, Dr. Michele Ciccazzo, at (305) 348-2889. If you have any questions concerning the rights of human subjects,

you may contact Dr. Jonathan Tubman, the Chairperson of the Institutional Review Board at Florida International University at (305)-348-3024 or (305)-348-2494.

Your signature below indicates that all questions have been answered to your liking. You are aware of your rights and would like to be in the study.

Signature of Participant

Printed Name

Date

I have explained the research procedure, subject rights and answered questions asked by the participant. I have offered her a copy of this informed consent form.

Signature of Witness

Date

Appendix I

LESSON PLANS FOR WEIGHT-CONTROL PROGRAM

Session 1

Introduction

Materials: Food Diaries (Notebooks)
Food Models
Measuring Utensils

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Identify reasons for program participation
2. Keep an accurate food diary

Class Outline:

- I. Introduction
 - A. Groups Discussion – Reasons for joining program, Expectations
 - B. Program Overview
- II. Food Diary
 - A. Distribute notebooks
 - B. Instruct clients to record all dietary intake
 - C. Explain portion control and give examples using food models and measuring utensils
- III. Assignments
 - A. Food Diary

Session 2

Food Groups

Materials: Food Guide Pyramid
Exchange List
Best Food Sources of Vitamins & Minerals

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Explain the nutritional contribution of each food group

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Define Serving Sizes
2. Plan a Balanced Meal
3. Evaluate food choices

Class Outline:

- I. Introduction
 - A. Group Discussion
- II. Food Guide Pyramid
 - A. Grains, Vegetables, Fruits, Oils, Milk, Meats & Beans
 - B. Moderation, Variety
- III. Exchange List
 - A. Serving sizes
 - B. Food groups
 - C. Menu Planning
- IV. Vitamins and Minerals
 - A. Classification
 - B. Role in good health and deficiency in smokers
 - C. Dietary Sources
- V. Assignments
 - A. Calculate in food diary number of servings consumed in each food group

Session 3

Weight Management

Materials: Health benefits of weight loss

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Identify factors that influence body weight
2. Explain the benefits of healthy eating

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Identify variables that regulate body weight
2. Identify benefits of weight loss

Class Outline:

- I. Factors that Influence Body Weight
 - A. Food Intake (main discussion)
 - B. Genetics
 - C. Environment
 - D. Physical Activity (mentioned but not discussed)
- II. Macronutrients
 - A. Fat
 - B. Carbohydrate
 - C. Protein
- III. Assignment
 - A. Food Diary

Session 4

Strategies for Weight Loss/Maintenance

Materials: Food Diaries (Notebooks)
Examples of Fad Diets

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Identify pertinent strategies for weight loss
2. Recognize and identify unhealthy dieting practices

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. State goals in regard to weight loss strategies
2. Explain the reasoning behind weight loss goals

Class Outline:

- I. Introduction
 - A. Discussion about ease and ability to record dietary intake through the use of food diaries
 - B. Experiences with keeping food diaries
- II. Strategies for Weight Loss
 - A. Support systems
 - B. Positive reinforcement/rewards
 - C. Acquisition of accurate nutrition information
 - D. Behavior modeling
- III. Group Discussion – Interview Experience
- IV. Unhealthy Dieting Practices
 - A. Anorexia Nervosa
 - B. Bulimia
 - C. Fad Diets
- V. Assignments
 - A. Food Diary

Session 5

High Risk Situations

Materials: Sample Menus

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Identify healthy menu selections
2. Identify high risk situations

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Accurately expand the food diary to place, people associations, and emotions
2. Explain ways they could control the environment in high risk situations to minimize risks

Class Outline:

- I. Introduction
 - A. Explanation of a high-risk situation
 - B. Examples of high-risk situations
- II. Dining Out
 - A. Menu Terms
 - B. Healthy Menu Selections
 - C. Ethnic Restaurants
- III. Expansion of the Food Diary
 - A. Place
 - B. People Associations
 - C. Emotions
- IV. Assignments
 - A. Food Diary

Session 6

Food Labels

Materials: Sample food labels

Handout: Sources of sodium and Alternatives

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Accurately read and interpret food labels
2. List ways to lower sodium in the diet

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Express understanding of factors that influence dietary intake through interpretation of food diaries

Class Outline:

- I. Introduction
 - A. Group Discussion
- II. Food Label
 - A. Nutrition Facts Panel
 - B. Daily Reference Values
 - C. Ingredient Listings
- III. Group Discussion
 - A. Expanded Food Diary
 - B. Food Shopping
- IV. Sodium
 - A. Sources
 - B. Low sodium alternatives
- V. Assignment
 - A. Food Diary

Session 7

Environmental Control

Materials: Benefits of fiber, Sources of fiber

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Define fiber and name high-fiber food sources
2. Understand the importance of a high-fiber diet in reducing health risks

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. List environmental influences on eating behavior
2. Identify methods to control environmental influences

Class Outline:

- I. Introduction
- II. Environmental Influences
 - A. Examples
 - B. Control of Influences
 - C. Group Discussion
- III. Fiber
 - A. Insoluble
 - B. Soluble
 - C. Influences on Health
 - D. Food Sources
- IV. Assignment
 - A. Food Diary

Session 8

Social Support

Materials: Foods rich in Calcium

Learning Objective: Upon completion of this session, subjects will be able to:

1. Understand the role of calcium in good health
2. Understand the importance of social support

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Choose a lifestyle change partner
2. Explain the benefits of social support
3. List ways of adding calcium to diet

Class Outline:

- I. Introduction
- II. Social Support
 - A. Examples
 - B. Benefits
 - C. Lifestyle change partner
- III. Calcium
 - A. Definition
 - B. Influences on health
 - C. Needs
 - D. Food Sources
- IV. Assignment
 - A. Food Diary

Session 9

Fat Intake

Materials: Foods that help lower cholesterol level
Foods that are high in saturated fats and unsaturated fats

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Recognize “hidden fats” in the diet.
2. Explain different types of fats

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Identify activities that can be used as alternatives to unhealthy eating practices

Class Outline:

- I. Introduction
 - A. Saturated fats, Omega fatty acids, and fiber effect on cholesterol levels and disease prevention
- II. Dietary Fats
 - A. Definition of fat and “hidden fat”
 - B. Different types of fats
 - C. Food Sources
 - D. Influences on health
- III. Alternative Activities
 - A. Examples
 - B. Hobbies
 - C. Group Discussion
- IV. Assignments
 - A. Food Diary
 - B. Make a list of alternative activities to unhealthy eating

Session 10

Eating on the Run

Materials: Stress Management

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Give examples of healthy convenience foods and snacks

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Identify and determine strategies for time management
2. Give examples of implementation of time management strategies

Class Outline:

- I. Introduction
- II. Convenience Foods
 - A. Examples/Alternatives
- III. Snacks
 - A. Contributions
 - B. Tips for Selection
 - C. Examples
- V. Assignments
 - A. Food Diary
 - B. Determine one personal time management strategy

Session 11

Healthy Cooking

Materials: Cooking demonstration unit
Recipe ingredients

Learning Objectives: Upon completion of this session, subjects will be able to:

1. Incorporate healthy modifications into recipes

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Prepare a low fat, low sodium recipe

Class Outline:

- I. Introduction
- II. Cooking Demonstration
 - A. Recipe – Penne with Chicken, Peas, and Peppers
- III. Assignments
 - A. Food Diary
 - B. Prepare demonstrated recipe for friends or family
 - C. Document high-risk situations encountered over the next week

Session 12

Relapse Prevention

Learning Objectives: Upon completion of this session, subjects will be able to:

1. List strategies to avoid high risk situations

Objectives for Increased Self-Efficacy Promotion: Upon completion this session, subjects will be able to:

1. Define relapse
2. Identify situations that can lead to relapse

Class Outline:

- I. Introduction
 - A. Group Discussion
 - B. Role Play
- II. Relapse
 - A. Definition
 - B. Causes
 - C. Examples
 - D. Prevention
- III. A. Wrap up
- IV. Assignments
 - A. Continuation of Food Diaries

Appendix J
GENERAL INFORMATION QUESTIONNAIRE

Name: _____

Local Address: _____
(Street Address) *(Apt. #)*

(City) *(State)* *(Zip Code)*

Telephone # (Daytime) _____ - _____ - _____ Email: _____

(Home): _____ - _____ - _____

(Cell): _____ - _____ - _____

Age: _____; Weight: _____; Height: _____; Sex: _____

Marital Status (Check one)

☐ Single ☐ Married ☐ Divorced ☐ Widowed ☐ Domestic Partner

Education (check highest level completed):

- ☐ Less than High School
- ☐ Some High School _____ year/s
- ☐ High School Graduate
- ☐ Technical Degree:
- ☐ Some college _____ year/s
- ☐ Associate Degree
- ☐ College Graduate
- ☐ Masters Degree
- ☐ PhD
- ☐ Other

Race (Check One):

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Hispanic
- ☐ Other

Household income:

- ☐ \$0-\$19,999 _____
- ☐ \$20,000- \$49,999 _____
- ☐ \$50,000- \$74,999 _____
- ☐ \$75,000- \$99,999 _____
- ☐ \$100,000 + _____

Are you currently or have you ever been treated for a mental health disorder such as, depression, anxiety, bi-polar, PMDD, etc.? _____

Do you have any other addictions currently or have you recovered from any addictions other than smoking (for example, alcoholism, heroin, cocaine, marijuana, etc.)? _____

How long have you been smoking? _____

How many cigarettes do you usually smoke on a daily basis? (Check one):

- ☐ < ½ pack ☐ ½ pack ☐ 1 pack ☐ 1½ packs ☐ 2 packs ☐ > 2 packs

Are you ready to quit smoking now? ☐ Yes ☐ No

Have you ever tried to quit before? ☐ Yes ☐ No

How many times have you tried to quit? (Check One):

- ☐ 1-2 times ☐ 3-5 times ☐ > 5 times

VITA

JENNIFER SALLIT

1977	Born, Allentown, Pennsylvania
1995-1999	B.S., Nutrition and Food Science Drexel University Philadelphia, Pennsylvania
1999-2001	M.S., Dietetics and Nutrition Florida International University Miami, Florida
1999-2003	Graduate Research Assistant Florida International University Miami, Florida
1999-2008	Dean's List Florida International University Miami, Florida
2001-2005	Teaching Assistant Florida International University Miami, Florida
2003	Teaching Assistant of the Year Award Florida International University Miami, Florida
2006	Dietetic Internship New York Institute of Technology Old Westbury, New York

PUBLICATIONS AND PRESENTATIONS

Sallit, J., Ciccazzo, M., Dixon, Z. (2007). *The Impact of a Cognitive-Behavioral Weight Control Program on Smoking Cessation in Weight-Concerned female Smokers*, Journal of the American Dietetic Association, 107:A51.