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Effects of Weight-Related Cues on Smoking Motivation

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Effects of Weight-Related Cues on Smoking Motivation

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
Department of Psychology
College of Arts and Sciences
University of South Florida

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Dedication

This thesis is dedicated to all those who have helped make it possible, such as all my friends within the department, including Hazel Anne Johnson, Haitham Khoury, and Sherece Fields. Thank you for providing me with whatever I needed, whether it were support, advice, study notes, good food, a good workout, an awesome mix CD, or merely comic relief.

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But most importantly, I want to dedicate this thesis to my parents, Carlos and Janis Lopez, for their never-ending support in all that I do. I appreciate their invaluable advice to help me make my decisions as well as the sense of confidence they've instilled in me to achieve whatever I desire. They are always there to help me and cheer me on, and I am thankful for their love and encouragement. And although this is only one of many accomplishments I will have in my life, and only a stepping stone in my graduate career, I am glad that they are with me to share in this achievement and to be with me through the ups and downs of all aspects of my life. I am who I am because of them. Thank you for everything – I love you both very much.

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Table of Contents

List of Tables	iii
List of Figures.....	iv
Abstract.....	v
Chapter One: Introduction	1
Body Image Dissatisfaction	4
Cue Reactivity.....	5
The Current Study.....	7
Chapter Two: Methods	9
Experimental Design and Overview	9
Participants.....	9
Measures	10
Demographic Questionnaire	10
Smoking Status Questionnaire (SSQ).....	10
Short Smoking Consequences Questionnaire (Short-SCQ).....	10
Eating Disorders Examination – Self-Report Questionnaire Version (EDE-Q)	11
The Eating Disorders Inventory (EDI)	11
Visual Analogue Scales (VAS).....	11
Object Desirability Form	12
Materials	12
Carbon monoxide (CO) monitor	12
Body-related images	12
Smoking cue reactivity images	13
Neutral images	13
Physiological measures.....	14

Computers.....	14
Weight.....	14
Procedure	16
Recruitment.....	16
Pre-manipulation.....	16
Manipulation.....	17
Post-manipulation	18
Chapter Three: Results.....	19
Participant Characteristics	19
Manipulation Check.....	19
Primary Analyses	21
Moderators	21
Mediators	23
Chapter Four: Discussion.....	26
Treatment Implications	29
Limitations	29
References.....	33

List of Tables

Table 1	Summary of Procedure	15
Table 2	Participant Characteristics	20
Table 3	Means (Standard Deviations) of Smoking Urge Ratings.....	21
Table 4	Correlations between Four Measures of Body Dissatisfaction and BMI ..	22

List of Figures

Figure 1 This shows that TBD moderates the body image manipulation
only when the smoking cue is absent23

Effects of Weight-Related Cues on Smoking Motivation

Elena Nicole Lopez

ABSTRACT

Smoking is now the leading cause of preventable death and disease in women. Understanding women's motivations to smoke is important in developing effective cessation and relapse prevention programs. Women, more so than men, appear to associate their smoking behavior to issues of weight. Although a general relationship between weight concerns and smoking has been found among women, a causal relationship had not been demonstrated. This study tested whether activation of negative body image cognitions would produce greater urges to smoke and whether the relationship would be moderated by trait body dissatisfaction and mediated by state body dissatisfaction.

A randomized 2 X 2 crossed factorial, within-subjects design (body image cues X smoking cues) was conducted with 62 female college smokers. The body image manipulation comprised an image of either a thin model or a neutral object, and the smoking manipulation comprised an image of either a smoking cue or a neutral object. Participants completed pre-intervention measures assessing smoking history and body image dissatisfaction. Urge to smoke, mood state, and weight and appearance satisfaction were assessed during the experiment.

It was hypothesized that main effects on reported urge to smoke would be found for both manipulations, with body dissatisfaction moderating the body image manipulation. Results indicated that both smoking cues and thin model images increased reported urges to smoke. Additionally, in the absence of smoking cues, the effect of the body image manipulation was moderated by baseline body dissatisfaction, with those women with greater body dissatisfaction reacting stronger to the thin model image. The effect on smoking urges by the body image manipulation was partially mediated by both state measures of affect and body satisfaction.

Thus, this study is the first to demonstrate through an experimental design that the presentation of images portraying thin women increased smoking urge, which is consistent with a causal influence of body image affecting their smoking motivation.

Chapter One

Introduction

According to the latest Surgeon General's Report on Smoking, cigarette smoking has been found to cause diseases in nearly every organ of the body (USDHHS, 2004). Despite widespread knowledge of the health risks associated with tobacco smoking, almost a quarter of the U.S. population continues to smoke (CDC, 2004). Although this statistic reflects a decline in the past few decades of the prevalence of smoking, this decline is not as great in women as it is in men (Escobedo & Peddicord, 1996, 1997; National Center for Health Statistics, 1993; Ockene, 1993). Young females seem to be initiating at higher rates than their male counterparts (CDC, 1994), and among older adolescents, the females are more nicotine dependent than the males (Young et al., 2002). Women also seem to have more difficulties in quitting and remaining abstinent than men (Bjornson, Rand, Connett, Lindgren, & et al., 1995; Blake et al., 1989; CDC, 1994; Cepeda-Benito, Reynoso, & Erath, 2004; Ockene, 1993; Ortner, Schindler, Kraigher, Mendelsohn, & Fischer, 2002; Swan, Ward, Carmelli, & Jack, 1993; Ward, Klesges, Zbikowski, Bliss, & Garvey, 1997; Wetter et al., 1999).

Smoking is now the leading cause of preventable death and disease in women (Husten, 1998; USDHHS, 2001), with 20% of women smoking as of 2002 (CDC, 2004). And while the lung cancer mortality rate in men is now beginning to level off, it continues to rise in females (Husten, 1998). This rise led lung cancer to become the United States' leading cause of female cancer death, surpassing breast cancer in 1987 (USDHHS, 2001). Although both men and women are susceptible to smoking-related illnesses, such as cancer and heart disease, it is believed that women may be at an even greater risk than men (Baldini & Strauss, 1997; Langhammer, Johnsen, Holmen, Gulsvik, & Bjermer, 2000; Ortner et al., 2002; Zang & Wynder, 1996). Women are also susceptible to other smoking-related diseases unique to females, such as those related to

cervical cancer and reproductive function (USDHHS, 2001). In general, women who smoke lose more years off their lives than men who smoke (14.5 years versus 13.2 years; USDHHS, 2004). In addition, women seem to be less aware of the significant dangers posed to them by continuing to smoke as seen in their less frequent reporting of health concerns as compared to men when discussing their motivations to quit smoking (Curry, Grothaus, & McBride, 1997). These findings illustrate the extreme importance of understanding smoking behavior within the female population.

We must be aware, however, of other gender differences. Past research has demonstrated that, in general, individuals report greater urges to smoke when experiencing negative affect (Brandon, Wetter, & Baker, 1996); however, women, more than men, report that they smoke to manage their mood (Cepeda-Benito & Reig Ferrer, 2000; Ward et al., 1997). Women also report weight control as another perceived benefit of smoking (Cepeda-Benito & Reig Ferrer, 2000; Ward et al., 1997). These differences in outcome expectancies may reflect the motivations underlying gender differences in smoking initiation, maintenance, and cessation. Women, more so than men, appear to tie their smoking behavior to reasons of weight control (Killen, 1998; Klesges et al., 1998; Ogden, 1994; Ward et al., 1997), weight loss (Klesges & Klesges, 1988; Ogden, 1994; Perkins, Levine, Marcus, & Shiffman, 1997), and/or fear of or actual post-cessation weight gain (Klesges & Klesges, 1988; Levine, Perkins, & Marcus, 2001; Perkins et al., 1997). Females are also more likely than males to diet (Klesges et al., 1998) and use inappropriate and even dangerous methods to control their weight, such as smoking (Cavallo & Pinto, 2001; Klesges et al., 1998; Mitchell & Perkins, 1998; Polivy & McFarlane, 1998; Wiseman, Turco, Sunday, & Halmi, 1998).

With regard to initiation, it is known that adolescent girls tend to have concerns about their weight and body shape (Killen, 1998), are more dissatisfied with their bodies than males, and are more inclined to actively engage in behaviors to lose weight than males. Moreover, this concern about weight and body shape has been increasing among pre-teenage girls (Polivy & McFarlane, 1998). Killen (1998) found that thoughts about weight, eating disorder symptoms, and weight control attempts were prospectively related to females – but not males – initiating smoking. This finding was supported by French,

Perry, Leon, and Fulkerson (1994) who found that general weight concerns predicted initiation of smoking in adolescent females but not in adolescent males. Stice and Shaw (2003) also found that body image disturbances greatly increased the risk for smoking initiation in adolescent girls. Although smoking for weight control is prevalent in both males and females in many different race/ethnic groups, it appears that girls are more influenced than boys by the desire to smoke for weight control or weight loss (Fulkerson & French, 2003; USDHHS, 2001). Klesges et al. (1998) also found that weight-conscious females, particularly Whites, may be initiating smoking in an attempt to control weight, believing that smoking has anorexic effects.

Many of these smoking expectancies may be based on tobacco advertising, which has been marketing cigarettes as a weight control device since the 1920's with ads such ones from as Lucky Strike, which invited women to "Reach for a Lucky instead of a sweet." Although the tobacco companies have been warned by the Federal Trade Commission not to market cigarettes as "reducing devices" ("Looking back: Who was the original Lucky Strike girl?," 1999, Fall), they still infuse their advertisements with this message by suggesting that women who smoke are slim, athletic, and sexually attractive (USDHHS, 2001).

The focus on weight and body image is not limited to adolescent girls, but instead affects women across the life span. In fact, in a national survey conducted by Cash, Winstead, and Janda (1986), fewer than 10% of the women reported having only minor concerns about their appearance, whereas the rest reported greater concerns. It is this focus on weight and body image that is a recurring theme when querying women about their smoking behavior. Compared to nonsmoking women, smokers are more likely to be concerned about their weight (Feldman, Hodgson, & Corber, 1985), to use diet pills (Gritz & Crane, 1991), to view their body weight as important to their self-esteem (Bruckner, Spring, & Pingitore, 1994), to be dissatisfied with their weight (Bruckner et al., 1994), to be higher in dietary restraint (Bruckner et al., 1994; Meyers et al., 1997), and to feel unattractive (King, Matacin, Marcus, Bock, & Tripolone, 2000). Of women who are currently smoking, young women have the least intention to quit (Perkins et al., 2001) and they are up to 4 times more likely than men to report weight gain as a cause of

relapse (Swan et al., 1993). Women's fear of post-cessation weight gain appears to have a factual basis (Williamson et al., 1991). Women are more likely to self-report greater eating and weight gain after quitting (Perkins et al., 2001), and, indeed, they do appear to gain more than men, either as a percentage of their initial weight or in absolute pounds (Williamson et al., 1991). It is, therefore, not surprising that women hold expectancies that smoking controls body weight and cessation leads to weight gain (Meyers et al., 1997). In fact, women hold higher expectations than men of cigarette's utility when it comes to controlling appetite and weight (Brandon & Baker, 1991). Although a general relationship between smoking and weight concerns has been found among women, what is unclear and untested is whether phasic fluctuations in body image influence situational cravings for cigarettes, and if this relationship is moderated by a woman's general body satisfaction. Such a relationship would provide evidence of a causal influence of body image on smoking motivation.

Body Image Dissatisfaction

Body image is a person's perception of his or her outer appearance (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). It is believed that dysfunctional body image is caused by socio-environmental variables (e.g., parents, peers, and media) that provide comparison standards, as well as by events that activate self-appraisal, such as viewing thin models (Cash, 1998; Thompson et al., 1999). Before the 1980's, the focus of body image research was on patients suffering from anorexia nervosa and bulimia. It was not until the 1980's that research began to demonstrate that individuals who do not have eating disorders experience body dissatisfaction (for a review see Thompson et al., 1999). Women are generally less satisfied with their bodies than men (Turner, Hamilton, Jacobs, Angood, & Dwyer, 1997). In fact, this phenomenon is so prevalent in the general population of women that the widespread dissatisfaction with one's body has now been labeled "normative discontent" (Rodin, Silberstein, & Striegel-Moore, 1984; Tiggemann & Wilson-Barrett, 1998).

The mass media are thought to be among the greatest influences of women's desire for thinness. Over the past three decades in Western culture, the models in magazines, movies, and television have become increasingly thin. This promotes a

modern ideal of feminine attractiveness that is a thin body (Owen & Laurel-Seller, 2000; Polivy & McFarlane, 1998). There is, consequently, a great deal of pressure on women to achieve an unhealthy level of body weight, which ranges from below-normal to a weight approaching the criteria for anorexia nervosa (Owen & Laurel-Seller, 2000; Polivy & McFarlane, 1998).

Experimental studies have examined the immediate impact of viewing images of thin models versus normal-weight models, obese models, or neutral images. These studies have found that women, following immediate exposure to thin models, report greater depression (Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999; Stice & Shaw, 1994), stress (Stice & Shaw, 1994), shame (Stice & Shaw, 1994), body and weight dissatisfaction (Irving, 1990; Kalodner, 1997; Ogden & Munday, 1996; Shaw, 1995; Stice & Shaw, 1994; Turner et al., 1997), weight concern (Posavac, Posavac, & Posavac, 1998) and anger (Pinhas et al., 1999), especially among women who are more responsive to personal cues (Wilcox & Laird, 2000). In terms of self-reported body satisfaction, Groesz and colleagues (2002), in their meta-analytic review, found an overall d value of -0.31, indicating body satisfaction decreased with the viewing of thin models as compared to viewing the control images. These studies support the conclusion by Turner et al. (1997) that the media shape societal perceptions, rather than just reflecting those perceptions.

Cue Reactivity

It is believed that classical conditioning may play a key role in drug use behavior. Under this general paradigm, it is thought that external stimuli, such as drug paraphernalia and situations, and interoceptive stimuli, such as cognition and affect, that accompany drug administration become paired with the drug itself. Over time, with repeated and reliable pairings, these conditioned stimuli can elicit conditioned responses. Many studies have been able to demonstrate this phenomenon in a laboratory setting, with smokers having subjective, physiological, and behavioral responses to either external or internal cues (Brandon, Piasecki, Quinn, & Baker, 1995; Carter & Tiffany, 1999; Niaura, Rohsenow, Binkoff, Monti, & et al., 1988; Rohsenow, Niaura, Childress,

Abrams, & et al., 1990). Cue reactivity can help identify the motivations behind drug use, including the stimuli and situations that provoke ongoing smoking and relapse.

Different theoretical models have been developed to account for cue reactivity (for a summary of theoretical models, see Tiffany, 1995). Two models are based on the idea of conditioned withdrawal, i.e. that certain stimuli evoke aversive, withdrawal-like responses, and the individual relapses to avoid these negative effects. The first such model was proposed by Wikler (1948). This conditioned withdrawal model stated that the environmental stimuli associated with a drug user's withdrawal becomes a conditioned stimuli (CS) eliciting the conditioned withdrawal response. Siegel and his associates (Poulos, Hinson, & Siegel, 1981; Siegel, 1983) proposed an alternate model, known as the conditioned compensatory response model, which was still based on the notion of conditioned withdrawal. This model stated that a stimulus paired with drug administration becomes the CS that elicits compensatory withdrawal-like response. Research has not consistently supported these models, and thus new theoretical models have been introduced. One such model is the conditioned incentive model proposed by Stewart, de Wit, and Eikelboom (1984). This model hypothesizes that environmental stimuli associated with drug administration become positive incentives by mimicking the appetitive effects of the drug, which motivates an individual to use the drug. This model has also faced some shortcomings in being able to predict an addict's behavior and response to drug-paired stimuli. Although these specific theoretical models have not completely explained how classical conditioning is involved in a drug user's craving, there is consensus that this general concept has a great deal of utility in helping to understand addictive behaviors (Drummond, Tiffany, Glautier, & Remington, 1995). A common element of all the models is that conditioned stimuli should elicit responses that include cravings to smoke.

In a meta-analysis conducted by Carter and Tiffany (1999), there were consistent findings indicating that exposure to smoking cues, as compared to neutral cues, increased heart rate and skin conductance responding. The average effect sizes in Cohen's *d* were .21 and .44 for each of those physiological measures respectfully. Self-report of cravings had a much larger effect size ($d = 1.18$). These cues included the induction of negative

affect, the imagining of a drug-related situation, the viewing of smoking images, or the presentation of real cigarettes. These results found in the smoking literature paralleled those found for other addictive substances (Brandon et al., 1995; Carter & Tiffany, 1999).

The Current Study

The overarching purpose of this study was to test if state body satisfaction plays a causal role in smoking motivation. Thus, we manipulated body image satisfaction to test whether activation of negative body image cognitions would produce greater urges to smoke. A smoking cue manipulation was included to test whether the body image manipulation was sufficient to evoke cravings to smoke or if both factors were necessary to have that effect. Additionally, the simultaneous presentation of the two factors allowed us to test whether there was a synergistic effect of the two manipulations on smoking urges.

This study drew upon two areas of research – body dissatisfaction and cue reactivity – and used methodology already established within each of these areas. The experimental condition of the body image manipulation displayed stimuli of thin fashion models, intended to threaten the woman's self-image, whereas the experimental condition of the smoking cue manipulation displayed smoking stimuli, intended to induce cravings. The control conditions of both manipulations were of neutral images of inanimate objects. Although there were two modes of assessment of smoking motivation, self-report measures of craving and physiological measures of heart rate and skin conductance, the self-report measures were the primary dependent variables of interest, as they have shown the greatest effect size in other research. The psychophysiological data were not analyzed for this thesis. For the dependent measures, it was hypothesized that main effects would be found for both the smoking cue manipulation and the body image manipulation, and the effects would be at least additive within the condition that includes both experimental manipulations.

In past research on body image satisfaction, greater effects for thin model images were found for participants with greater body dissatisfaction (Groesz et al., 2002). Therefore, our second aim was to evaluate level of body satisfaction as a moderating variable in the body image manipulation. A secondary hypothesis was that those

individuals with higher scores on the measure of body dissatisfaction would demonstrate the greatest impact from the body image manipulation.

Chapter Two

Methods

Experimental Design and Overview

Participants were recruited under the guise of a study interested in smokers' reactions to different images. The experiment was a randomized 2 X 2 crossed factorial, within-subjects design (body image manipulation X smoking cue manipulation). Thus, the four conditions were thin models/smoking cues (T/S), thin models/neutral cues (T/N), neutral cues/smoking cues (N/S), and neutral cues/neutral cues (N/N). Participants completed measures assessing basic demographics, smoking history, smoking expectancies, body image dissatisfaction, mood state, and urge to smoke, as well as had their heart rate and skin conductance assessed. The dependent measures were the reported smoking urges.

Participants

Participants were 62 college females. University students were used due to findings from the CDC (2002) indicating that, nationally from 1993-2000, individuals in the age group of 18-24 have not decreased their prevalence of smoking and continue to have one of the highest rates of prevalence. In addition, the prevalence of current smoking increased among those aged 20-24 with 13 or more years of education. A nationwide study by Wechsler, Rigotti, Gledhill-Hoyt, and Lee (1998) indicated that the prevalence of smoking among all types of college students was increasing, and the increase was much greater among those students at public schools than at private schools. Klesges' (1988) research indicated that college students have an increased smoking incidence and rate, especially in the female population. There is also evidence suggesting that university females report a greater level of body dissatisfaction and increased beliefs of being overweight than they had as high school seniors (Vohs, Heatherton, & Herrin, 2001). It has been shown that within the university population, it is a high priority to

achieve and maintain an ideal weight, and that the use of dieting strategies of all types are extremely high in this group (Klesges & Klesges, 1988).

Participants were recruited from the University of South Florida through fliers posted on campus, freshman orientation screenings, classroom recruitment, and psychology courses that offered extra credit for courses by participating in research. Potential participants were screened over the telephone, with participation limited to those women currently attending college, between the ages of 18 and 24, and who smoked at least 10 cigarettes per day for at least 1 year. Participants recruited within the undergraduate psychology pool received two extra credit points, and all others were paid \$20.00. All participants had their names entered into a lottery to win \$50.00.

Measures

Demographic Questionnaire. Single items assessed the age, education, marital status, and ethnicity of the participants, and as well as their parents' level of education and household income.

Smoking Status Questionnaire (SSQ). This form was used to assess the participants' smoking status and nicotine dependence. This questionnaire contains items from the Fagerström Test for Nicotine Dependence (FTND). The FTND is a reliable and valid measure of nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991).

Short Smoking Consequences Questionnaire (Short-SCQ; Myers, McCarthy, MacPherson, & Brown, 2003). This is a 21-item version of the original 50-item Smoking Consequences Questionnaire (SCQ; Brandon & Baker, 1991), a standard instrument for measuring smoking expectancies among college students. The internal consistency for the full Short-SCQ was high (.93) and it correlated highly with the original ($r = .94$). Both questionnaires have four factors on which outcome expectancies can be measured: Positive Reinforcement/Sensory Satisfaction, Negative Reinforcement/Negative Affect Reduction, Appetite/Weight Control, and Negative Consequences. The Appetite/Weight Control factor is the same for both the SCQ and the Short-SCQ. The other three factors on the Short-SCQ correlated well with the factors of the SCQ (PR: $r = .86$, NR: $r = .99$,

NC: $r = .78$). This study was only interested in the Appetite/Weight Control factor, but the complete form was administered.

Eating Disorders Examination – Self-Report Questionnaire Version (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is a 41-item self-report measure based on the Eating Disorders Examination clinical interview (EDE; Cooper & Fairburn, 1987), the latter of which has excellent psychometric properties. Good to adequate correspondence was found between the two assessments on the different subscales indicating the EDE-Q's acceptability as a self-report measure (Fairburn & Beglin, 1994). All the subscales have excellent internal consistency and two week test-retest reliability. This study used only the Shape Concerns and Weight Concerns subscales, totaling 12 items, to measure body dissatisfaction at baseline. The EDE-Q subscales are scored in the same manner as the original EDE: items are rated on a 7-point forced-choice format ranging from 0-6. Higher scores reflect greater frequency or severity. The total score of the subscales, as opposed to the mean, were used in this study.

The Eating Disorders Inventory (EDI; David M. Garner, Olmstead, & Polivy, 1983). The EDI is a widely used self-report measure of symptoms associated with eating disorders, such as body dissatisfaction, perfectionism, and weight concern. This study used the 7-item Drive for Thinness (DFT) subscale, which assesses concern with dieting, fear of weight gain, and preoccupation with weight, and the 9-item Body Dissatisfaction (BD) subscale, which assesses satisfaction with weight-related body sites. The subscales have shown good to excellent internal consistency (DFT: $\alpha = .87-.91$; BD: $\alpha = .92-.93$) in a nonpatient female group (D. M. Garner, Olmsted, Polivy, & Garfinkel, 1984; Raciti & Norcross, 1987; Vanderheyden & Boland, 1987). Excellent to good test-retest reliability in nonpatient college students has been demonstrated at three weeks (DFT: $r = .92$; BD: $r = .97$; Wear & Pratz, 1987) and at one year (DFT: $r = .72$; BD: $r = .75$; Crowther, Lilly, Crawford, Shepherd, & Oliver, 1990; Tiggemann & Wilson-Barrett, 1998). The subscales are usually scored on a 0-3 scoring system, but for the present study the items were scored with a 1-6 scoring system to increase the range of response.

Visual Analogue Scales (VAS). These were 4 scales displayed on a computer screen following each trial. The four statements asked the participant to rate how they

felt at that exact moment. They assessed urge to smoke a cigarette (*not strong at all to very strong*), affect (*very unhappy to very happy*), overall body weight satisfaction (*very dissatisfied to very satisfied*), and overall appearance satisfaction (*very dissatisfied to very satisfied*). The scales had a range of 21 points (0 to 20), but the participant only saw the anchors 0 and 10, with a line marking the middle of the scale. The participant used a trackball mouse to move the marker along the line and then clicked the mouse key when she felt the marker best represented how she felt. These scales assessed participants' state characteristics following the experimental trials. The weight and appearance satisfaction scales also served as manipulation checks to determine if the thin images induced body dissatisfaction.

Object Desirability Form. This form was used to encourage social comparison to the thin model images and to reinforce the belief that the study was solely interested in smokers' opinions and feelings following different images. This form provided spaces for each image for the participant to mark whether or not she wanted to own the items displayed in the image. The instructions, given both verbally and in written form, asked the participant to imagine owning the item and using the item. Those instructions were especially relevant in encouraging the social comparison to the thin images.

Materials

Carbon monoxide (CO) monitor. A BreathCo carbon monoxide recorder by Vitalograph was used to measure the participants' level of CO in parts per million (ppm). This measurement was taken immediately following informed consent and HIPPA consent. The participant was instructed to hold her breath for 20 seconds and then breathe into a disposable cardboard tube. (This measure was not available for the first 7 participants.)

Body-related images. Media images have been used in previous studies with success. The images of thin models used for this study were taken from websites that contained fashion images similar to those found in popular women's fashion magazines such as *Cosmopolitan* and *Vogue*. These fashion magazines have been mentioned on various websites as being the most popular among women (*Amazon Booksellers' women's interest page.*, n.d.; *Top magazines by category.*, n.d.). They are considered to be at the

cutting edge of fashion and beauty, part of which encompasses the thin-ideal. One such on-line announcement stated that the magazine “lives by the maxim that you can’t be too rich or too thin” and describes the models as being “broomstick-thin” (*Amazon Booksellers' women's interest page.*, n.d.). A total of six images were used in the experimental condition of the body image manipulation. All models appeared to be in the age group of the participants, and a sampling of ethnically/racially diverse individuals was chosen.

Smoking cue reactivity images. The smoking cue images were devoid of complete human models so as to not confound the results. Six images were used in the experimental condition of the smoking cue manipulation. Three of the images were of burning cigarettes alone, and the other three images contained a gender-neutral hand holding the cigarette.

Neutral images. These images were devoid of any human models that may have influenced the participant. Past body image research has used control images of normal weight models, obese models, or inanimate objects. Although there is some concern that the inanimate stimuli may confound the body image manipulation with effects of seeing an attractive person (regardless of thinness of the model), similar effects sizes have been found for comparison to average models and inanimate objects (Groesz et al., 2002). This lends support to the notion that it is the slenderness of the model and not the viewing of an attractive person that provides the hypothesized effects.

To maximize the differences between the experimental and control images, this study used inanimate objects as control images. Images chosen had no obvious relation to eating, grooming, body weight, physical body image, or smoking and thus were not expected to trigger any body or weight evaluation or smoking urges. A sample of Peter Lang’s collection of neutral images (e.g., household appliances, furniture), which have been previously demonstrated to show low arousal, were used (CSEA-NIMH, 1995). Also used were comparable images taken with a digital camera of similar objects (e.g., office supplies, household objects). These 36 neutral images were shown as control images for the body image manipulation and the smoking cue manipulation, and they were also the images used in the distractor trials. The distractor trials, with the same

layout as the experimental trials, allowed the data collection to be a fluid process, while offering a recovery period between the experimental trials. These images also allowed for some distraction to reduce carry-over effects from one experimental trial to the next.

Physiological measures. Heart rate and skin conductance are both fairly robust measures of physiological responding and are not very invasive. Heart rate is a measure of cardiovascular function that varies in response to emotional arousal or cognitive effort (e.g., Schwartz, Weinberger, & Singer, 1981). Skin conductance responses provide an index of sympathetic arousal (e.g., Raskin, 1973). Electrodes were attached according to established guidelines to measure both heart rate and skin conductance. For heart rate, one large (8mm) electrode filled with saline electrode gel was placed on each forearm, and one ground electrode was also placed on the non-dominant forearm. To measure skin conductance, two large (8mm) electrodes filled with K-Y Jelly were attached to the hypothenar eminence on the participant's non-dominant hand. The data were directly inputted into a computer. For the initial baseline of 2 minutes, echocardiogram (EKG) and skin conductance was monitored continuously. For each trial, a two second baseline was recorded prior to the picture viewing and then 10 seconds were recorded from the beginning of the picture viewing. Heart rate was recorded as interbeat intervals, which were triggered by R-waves detected by a Schmitt trigger. Stored interbeat intervals were edited offline to correct for artifacts and then converted to beats per minute for each half-second value. Skin conductance was sampled at 20 Hz and stored as the medians of each half-second value. These data were not analyzed for this thesis.

Computers. One computer controlled the recording of the psychophysiology data. A second computer controlled the presentation of the images and the VAS questions. The second computer also recorded the responses to the VAS measures.

Weight. A professional, medical scale was used to measure weight to the nearest $\frac{1}{4}$ pound and height to the nearest $\frac{1}{4}$ inch, which were used to calculate the Body Mass Index (BMI).

Table 1

Summary of Procedure

<p>Pre-Manipulation</p>	<ul style="list-style-type: none"> • Informed consent and HIPPA authorization • CO measured • Participant smoked one cigarette • Participant completed baseline measures <ul style="list-style-type: none"> ○ Demographic questionnaire ○ SSQ ○ Short-SCQ ○ PANAS ○ EDE-Q (Weight Concerns and Shape Concerns subscales) ○ EDI (Drive for Thinness and Body Dissatisfaction subscales) • Baseline measure of heart rate and skin conductance
<p>Manipulation</p>	<ul style="list-style-type: none"> • Shown three blocks, each block comprised of one each of four experimental trials <ul style="list-style-type: none"> ○ Thin models/smoking cues (T/S) ○ Thin models/neutral cues (T/N) ○ Neutral images/smoking cues (N/S) ○ Neutral images/neutral cues (N/N) • Shown a distractor trial after each experimental trial • Given the Object Desirability Form to complete for each trial • Heart rate and skin conductance measured at the beginning of each image • VAS for urge, mood, weight satisfaction, and appearance satisfaction measured after each trial
<p>Post-Manipulation</p>	<ul style="list-style-type: none"> • Deception check • Height and weight measured • Debriefed • Compensated for participation

Procedure

Recruitment. Some participants were recruited through the University of South Florida's undergraduate psychology pool. These individuals registered to participate in the study through an on-line registration site where they were screened on-line and received credit for courses after the completion of the experiment. Other participants were recruited through flyers and/or newspaper ads, through courses, and through a freshman orientation screening questionnaire. These individuals were screened over the phone and received monetary compensation after the completion of the experiment. All participants who were qualified were scheduled for an individual appointment in the afternoon or evening to be held in a room at the Tobacco Research and Intervention Program at the H. Lee Moffitt Cancer Center and Research Institute. The late scheduling time was established with the hope that most of the participants would have smoked at least one cigarette before arriving and thus would not be in a state of over-night abstinence. The participants were tested individually. They were instructed to bring their cigarettes to the appointment.

Pre-manipulation. Upon their arrival, participants were informed that they were participating in a study to understand smokers' feelings and reactions to different images. They were told that the experiment would involve their viewing and rating different stimuli while we assessed their reactions. Informed consent and HIPPA authorization were obtained at this time. A breath sample was collected for the CO analysis. The participant was then instructed to go outside to smoke one cigarette. This allowed for standardization across participants and to avoid having the urge ratings be influenced by high withdrawal levels.

After finishing smoking her cigarette, the participant was asked to complete the demographic questionnaire, the SSQ, the Short-SCQ, the PANAS, the EDI (Drive for Thinness and Body Dissatisfaction subscales), and the EDE-Q (Weight and Shape Concerns subscales). The participant was told that the information obtained from the measures would be used to better understand college students in general and consumers who are smokers. The participant was also informed that the measures assessed her current feelings before beginning the experiment to be able to control for individual

differences. This information was given to minimize suspicion of the body image questionnaires.

Manipulation. The participant was seated in a comfortable chair about 2 feet in front of a high-resolution color computer monitor. The female experimenter attached the five physiological electrodes to the participant and then left the room to begin recording 2 minutes of baseline heart rate and skin conductance.

The experimenter returned to the experimental room and read a script informing the participant that she would see many different pairs of images, each one shown for only a brief amount of time. The participant was instructed to imagine using each object displayed, and then decide whether or not she would like to own the object, recording her decision on the Object Desirability Form. She was given two examples, one of a chair and another of a clothing outfit, to explain how to think about each object shown. The participant was given instructions on how to complete the VAS measures on the computer using the mouse, after which she was then left alone to complete the session.

The participant was exposed to one of six orders of trials. The orders were based on a random categorization of three blocks of trials. Each block was comprised of four experimental trials (one of each experimental condition), each separated by a distractor trial (i.e. eight trials per block). Within the block, the order of the experimental trials was randomly established. Each experimental trial contained a photo representing the body image manipulation displayed side-by-side an image representing the smoking cue manipulation. The side of the smoking cues and body image photos were counterbalanced. The distractor trials contained two neutral images displayed side-by-side to mimic the appearance of the experimental trials.

Each trial slide (i.e., image pair) was shown for 17 seconds, followed by three seconds of black screen. The participant was instructed to watch each slide for the entire time that it was displayed. Psychophysiological measures were collected throughout the first 10 seconds of the slide-viewing interval. The participant was instructed to remain still until hearing a tone, which was presented 10 seconds into the trial. At this time, the participant was allowed to move to make her ratings on the Object Desirability Form. At the end of the trial, the four VAS ratings were completed. After the completion of the

last VAS, there were two seconds of black screen, during which the baseline physiological measurements for the upcoming trial were recorded.

Post-manipulation. Upon completion of the study, each participant was asked to guess the purpose of the experiment, so as to assess whether the manipulations were adequately concealed. The experimenter then weighed her and measured her height to calculate her BMI. Lastly, the participant was debriefed and asked not to tell anyone else about her experience. The participant was then awarded either experimental points or money for participation and was entered into the lottery.

Chapter Three

Results

Participant Characteristics

Demographic and smoking history characteristics are presented in Table 2. Although all participants met the inclusion criteria of smoking a minimum of 10 cigarettes per day for at least one year, the mean score on the FTND (3.29) indicates a low level of nicotine dependence.

Manipulation Check

VAS measures of urge, mood, weight satisfaction, and appearance satisfaction ratings were averaged across same trials types (e.g., the mean of the urge ratings for the three T/S trials) for use in subsequent analyses. As expected, the ratings for overall weight satisfaction and overall appearance satisfaction were highly intercorrelated in all four conditions (T/S: $r = .84, p < .001$; N/S: $r = .84, p < .001$; T/N: $r = .84, p < .001$; N/N: $r = .83, p < .001$). Therefore, the mean of the weight and appearance satisfaction ratings for each condition was calculated creating a new variable, *state body satisfaction*.

The experimental design required that the thin images induce body dissatisfaction. We conducted a 2 X 2 Repeated Measure Analyses of Variance (ANOVA) using the state body satisfaction ratings. The means of the ratings show that the thin images ($M = 10.16, SE = .72$) produced less satisfaction than the neutral images ($M = 10.73, SE = .68$), indicating that the manipulation was successful, $F(1, 61) = 21.98, p < .001$. The smoking images also had a significant effect on state body satisfaction, $F(1, 61) = 4.71, p < .05$, with the smoking images ($M = 10.37, SE = .71$) producing lower body satisfaction ratings than the neutral images ($M = 10.53, SE = .70$). No interaction was found.

Table 2

Participant Characteristics

Variable	%	<i>M</i>	<i>SD</i>
Age		20.03	1.50
Smoking History			
Years smoked		4.58	2.37
Cigarettes smoked per day		15.65	4.89
Fagerström score		3.29	2.00
Carbon monoxide level*		15.16	8.74
Ethnicity			
Caucasian	91.9		
Black	3.2		
Other	4.8		
Hispanic			
Yes	8.1		
No	91.9		
Year in school			
Freshman	32.3		
Sophomore	29.0		
Junior	22.6		
Senior	16.1		
Marital Status			
Single	100		
Married	0		
Does/did Father Smoke			
Yes	69.4		
No	27.4		
I don't know	3.2		
Does/did Mother Smoke			
Yes	45.2		
No	51.6		
I don't know	3.2		

*Based on only 55 subjects from whom this was collected.

Primary Analyses

A 2 X 2 Repeated Measures ANOVA was conducted to test the effects of the manipulations on the VAS smoking urge ratings. A main effect of the smoking cue manipulation was found, $F(1, 61) = 17.13, p < .001$. Smoking images produced greater urges to smoke ($M = 8.97, SE = .77$) than neutral images ($M = 8.00, SE = .69$), replicating previous cue-reactivity research.

A main effect, although smaller, was also found for the body image manipulation, $F(1, 61) = 5.80, p = .02$. Consistent with our primary hypothesis, the thin model images produced greater urges to smoke ($M = 8.62, SE = .73$) than neutral images ($M = 8.35, SE = .72$).

Although both the smoking and body image manipulations produced significant main effects, there was no interaction between the two manipulations, $F(1, 61) = .65, p = .42$. This indicates that the two manipulations had additive but not synergistic effects (see Table 3).

Table 3

Means (Standard Deviations) of Smoking Urge Ratings

Smoking image manipulation	Body image manipulation	
	Thin	Neutral
Smoking	9.06 (6.10)	8.88 (6.13)
Neutral	8.19 (5.57)	7.82 (5.36)

Note. Urge rating scale ranged from 0 to 20.

Moderators

Given a main effect for the body image manipulation, our second aim was to analyze level of trait body dissatisfaction as a possible moderator of the effect. Four measures of body dissatisfaction were collected, the EDI-Drive for Thinness, EDI-Body Dissatisfaction, EDE-Weight Concerns, and EDE-Shape Concerns. As expected, they were highly intercorrelated (see Table 4). Therefore, a combined score was computed to encompass the body dissatisfaction construct. This new variable, called *Trait Body Dissatisfaction (TBD)*, was created by summing the z-scores of the four measures. TBD

was not correlated with smoking urge ratings in any of the experimental conditions (T/S: $r = .05, p = .69$; N/S: $r = .06, p = .63$; T/N: $r = .07, p = .57$; N/N: $r = -.01, p = .92$).

Table 4

Correlations between Four Measures of Body Dissatisfaction and BMI

Measure	1	2	3	4	5
1. EDI – Body Dissatisfaction	-				
2. EDI – Drive for Thinness	.62**	-			
3. EDE – Weight Concerns	.74**	.80**	-		
4. EDE – Shape Concerns	.78**	.80**	.93**	-	
5. BMI	.45**	.20	.38**	.42**	-

Note. EDI = Eating Disorders Inventory; EDE = Eating Disorders Examination.

** $p < .01$.

To test for a moderating effect on smoking urge, a generalized linear model was established with the smoking and body image manipulations as within-subjects factors and the TBD as a continuous between-subjects factor. The hypothesized two-way interaction between the body image manipulation and the TBD approached significance, $F(1, 60) = 3.41, p = .07$. Moreover, a significant three-way interaction was found between the two within-subjects factors and the TBD, $F(1, 60) = 5.72, p = .02$.

To determine the nature of the three-way interaction, separate ANOVAs were conducted to assess for a main effect of the body image manipulation both in the presence of the smoking image and without the presence of the smoking image. In the absence of the smoking image, there was not only a significant main effect of the body image manipulation, $F(1, 60) = 5.04, p = .03$, but also a significant interaction effect with TBD, $F(1, 60) = 8.42, p < .01$. This indicates that the TBD moderated the effect of the body manipulation. In the presence of the smoking image, there was no main effect of the body image manipulation, $F(1, 60) = 1.36, p = .25$, nor an interaction with the TBD, $F(1, 60) = .18, p = .67$. Thus, only when smoking images were *not* present did thin images induce urges, and this effect was moderated by body dissatisfaction. Figure 1 displays this relationship using a median split of TBD.

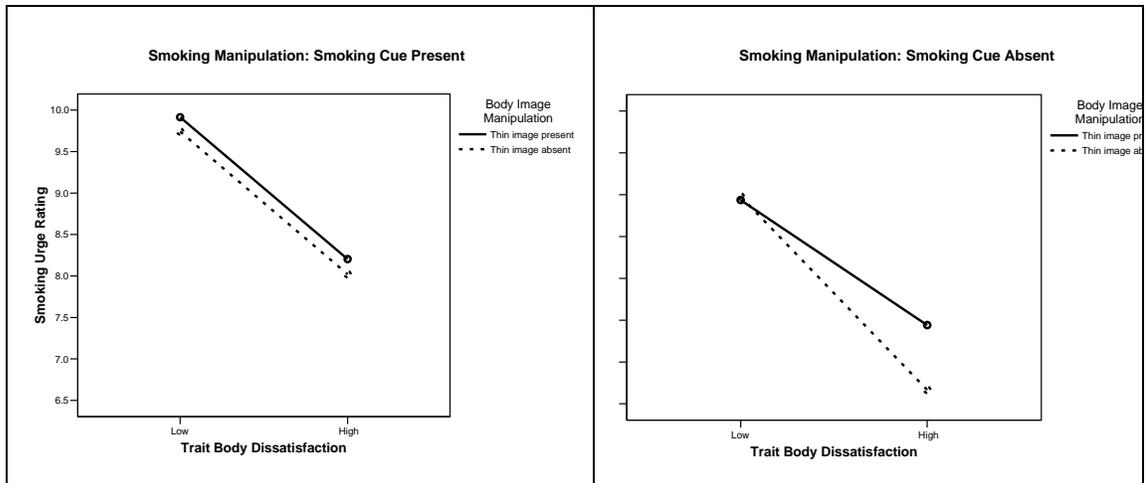


Figure 1. This shows that Trait Body Dissatisfaction moderates the body image manipulation only when the smoking cue is absent. TBD categories are based on a median split of that variable. Ratings were made on a 21-point scale (0 = *urge to smoke a cigarette is not strong at all*, 20 = *urge to smoke a cigarette is very strong*).

Because BMI is highly correlated with most of the measures of body dissatisfaction (Table 4), we analyzed BMI as a continuous between-subjects factor to assess for its moderating effects. However, it did not show any significant interactions with the manipulations (i.e., body image manipulation X BMI, $F(1, 60) = .64, p = .43$; smoking cue manipulation X BMI, $F(1, 60) = .12, p = .73$; body image manipulation X smoking cue manipulation X BMI, $F(1, 60) = .47, p = .50$).

The Appetite/Weight Control factor of the Short-SCQ was used as a continuous between-subjects factor to examine whether those expectancies moderated the relationship between the body image manipulation and smoking urges. There were no significant interactions with the manipulations (i.e., body image manipulation X BMI, $F(1, 60) = .01, p = .91$; smoking cue manipulation X BMI, $F(1, 60) = .34, p = .56$; body image manipulation X smoking cue manipulation X BMI, $F(1, 60) = .37, p = .55$). Moreover this variable was not correlated with TBD ($r = .19, p = .14$).

Mediators

Mediators were tested using the logic of Baron and Kenny's (1986) recommended procedures. To test the possibility that negative affect may mediate the relationship between the body image manipulation and urges to smoke, a repeated measures ANOVA

with the VAS mood ratings as the dependent variable was first conducted. Although there was a trend for the thin model image to produce greater negative affect than the neutral image ($M = 10.92$, $SE = .42$ and $M = 11.18$, $SE = .42$, respectively), the difference did not reach significance, $F(1, 61) = 2.87$, $p = .10$. There was also no significant effect for the viewing of the smoking factor, $F(1, 61) = .71$, $p = .40$, nor was there an interaction between the two types of factors, $F(1,61) = .001$, $p = .98$.

However, because there was a trend toward significance with the body image manipulation, a continued evaluation of the mediational relationship was explored. First, a mean of the smoking urge ratings was calculated for both the trials with thin images (i.e. T/S and T/N) and the trials without thin images (i.e. N/S and N/N). A difference score between these two means was computed. The same was done for the mood ratings. These two difference scores were correlated ($r = -.28$, $p < .05$), indicating that as the thin image produced lower positive affect, it also produced greater smoking urges.

Finally, a 2 X 2 Repeated Measures ANCOVA was conducted to test the effects of the body image manipulation on the urge ratings with the mood ratings for each trial as covariates. No longer did the body image manipulation produce significant differences in urge, $F(1, 57) = .65$, $p = .42$. This supports the hypothesis that state affect did mediate the relationship. A caveat is that the one step in the mediational analysis only approached significance.

Because the body image manipulation decreased state body satisfaction and increased smoking urges, state body satisfaction was tested as a mediator of the body image manipulation's effect on smoking urges. A mean of the state body satisfaction ratings was calculated in the same way as the smoking urge ratings described above, and a difference score between these two means was computed. The difference scores for the state body satisfaction ratings and the smoking urge ratings were correlated ($r = -.51$, $p < .001$), indicating that the magnitude of the body image manipulations' effect on state body satisfaction was associated with the manipulations' effect on urge ratings. That is, as the thin image produced lower body satisfaction, it also produced greater smoking urges.

To continue the test for mediation, a 2 X 2 Repeated Measures ANCOVA was conducted again to test the effects of the manipulations on the smoking urge ratings, but this time with the state body satisfaction ratings for each trial as covariates. There was no longer a main effect of the body image manipulation, $F(1, 57) = .23, p = .64$, indicating that state body satisfaction did also mediate the relationship.

State body satisfaction was also tested as a mediator of the smoking cue manipulation's effect on smoking urges. The smoking cue manipulation decreased state body satisfaction and increased smoking urges, therefore, a mean of the smoking urge ratings was calculated for both the trials with smoking images (i.e. T/S and N/S) and the trials without thin images (i.e. T/N and N/N). A difference score between these two means was computed. The same was done for the state body satisfaction ratings. The two difference scores were not correlated ($r = .09, p = .49$), indicating that state body satisfaction did not mediate the relationship for the smoking cue manipulation.

Chapter Four

Discussion

With many women claiming they smoke to manage their weight, it is imperative to understand how this motivation affects the phasic fluctuations in urges to smoke that perpetuate smoking behavior. To date, there have been no systematic studies to address how body dissatisfaction and concerns about weight can affect urge to smoke. The current study was designed to address this question among college student women, the key demographic group for body image distortion.

This study had two principle aims: to assess the effect of a smoking cue manipulation and a body image manipulation on self-reported urges to smoke; and to assess if body dissatisfaction moderated the relationship between that manipulation and the reported urge to smoke. With the smoking cue manipulation, we hypothesized that we would replicate past studies that showed smoking cues produced greater urges to smoke than neutral images. Our results supported this hypothesis. With the body image manipulation, we hypothesized that thin model images would produce greater urges to smoke than neutral images. As hypothesized, we found a smaller, but still significant, main effect of the body image manipulation with thin images evoking greater urges. Because the two factors were displayed simultaneously, we hypothesized that exposure to the two experimental conditions would produce at least an additive effect if not a synergistic effect on the reported urge to smoke. The two main effects without an interaction indicated that there was an additive effect of the two experimental images shown together but no synergistic effect between them. These results indicate that not only can smoking cues evoke urges to smoke, but so, too, can images of thin models.

Because a main effect for the body image manipulation was found, we explored body dissatisfaction as a potential moderating variable. Other studies have demonstrated that women with greater baseline body dissatisfaction are more affected by body image

manipulations (Groesz et al., 2002). We hypothesized that those women with higher body dissatisfaction would be most affected by the thin model image and thus show greater urge responses. This hypothesis was supported; however, this effect was only observed in the absence of the smoking image. It appears as though the smoking images are much more potent than the thin images in producing an urge response and thus the smoking image overpowers the more subtle effect of the thin image as moderated by body dissatisfaction. However, the effect of the body image manipulation is still very important as women are constantly being bombarded with images of the thin-ideal through magazines, television, and movies, and usually they are presented in the absence of smoking cues. Thus for women high in body dissatisfaction, they are at a great risk of continuous cueing, which can make quitting a challenge and relapse, among those who do quit, a high probability.

Because body dissatisfaction was highly correlated with BMI, we examined whether women's actual body mass moderated the relationship between the body image manipulation and the reported urges to smoke. This was not found, indicating that it was not the actual weight of the individual, but rather her perception of her body that influenced her urge to smoke. This finding is consistent with a treatment study for women smokers concerned with weight gain (Perkins et al., 2001). The study compared three types of adjunct treatments to a smoking cessation counseling group: a standard program, which did not address weight gain; a behavioral weight control program, to prevent weight gain; and a cognitive-behavioral therapy (CBT) program, to directly reduce weight concerns but not weight. Results indicated the CBT adjunct and not the behavioral weight control adjunct, improved smoking cessation outcome beyond that produced by the standard counseling. Our study provides additional support to the idea of focusing on cognitive therapy for body image in addressing post-cessation weight concerns, rather than on the weight itself.

Expectancies can be thought of as determinants of behavior, with a stimulus activating an expectancy that directly leads to an initiation of a behavioral response that has been previously associated with that stimulus (for a review see Kirsch, 1999). Within smoking research, expectancies have been found to be associated with many measures of

smoking motivation (Brandon, Juliano, & Copeland, 1999). Previous research has found that expectancy for negative affect relief moderated the effects of a negative affect manipulation on urges to smoke (Brandon et al., 1996). However, we failed to find that women's expectancies of cigarette's ability to control their appetite and weight moderated the relationship between the body image manipulation and reported smoking urges.

It is possible that these expectancies may need to be primed or activated prior to measurement for them to act as predictors or moderators of smoking urge. In a study that tested the effect of an implicit prime for body image on weight control expectancies, women were asked to participate in a bogus task of rating slides (McKee, Hinson, & Nhean, 2004). Half the women were shown images of thin models while the other half were shown neutral images. After the viewing of the slides, they were assessed on their smoking expectancies and eating restraint. Women who were high in dietary restraint endorsed more smoking expectancies when they had been primed initially with the thin model images than when they had been primed with the neutral images. It is possible that in the present study, similar post-priming assessment of expectancies, might have shown greater predictive power.

Some studies have demonstrated that viewing thin models can increase negative affect (Stice & Shaw, 1994), and other studies have found negative affect to produce smoking urges (Brandon et al., 1996; Payne, Schare, Levis, & Colletti, 1991). Thus, we examined whether the effect of the body image manipulation on smoking urge might be mediated by negative affect. This was supported, although a caveat was that the relationship between the body image manipulation and state affect only approached significance. Significance of this one relationship may be due to psychometric and statistical limitations. The trend, however, was in the expected direction, with the thin images producing greater negative affect than neutral images.

Because a main effect was found for the body image manipulation for both state body satisfaction and smoking urges, an analysis was conducted to determine whether state body satisfaction mediated the effect of that manipulation on smoking urges. This indeed was found. There no doubt are additional mediators between body dissatisfaction

and smoking motivation. State appetite/weight control expectancies come to mind, but it was not tested in the present study.

Treatment Implications

Overall, the results suggest that images of thin models can act as cues to smoke among women who are dissatisfied with their bodies. Studies of actual smoking relapse suggest that cue reactivity may be related to relapse (Niaura et al., 1988) and thus cue exposure therapy should have clinical efficacy. This type of treatment is based on Pavlovian extinction: repeated presentation of drug-related cues (e.g., the drug itself, drug paraphernalia) in the absence of drug administration should eventually extinguish the cravings to the stimuli. Unfortunately, a meta-analysis by Conklin and Tiffany (2002) showed poor results for cue exposure therapy for a variety of drug addictions, including cigarette smoking. One explanation given for the poor outcomes was the lack of extinction to the actual drug administration. However, it has also been suggested that cue-exposure paradigms should be expanded to include extinction to upstream cues and to interoceptive (cognitive and affective) cues. Findings from the present study suggest that exposure stimuli might also include images that induce body dissatisfaction, as well as the dysfunctional cognitions themselves. Also, as noted earlier, body dissatisfaction and weight concerns could be direct targets of other forms of cognitive-behavioral treatments for smoking cessation (c.f. Perkins et al., 2001).

Limitations

There were several methodological limitations of this study that should be considered when interpreting the results. An ethically and racially diverse sampling of thin models was chosen as stimuli for the body image manipulation. However, the sample of participants was quite homogeneous. This might have decreased the effect of the manipulation due to the Caucasian participants not socially comparing themselves to those models of other ethnic and racial groups. Social comparison theory states that an individual usually will make comparisons to others who share similar relevant dimensions, such as skin color (Festinger, 1954). Greater effects on self-evaluations are usually seen when social comparison occurs with members of meaningful in-groups than with members of out-groups (Brewer & Weber, 1994; Major, Sciacchitano, & Crocker,

1993; Miller, Turnbull, & McFarland, 1988). In a study conducted by Frisby (2004) there was no effect to African American women on their mood or body satisfaction from idealized media images when the model was of a dissimilar ethnic background. This suggests that similarity to the model in the images may play a role in how the images affect body satisfaction. It is unclear as to whether this applies across all ethnic groups or only minorities, but future studies should be aware of this and tailor the stimuli to the characteristics of individual participants.

The experimental effects may have also been influenced by whether participants actually engaged in a comparison with the model. According to Wilcox and Laird (2000), an individual can choose either to socially compare herself to the model or to identify with the model. Our manipulation depended upon social comparison occurring. If instead, identification with the model occurred in some participants, body satisfaction may have been enhanced rather than challenged, reducing the impact of the manipulation. It is also possible that based on the instructions, some participants may have overly focused on the models' clothing to the exclusion of the model herself, thus limiting social comparison. Future studies may wish to be either more explicit in their instructions for the image viewing (although this can increase demand effects) or include some measure of social comparison at the end of the image viewing.

Another limitation was that, although the differences in urge ratings among the different trials were statistically significant, the differences were quite small and may not be clinically significant. This might have been due to having the participants smoke about 30 minutes before beginning the exposure to the trials. This was done to standardize all the participants with regard to level of nicotine withdrawal. However, because many of the participants were light smokers, smoking that one cigarette may have prevented a greater urge response from occurring. Future studies might increase the time between the participant smoking her cigarette and beginning the experiment. Another modification may be to use a higher smoking rate inclusion criterion. An increase in smoking rate may increase the level of nicotine dependence of the sample and provide participants with greater conditioning histories, which could lead to a greater responses to the stimuli (Niaura et al., 1988).

The smaller than expected effect size may also be a function of the within-subjects design. In their meta-analysis, Groesz, Levine, and Murnen (2002) found a greater effect size for body image manipulations that used between-subjects designs. Although their meta-analysis did not discuss explanations for the relative weakness of within-subjects designs, a reasonable explanation is that carry-over effects occur across trials and conditions, even when distractor trials are used between experimental trials. The half-life of body image threats is unknown and may be longer than the inter-trial interval of this study. Nevertheless, the within-subjects design offered us the advantages of relatively high statistical power with a small sample size for the initial test of the causal role of body dissatisfaction on smoking urges.

Our design was unique in that we paired stimuli together to test for additive and synergistic effects. However, the use of the side-by-side image design may also have reduced effect sizes by diffusing the participant's attention to any given stimuli. The trials containing the smoking images elicited greater smoking urges, and thus this greater salience of the smoking images may have reduced the focus and social comparison to the thin model. Future studies could use a subtler smoking cue, such as an ashtray by the computer, which would not consciously take away from the focus of examining the thin images, but would allow for an exploration of additive effects of the dual manipulations. Additionally, future studies could just present single, unpaired stimuli, eliminating the issues of the dual-stimuli design.

Another limitation of this study is the lack of a behavioral measure of smoking motivation. In their study, Brandon, Wetter, and Baker (1996) found no covariance between measures of self-reported urge and smoking consumption, which is consistent with Tiffany's (1990) model of drug motivation, viewing urge and administration behavior as functionally independent. However, other drug motivation models (Baker, Morse, & Sherman, 1987; e.g., Heather & Stallard, 1989; Marlatt, 1985; Niaura et al., 1988) view urge as an integral aspect of self-administration behavior. Multi-modal assessment is essential, and therefore future studies should include behavioral assessments in addition to self-reported urge ratings. The as-yet-unanalyzed psychophysiological measures included in this study will also serve a similar function.

Despite the limitations, the results are promising. This study builds upon past descriptive and correlational research that has indicated a relationship between body dissatisfaction and smoking behavior by utilizing an experimental paradigm. The presentation of images depicting thin women increased smoking urge, which is consistent with a causal influence of body image. Although many women report smoking for weight control reasons in a global sense, this study is the first to show that images of thin women, which have been shown to threaten body image, can affect situational cravings to smoke. This is important to know for women of all ages, because the concept of body dissatisfaction is quite prevalent in the general population. However, these results are especially important in the college-aged female population, with whom this study was conducted. Because these women are in a transitory period of their smoking behavior, it is important to learn the motivations of their smoking behavior, so that interventions can be developed before these women become chronically dependent on tobacco.

References

- Amazon Booksellers' women's interest page*. (n.d.). Retrieved November 9, 2002, from www.amazon.com/exec/obidos/tg/browse/-/602372/104-9932803-0932729
- Baker, T. B., Morse, E., & Sherman, J. E. (1987). The motivation to use drugs: A psychobiological analysis of urges. In C. Rivers (Ed.), *Nebraska Symposium on Motivation: Vol. 34* (pp. 257-323). Lincoln: University of Nebraska Press.
- Baldini, E. H., & Strauss, G. M. (1997). Women and lung cancer: waiting to exhale. *Chest, 112*(4 Suppl.), 229S-234S.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology, 51*(6), 1173-1182.
- Bjornson, W., Rand, C., Connett, J. E., Lindgren, P., & et al. (1995). Gender differences in smoking cessation after 3 years in the Lung Health Study. *American Journal of Public Health, 85*(2), 223-230.
- Blake, S. M., Klepp, K. I., Pechacek, T. F., Folsom, A. R., Luepker, R. V., Jacobs, D. R., et al. (1989). Differences in smoking cessation strategies between men and women. *Addictive Behaviors, 14*, 409-418.
- Brandon, T. H., & Baker, T. B. (1991). The Smoking Consequences Questionnaire: The subjective expected utility of smoking in college students. *Psychological Assessment, 3*(3), 484-491.
- Brandon, T. H., Juliano, L. M., & Copeland, A. L. (1999). Expectancies for tobacco smoking. In I. Kirsch (Ed.), *How expectancies shape experience*. (pp. 263-299). Washington, DC: American Psychological Association.
- Brandon, T. H., Piasecki, T. M., Quinn, E. P., & Baker, T. B. (1995). Cue exposure treatment in nicotine dependence. In *Drummond, D. Colin (Ed); Tiffany, Stephen T. (Ed); et al. (1995). Addictive behaviour: Cue exposure theory and practice. The Wiley series in clinical psychology. (pp. 211-227). xix, 248pp.*
- Brandon, T. H., Wetter, D. W., & Baker, T. B. (1996). Affect, expectancies, urges, and smoking: Do they conform to models of drug motivation and relapse? *Experimental & Clinical Psychopharmacology, 4*(1), 29-36.

- Brewer, M. B., & Weber, J. G. (1994). Self-evaluation effects of interpersonal versus intergroup social comparison. *Journal of Personality & Social Psychology, 66*(2), 268-275.
- Bruckner, E., Spring, B., & Pingitore, R. (1994). Weight consciousness and food intake during smoking cessation. *Annals of Behavioral Medicine, 16*(Suppl.), S118.
- Carter, B. L., & Tiffany, S. T. (1999). Meta-analysis of cue-reactivity in addiction research. *Addiction, 94*(3), 327-340.
- Cash, T. F. (1998). The emergence of negative body images. In E. A. Blechman & K. D. Brownell (Eds.), *Behavioral medicine and women: A comprehensive handbook*. (pp. 386-391). New York, NY, US: The Guilford Press.
- Cash, T. F., Winstead, B. A., & Janda, L. H. (1986). The great American shape-up. *Psychology Today, 20*(4), 30-37.
- Cavallo, D. A., & Pinto, A. (2001). Effects of mood induction on eating behavior and cigarette craving in dietary restrainers. *Eating Behaviors, 2*(2), 113-127.
- Center for the Study of Emotion and Attention [CSEA-NIMH]. (1995). *The International Affective Picture System* (photographic slides). The Center for Research in Psychophysiology, University of Florida, Gainesville, FL.
- Centers for Disease Control and Prevention. (1994). Surveillance for selected tobacco-use behavior - United States, 1900-1994. *Morbidity and Mortality Weekly Report, 43*(Suppl.), 1-43.
- Centers for Disease Control and Prevention. (2002). Cigarette smoking among adults--United States, 2000. *Morbidity and Mortality Weekly Report, 51*(29), 642-645.
- Centers for Disease Control and Prevention. (2004). Cigarette smoking among adults--United States, 2002. *Morbidity and Mortality Weekly Report, 53*(20), 427-431.
- Cepeda-Benito, A., & Reig Ferrer, A. (2000). Smoking Consequences Questionnaire--Spanish. *Psychology of Addictive Behaviors, 14*(3), 219-230.
- 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 & Clinical Psychology, 72*(4), 712-722.
- Conklin, C. A., & Tiffany, S. T. (2002). Applying extinction research and theory to cue-exposure addiction treatments. *Addiction, 97*(2), 155-167.

- Cooper, Z., & Fairburn, C. (1987). The Eating Disorder Examination: A semi-structured interview for the assessment of the specific psychopathology of eating disorders. *International Journal of Eating Disorders*, 6(1), 1-8.
- Crowther, J. H., Lilly, R. S., Crawford, P. A., Shepherd, K. L., & Oliver, L. L. (1990). *The stability of the Eating Disorder Inventory*. Paper presented at the Paper presented at the Annual Meeting of the American Psychological Association, Boston, MA.
- Curry, S. J., Grothaus, L., & McBride, C. (1997). Reasons for quitting: Intrinsic and extrinsic motivation for smoking cessation in a population-based sample of smokers. *Addictive Behaviors*, 22(6), 727-739.
- Drummond, D. C., Tiffany, S. T., Glautier, S., & Remington, B. (Eds.). (1995). *Addictive behaviour: Cue exposure theory and practice*. New York: John Wiley and Sons.
- Escobedo, L. G., & Peddicord, J. P. (1996). Smoking prevalence in US birth cohorts: the influence of gender and education. *Am J Public Health*, 86(2), 231-236.
- Escobedo, L. G., & Peddicord, J. P. (1997). Long-term trends in cigarette smoking among young U.S. adults. *Addictive Behaviors*, 22(3), 427-430.
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, 16(4), 363-370.
- 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.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117-140.
- 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.
- Frisby, C. M. (2004). Does Race Matter? Effects of Idealized Images on African American Women's Perceptions of Body Esteem. *Journal of Black Studies*, 34(3), 323-347.
- Fulkerson, J. A., & French, S. A. (2003). Cigarette smoking for weight loss or control among adolescents: Gender and racial/ethnic differences. *Journal of Adolescent Health*, 32(4), 306-313.

- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2(2), 15-34.
- Garner, D. M., Olmsted, M. P., Polivy, J., & Garfinkel, P. E. (1984). Comparison between weight-preoccupied women and anorexia nervosa. *Psychosomatic Medicine*, 46(3), 255-266.
- 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.
- Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders*, 31(1), 1-16.
- Heather, N., & Stallard, A. (1989). Does the Marlatt model underestimate the importance of conditioned craving in the relapse process? In *Gossop, Michael (Ed). (1989). Relapse and addictive behaviour. (pp. 180-208). viii, 305pp.*
- Heather, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerström, K.-O. (1991). The Fagerström Test for Nicotine Dependence: A revision of the Fagerström Tolerance Questionnaire. *British Journal of Addiction*, 86(9), 1119-1127.
- Husten, C. G. (1998). Cigarette Smoking. In E. A. Blechman & K. D. Brownell (Eds.), *Behavioral medicine and women: A comprehensive handbook*. (pp. 425-430). New York, NY, US: The Guilford Press.
- Irving, L. M. (1990). Mirror images: Effects of the standard of beauty on the self- and body-esteem of women exhibiting varying levels of bulimic symptoms. *Journal of Social & Clinical Psychology*, 9(2), 230-242.
- Kalodner, C. R. (1997). Media influences on male and female non-eating-disordered college students: A significant issue. *Eating Disorders: the Journal of Treatment & Prevention*, 5(1), 47-57.
- Killen, J. D. (1998). Smoking Prevention. In E. A. Blechman & K. D. Brownell (Eds.), *Behavioral medicine and women: A comprehensive handbook*. (pp. 228-232). New York, NY, US: The Guilford Press.
- King, T. K., Matarin, M., Marcus, B. H., Bock, B. C., & Tripolone, J. (2000). Body image evaluations in women smokers. *Addictive Behaviors*, 25(4), 613-618.
- Kirsch, I. (Ed.). (1999). *How expectancies shape experience*: Washington, DC, US: American Psychological Association. (1999). xiv, 431pp.

- Klesges, R. C., & Klesges, L. M. (1988). Cigarette smoking as a dieting strategy in a university population. *International Journal of Eating Disorders*, 7(3), 413-419.
- Klesges, R. C., Ward, K. D., Ray, J. W., Cutter, G., Jacobs, D. R., Jr., & Wagenknecht, L. E. (1998). The prospective relationships between smoking and weight in a young, biracial cohort: The Coronary Artery Risk Development in Young Adults study. *Journal of Consulting & Clinical Psychology*, 66(6), 987-993.
- Langhammer, A., Johnsen, R., Holmen, J., Gulsvik, A., & Bjermer, L. (2000). Cigarette smoking gives more respiratory symptoms among women than among men. The Nord-Trondelag Health Study (HUNT). *Journal of Epidemiology and Community Health*, 54(12), 917-922.
- Levine, M. D., Perkins, K. A., & Marcus, M. D. (2001). The characteristics of women smokers concerned about postcessation weight gain. *Addictive Behaviors*, 26, 749-756.
- Looking back: Who was the original Lucky Strike girl? (1999, Fall). *Front and Center* (Vol. 6).
- Major, B., Sciacchitano, A. M., & Crocker, J. (1993). In-group versus out-group comparisons and self-esteem. *Personality & Social Psychology Bulletin*, 19(6), 711-721.
- Marlatt, G. A. (1985). Cognitive factors in the relapse process. In J. R. Gordon (Ed.), *Relapse prevention* (pp. 128-200). New York: Guilford.
- McCabe, M. P., & Ricciardelli, L. A. (2001). Parent, peer, and media influences on body image and strategies to both increase and decrease body size among adolescent boys and girls. *Adolescence*, 36(142), 225-240.
- McKee, S. A., Hinson, R. E., & Nhean, S. (2004). *Smoking for weight control: Effect of implicitly priming for body image in restrained eaters*. Paper presented at the Society for Research on Nicotine and Tobacco, Scottsdale, AZ.
- 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 & Clinical Psychology*, 65(3), 448-452.
- Miller, D. T., Turnbull, W., & McFarland, C. (1988). Particularistic and universalistic evaluation in the social comparison process. *Journal of Personality & Social Psychology*, 55(6), 908-917.
- Mitchell, S. L., & Perkins, K. A. (1998). Interaction of stress, smoking, and dietary restraint in women. *Physiology & Behavior*, 64(1), 103-109.

- Myers, M. G., McCarthy, D. M., MacPherson, L., & Brown, S. A. (2003). Constructing a short form of the Smoking Consequences Questionnaire with adolescents and young adults. *Psychological Assessment, 15*(2), 163-172.
- National Center for Health Statistics. (1993). *Healthy People 2000 Review, 1992*. Hyattsville, Maryland: Public Health Service.
- Niaura, R. S., Rohsenow, D. J., Binkoff, J. A., Monti, P. M., & et al. (1988). Relevance of cue reactivity to understanding alcohol and smoking relapse. *Journal of Abnormal Psychology, 97*(2), 133-152.
- Ockene, J. K. (1993). Smoking among women across the life span: prevalence, interventions, and implications for cessation research. *Annals of Behavioral Medicine, 15*, 135-148.
- Ogden, J. (1994). Effects of smoking cessation, restrained eating, and motivational states on food intake in the laboratory. *Health Psychology, 13*(2), 114-121.
- Ogden, J., & Munday, K. (1996). The effect of the media on body satisfaction: The role of gender and size. *European Eating Disorders Review, 4*(3), 171-182.
- Ortner, R., Schindler, S. D., Kraigher, D., Mendelsohn, A., & Fischer, G. (2002). Women addicted to nicotine. *Archives of Women's Mental Health, 4*(4), 103-109.
- Owen, P. R., & Laurel-Seller, E. (2000). Weight and shape ideals: Thin is dangerously in. *Journal of Applied Social Psychology, 30*(5), 979-990.
- Payne, T. J., Schare, M. L., Levis, D. J., & Colletti, G. (1991). Exposure to smoking-relevant cues: Effects on desire to smoke and topographical components of smoking behavior. *Addictive Behaviors, 16*(6), 467-479.
- 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*(2), 173-182.
- Perkins, K. A., Marcus, M. D., Levine, M. D., D'Amico, D., Miller, A., Broge, M., et al. (2001). Cognitive-behavioral therapy to reduce weight concerns improves smoking cessation outcome in weight-concerned women. *Journal of Consulting & Clinical Psychology, 69*(4), 604-613.
- Pinhas, L., Toner, B. B., Ali, A., Garfinkel, P. E., & Stuckless, N. (1999). The effects of the ideal of female beauty on mood and body satisfaction. *International Journal of Eating Disorders, 25*(2), 223-226.

- Polivy, J., & McFarlane, T. L. (1998). Dieting, Exercise, and Body Weight. In E. A. Blechman & K. D. Brownell (Eds.), *Behavioral medicine and women: A comprehensive handbook*. (pp. 369-373). New York, NY, US: The Guilford Press.
- Posavac, H. D., Posavac, S. S., & Posavac, E. J. (1998). Exposure to media images of female attractiveness and concern with body weight among young women. *Sex Roles, 38*(3-4), 187-201.
- Poulos, C. X., Hinson, R. E., & Siegel, S. (1981). The role of Pavlovian processes in drug tolerance and dependence: Implications for treatment. *Addictive Behaviors, 6*(3), 205-211.
- Raciti, M. C., & Norcross, J. C. (1987). The EAT and EDI: Screening, interrelationships, and psychometrics. *International Journal of Eating Disorders, 6*(4), 579-586.
- Raskin, D. C. (1973). Attention and arousal. In D. C. Raskin (Ed.), *Electrodermal activity in psychological research* (pp. 125-155). New York: Academic Press.
- Rodin, J., Silberstein, L., & Striegel-Moore, R. (1984). Women and weight: A normative discontent. *Nebraska Symposium on Motivation, 32*, 267-307.
- Rohsenow, D. J., Niaura, R. S., Childress, A. R., Abrams, D. B., & et al. (1990). Cue reactivity in addictive behaviors: Theoretical and treatment implications. *International Journal of the Addictions, 25*(7A-8A), 957-993.
- Schwartz, G. E., Weinberger, D. A., & Singer, J. A. (1981). Cardiovascular differentiation of happiness, sadness, anger, and fear following imagery and exercise. *Psychosomatic Medicine, 43*(4), 343-364.
- Shaw, J. (1995). Effects of fashion magazines on body dissatisfaction and eating psychopathology in adolescent and adult females. *European Eating Disorders Review, 3*(1), 15-23.
- Siegel, S. (1983). Classical conditioning, drug tolerance and drug dependence. In R. G. Smart (Ed.), *Research Advances in Alcohol and Drug Problems* (Vol. 7, pp. 207-246). New York: Plenum Press.
- Stewart, J., de Wit, H., & Eikelboom, R. (1984). Role of unconditioned and conditioned drug effects in the self-administration of opiates and stimulants. *Psychological Review, 91*(2), 251-268.
- Stice, E., & Shaw, H. (2003). Prospective relations of body image, eating, and affective disturbances to smoking onset in adolescent girls: How Virginia slims. *Journal of Consulting & Clinical Psychology, 71*(1), 129-135.

- Stice, E., & Shaw, H. E. (1994). Adverse effects of the media portrayed thin-ideal on women and linkages to bulimic symptomatology. *Journal of Social & Clinical Psychology, 13*(3), 288-308.
- 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.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC, US: American Psychological Association. (1999). xii, 396pp.
- Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes. *Psychological Review, 97*(2), 147-168.
- Tiffany, S. T. (1995). Potential functions of classical conditioning in drug addiction. In Drummond, D. Colin (Ed); Tiffany, Stephen T. (Ed); et al. (1995). *Addictive behaviour: Cue exposure theory and practice. The Wiley series in clinical psychology. (pp. 47-71). xix, 248pp.*
- Tiggemann, M., & Wilson-Barrett, E. (1998). Children's figure ratings: Relationship to self-esteem and negative stereotyping. *International Journal of Eating Disorders, 23*(1), 83-88.
- Top magazines by category.* (n.d.). Retrieved November 9, 2002, from www.ulm.edu/~mft/magazine.html
- Turner, S. L., Hamilton, H., Jacobs, M., Angood, L. M., & Dwyer, D. H. (1997). The influence of fashion magazines on the body image satisfaction of college women: An exploratory analysis. *Adolescence, 32*(127), 603-614.
- U.S. Department of Health and Human Services. (2001). *Women and smoking: A report of the Surgeon General*. Rockville: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- U.S. Department of Health and Human Services. (2004). *The health consequences of smoking: A report of the Surgeon General*. Atlanta: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and

Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

- Vanderheyden, D. A., & Boland, F. J. (1987). A comparison of normals, mild, moderate, and severe binge eaters, and binge vomiters using discriminant function analysis. *International Journal of Eating Disorders*, 6(3), 331-337.
- Vohs, K. D., Heatherton, T. F., & Herrin, M. (2001). Disordered eating and the transition to college: A prospective study. *International Journal of Eating Disorders*, 29(3), 280-288.
- Ward, K. D., Klesges, R. C., Zbikowski, S. M., Bliss, R. E., & Garvey, A. J. (1997). Gender differences in the outcome of an unaided smoking cessation attempt. *Addictive Behaviors*, 22(4), 521-533.
- Wear, R. W., & Pratz, O. (1987). Test-retest reliability for the Eating Disorder Inventory. *International Journal of Eating Disorders*, 6(6), 767-769.
- Wechsler, H., Rigotti, N. A., Gledhill-Hoyt, J., & Lee, H. (1998). Increased levels of cigarette use among college students: A cause for national concern. *Journal of the American Medical Association*, 280(19), 1673-1678.
- Wetter, D. W., Kenford, S. L., Smith, S. S., Fiore, M. C., Jorenby, D. E., & Baker, T. B. (1999). Gender differences in smoking cessation. *Journal of Consulting & Clinical Psychology*, 67(4), 555-562.
- Wikler, A. (1948). Recent progress in research on the neurophysiological basis of morphine addiction. *American Journal of Psychiatry*, 105, 329-338.
- Wilcox, K., & Laird, J. D. (2000). The impact of media images of super-slender women on women's self-esteem: Identification, social comparison, and self-perception. *Journal of Research in Personality*, 34(2), 278-286.
- 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.
- Wiseman, C. V., Turco, R. M., Sunday, S. R., & Halmi, K. A. (1998). Smoking and body image concerns in adolescent girls. *International Journal of Eating Disorders*, 24(4), 429-433.
- Young, S. E., Corley, R. P., Stallings, M. C., Rhee, S. H., Crowley, T. J., & Hewitt, J. K. (2002). Substance use, abuse and dependence in adolescence: Prevalence, symptom profiles and correlates. *Drug & Alcohol Dependence*, 68(3), 309-322.

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(3-4), 183-192.