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LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Faculty of Graduate Studies

Body Dissatisfaction, Perceived Smoking Consequences, and Weight Control Smoking

by

Samantha N. Martinez

A Dissertation submitted in partial satisfaction of
the requirements for the degree
Doctor of Philosophy in Clinical Psychology

September 2019

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Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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ABBREVIATIONS

BMI	Body Mass Index
USDHHS	US Department of Health and Human Services
AWC	Appetite and Weight Control
EDI-3-BD	Eating Disorder Inventory 3- Body Dissatisfaction
SWEET	Smoking-Related Weight and Eating Episode Test
SCQ	Smoking Consequences Questionnaire
CDC	Center for Disease Control
SDA	Seventh-day Adventist

ABSTRACT OF THE DISSERTATION

Body Dissatisfaction, Perceived Smoking Consequences, and Weight Control Smoking

by

Samantha N. Martinez

Doctor of Philosophy, Graduate Program in Clinical Psychology
Loma Linda University, September 2019
Dr. Holly E. R. Morrell, Chairperson

Eating disorders are a significant public health concern affecting approximately 8 million individuals in the United States, with women suffering at disproportionate rates. Eating disorders have been associated with a variety of negative health behaviors, including smoking. Despite an overall decrease in smoking prevalence, smoking rates remain high among females with eating disorders. The current study explored the role that perceived consequences of smoking related to appetite/weight control plays in moderating the relationship between body dissatisfaction, which is a risk factor for the development of an eating disorder, and weight control smoking, controlling for the effects of race/ethnicity smoking status, BMI, and several interactions with smoking status. Participants were 397 college-aged women (mean age = 20.11, SD = 2.12; 38.6% Hispanic/Latino, 8.9% current smokers) who completed an online survey for course credit or a gift card. Results indicated that BMI was positively related to weight control smoking for both current smokers and individuals who reported ever smoking in their lifetime. Further, among current smokers, weight control smoking decreased as body dissatisfaction increased. Additionally, beliefs about whether smoking helps to control appetite/weight increased as body dissatisfaction increased, but this relationship was

stronger among individuals who had reported smoking in their lifetime. African-American participants reported higher rates and Hispanic/Latino participants reported lower rates of weight control smoking than Caucasian participants. Weight control smoking also increased as beliefs about whether smoking helps to control appetite/weight increased, but this relationship appeared stronger among smokers. Lastly, there was a significant three-way interaction. Simple regression plots revealed that for smokers, weight control smoking decreased as beliefs about whether smoking helps to control appetite/weight increased, but the relationship appeared to be stronger among participants who reported higher levels of body dissatisfaction. Given that BMI is associated with weight control smoking, incorporating psychoeducation about the consequences of smoking and its ineffectiveness to control appetite and weight into smoking prevention and cessation programs may be beneficial to targeting these beliefs.

Keywords: Eating disorders, body dissatisfaction, smoking, weight control smoking, smoking consequences

CHAPTER ONE

INTRODUCTION

Eating disorders are a significant public health concern, especially among adolescents and young adults (Hudson, Hiripi, Pope, & Kessler, 2007). The lifetime prevalence rate for an eating disorder is generally below 3% in the United States; however, this is estimated to be approximately eight million individuals. Prevalence rates for women are one and one-half to three times higher than for men (Hudson et al., 2007; Swanson, Crow, Le Grange, Swedsen, & Merikangas, 2011). Eating disorders can contribute to a variety of negative health effects, including bone density loss and heart failure, and can result in death (Chavez & Insel, 2007). Mortality rates due to eating disorders are reported to be as high as 20%. Eating disorders also have high comorbidity rates with other mental health problems including depression, anxiety, substance use, and suicide (Chavez & Insel, 2007; Hudson, et al., 2007; Fornaro, Pergui, Gabrielli, Prestia, Mattei, Vinciguerra, & Fronaro, 2010; Nielsen, 2001). It is important to note that subthreshold eating disorders are also marked with the similar severe outcomes that are associated with cases that meet full diagnostic criteria (Swanson et al., 2011). Thus, the impact of disordered eating is likely to be much greater than the reported prevalence rates for eating disorders.

The use of smoking as a weight control strategy is an area that has been explored in relation to eating disorders. The negative health effects of smoking have been well documented. Smoking has been linked to numerous medical conditions including, but not limited to, hypertension, type 2 diabetes, coronary heart disease, lung disease, and asthma (Al-Delaimy, Manson, Solomon, Kawachi, Stampfer, & Willett, 2002; Bartal, 2001;

Halimi, Giraudeau, Wol, Caces, Nivet, & Tichet, 2002). According to the US Department of Health and Human Services (2014), tobacco use remains the leading cause of preventable disease and death in the United States. Tobacco use is linked to an estimated 480,000 premature deaths and well over three billion dollars in healthcare costs (US Department of Health and Human Services, 2014). Current smoking prevalence estimates indicate that 16.8% of US adult population or 40 million people are smokers, with the highest rates among individuals aged 18-25 (Center of Disease Control and Prevention, 2015). Individuals who smoke tend to view their body more negatively than nonsmokers and endorse higher rates of body dissatisfaction (Boles & Johnson, 2001; Grogan, Hartley, Conner, Fry, & Gough, 2010). These findings are of great concern, given that body dissatisfaction has been identified as a risk factor for dieting and bulimic pathology (Stice, 2002) and eating disorders onset (Stice, Marti, & Durant, 2011). As eating disorders are considered to be among the most difficult psychological disorders to treat (Wilson, Grilo, Vitousek, 2007), factors influencing the onset of eating disorders warrant greater research.

Sociocultural Theory of Body Image Disturbance

Sociocultural theories have been proposed to explain the influence of social, interpersonal, and cultural factors on the development and onset of body image and eating disturbances. One of the most empirically supported theories is the Tripartite Model of Body Image and Eating Disturbance (Van den Berg, Thompson, Obremski-Brandon, & Coovert, 2002). This model proposes that peers, parents, and the mass media are sources of influence that directly and indirectly lead to the development of body

dissatisfaction and eating disturbances (Thompson, Schaefer, & Menzel, 2012). Grogan (2008) defines body dissatisfaction as "a person's negative thoughts and feelings about his or her body," typically involving "a perceived discrepancy between a person's evaluation of his or her body and his or her ideal body" (Grogan, 2008, p. 4). In the Tripartite model, body dissatisfaction influences restrictive and bulimic behaviors.

More specifically, the Tripartite Model suggests that the three sources of influence promote the thin ideal for women, and contribute to the internalization of the thin ideal and perpetuate social comparisons (Thompson, Schaefer, & Menzel, 2012; Van den Berg et al, 2002). The thin ideal refers to the societal reinforcement of thinness as the primary form of attractiveness (Thompson & Stice, 2001). Thin ideal internalization occurs when individuals accept societal standards of attractiveness and strive to attain such standards (Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999). However, given that societal appearance ideals are often unrealistic and unattainable, many women experience a discrepancy between the actual self and ideal-self, leading to body dissatisfaction (Stice, 2001). It is apparent that body dissatisfaction for women results as an outcome of thin ideal internalization (Thompson, Schafer, & Menzel, 2012). This body dissatisfaction is often a result of engaging in appearance comparisons, which refers to the comparison of one's appearance to others to determine one's level of attractiveness (Van den Berg et al., 2002). Overall, this model proposes that body dissatisfaction develops through the effect of thin ideal internalization and social comparison related to sociocultural pressures from peers, parents, and the media (Van den Berg et al., 2002).

Body Dissatisfaction and Disordered Eating

Research has indicated that body dissatisfaction is prevalent among females and that females report higher levels of body dissatisfaction than males. Current prevalence rates of body dissatisfaction among adults falls between 14%-40% for females and 10%-30% for males (Frederick, Jafray, Gruys, & Daniels, 2012). In a national survey, 38% of women with a normal weight, according to their body mass index, reported being overweight (National Health and Nutrition Examination Survey,1996; Chang & Christakis, 2003). Women tend to experience greater body dissatisfaction in terms of their weight and often report wanting to have a thinner body, in comparison to men (Miller, Gleaves, Hirsch, Green, Snow, & Corbett, 2000). In addition, women also report greater dissatisfaction with specific areas of their body, levels of fitness, and overweight preoccupation, in comparison to men (Feingold & Mazzella, 1998; Stice 2002).

College-aged women, 18-30 years-old, seem to be at risk for the development of body dissatisfaction, as this is a time period where rates of body dissatisfaction are particularly high (Cash, 2002). Longitudinal research has found that body dissatisfaction is the strongest predictor of the development of eating disorders (Stice, Marti, & Durant, 2011). Moreover, college-aged women who experience greater body dissatisfaction often engage in unhealthy eating and exercise behaviors in an effort to achieve their ideal body (Anton, Perri, & Ripley, 2000; Hubbard, Gray, & Parker, 1998). Specifically, college-aged women are more likely to use unhealthy dieting strategies, such as caloric restriction, purging, and smoking, in response to their high levels of body dissatisfaction (Klesges & Klesges 1988; Thompson et al., 1999; Vohs, Heatherton & Herrin, 2001). Given that many women hold unrealistic standards of an ideal body, healthy weight

control strategies are often unsuccessful in achieving these appearance ideals (Neighbors & Sobal, 2007). As a result, the pressure women feel to achieve these standards results in the adoption of unhealthy behaviors, such as disordered eating and smoking (Cash, 2004; Fairweather-Schmidt, & Wade, 2015; Neighbors & Sobal, 2007; Stice & Shaw, 2002).

In addition, the college-age period is a time when disordered eating is relatively common and when eating disorders typically develop. Longitudinal research suggests that the peak age of onset for disordered eating is during the college-aged period (Stice, Marti, & Rohde, 2013). In a large sample of college students, Quick, Berg, Bucchianeri, and Byrd-Bredbenner (2014) found that approximately 11% of women met diagnostic criteria for anorexia nervosa, bulimia nervosa, or binge eating disorder, and over 50% met criteria for an eating disorder not otherwise specified which includes subthreshold eating disorders. Overall, college-aged women have particularly high rates of body dissatisfaction which places them at an increased risk for the development of eating pathology.

Smoking

Smoking prevalence among college-aged females remains high, despite an overall decline in rates of smoking (Jamal, Homa, O'Connor, Babb, Caraballo, Singh, et al., 2015). It is estimated that approximately 14.8% of women aged 18 to 24 years old are current smokers (Jamal et al., 2015). In addition, female college students are likely to experiment with smoking and transition from being occasional smokers to regular smokers (Lantz, 2003; Ling & Glantz, 2002; Moran, Wechsler, & Rigotti, 2004; Rigotti, Lee, & Wechsler, 2000). Women aged 18-24 years old are initiating smoking at greater

rates than the overall population and are considered less likely to quit once they start (Cepeda-Benito, Reynoso, & Erath, 2004; Ellickson, Tucker, & Klein, 2001; Ockene, 1993; Ortner, Schindler, Kraigher, Mendelsohn, & Fischer, 2002). Thus, college women are at an increased risk for smoking initiation and continuation.

Smoking prevalence among women with eating disorders remains substantially high, despite the known negative health effects (USDHHS, 2001). In a large clinical sample of women, Anzengruber et al. (2006) found that individuals with an eating disorder reported greater rates of smoking in comparison to those without an eating disorder. The lifetime prevalence of smoking among adults with an eating disorder is estimated to be highest among individuals with binge eating disorder, with rates ranging from 34% to 60% (Solmi, Veronese, Sergi, Luchini, Favaro, Santonastaso et al., 2016). Individuals with bulimia nervosa report the second highest lifetime smoking prevalence, which is estimated to be 33% to 45% (Solmi et al., 2016). Lastly, lifetime smoking prevalence among individuals with anorexia nervosa ranges from 17% to 28% (Solmi et al., 2016). Lifetime prevalence of smoking is higher among individuals with symptoms of bingeing and purging, compared with more restrictive disordered eating, suggesting that smoking may serve as a compensatory strategy in response to real or perceived overeating.

Although the smoking prevalence rates among women with an eating disorder remain high, this relationship is largely unexplored. College-aged women appear to be more likely to engage in smoking to control their weight ("weight control smoking") compared to other age groups, given the elevated rates at which they experience body dissatisfaction and eating disorders, as well as their tendency to engage in unhealthier

dieting strategies. Despite the negative consequences of smoking (Al-Delaimy, et al., 2002; Bartal, 2001; Halimi, et al., 2002), many college-aged women continue smoking because the benefits are considered immediate (Lichenstein, 1982; Pomerleau, 1979). In addition, smoking initiation among individuals with an eating disorder has been reported to most commonly occur after the onset of eating disorder pathology (Anzengruber et al, 2006). A better understanding of the weight-related reasons for initiation and maintenance of smoking among female college students is needed to promote successful smoking prevention/cessation and thus more positive health outcomes.

Weight Control Smoking

One possible explanation for the high smoking prevalence among individuals with body dissatisfaction and eating disorders is the use of smoking as a weight control strategy (Fairweather-Schmidt, & Wade, 2015). Research suggests that approximately 33% of women begin smoking in effort to control their weight due to the belief that nicotine suppresses appetite (Bulik, & Brinded, 1994; Welch & Fairburn, 1998; White, 2012). Among college-aged women, concerns about weight and body image have been associated with smoking. Specifically, dieting concerns have been found to be a predictor of smoking initiation (Saules, Pomerleau, Snedecor, Mehringer, Shadle, Kruth et al., 2004). In addition, pressures to maintain a healthy weight are associated with having tried smoking (Saules, et al., 2004). Lastly, the intention to lose weight has been associated with current smoking (Carroll, Lee, Kaur, Harris, Strother & Huang, 2006). Nearly half of all female college smokers report smoking for the sole purpose of weight control and have the least intention to quit (Camp, Klesges, & Relyea, 1993; Klesges & Klesges,

1988; Ward, Elli, & Jack, 1993). Individuals who are current smokers view their body more negatively than non-smokers (Grogan, Hartley, Conner, Fry, & Gough, 2010).

While research has shown that women use smoking as a weight control strategy (Fairweather-Schmidt, & Wade, 2015), the role body dissatisfaction plays in the initiation and maintenance of smoking among college women remains unclear. There is evidence indicating that women who smoke report feeling less attractive, greater body dissatisfaction, and a greater desire to control their weight compared to non-smokers (Ben-Tovim & Walker, 1991; Boles & Johnson, 2001; King, Matacin, Marcus, Bock, & Tripolone, 2000). With regard to college-aged women, smokers report higher levels of body dissatisfaction than non-smokers (Boles & Johnson, 2001; Clark, Croghan, Reading, Schroeder, Stoner, Patten, et al., 2006; King et al., 2000). Several studies suggest that for college-aged women, body dissatisfaction is a predictor of smoking initiation, maintenance, and relapse (Bruckner, Spring, & Pingitore, 1994; Granner, Black, & Abood, 2002; Jeffery, Hennrikus, Lando, Murray, & Liu, 2000; King, et al., 2000; Saules et al., 2004). However, potential moderators of this relationship have not been studied.

There is evidence suggesting that smoking is solely used as a weight control strategy for some adult women. Lopez, Drobes, Thompson, and Brandon (2008) found that college women with higher levels body dissatisfaction reported greater urges to smoke after viewing an image of a thin model, but only when the smoking cue was removed. The findings suggest that the urge to smoke was in response to negative body image cues rather than smoking cues. Furthermore, for adult women, weight control smoking has been found to predict current smoking status and the desire to continue

smoking (Weekley, Klesges, & Reylea, 1992). This suggests that smoking cessation treatments should address weight and body image concerns. Perkins et al. (2001) found that a cognitive behavioral therapy treatment targeting weight concerns among female smokers led to greater decreases in smoking than a behavior therapy program designed to help individuals quit smoking. Overall, this suggests that some women will continue to smoke, because of concerns about weight, despite the negative health impacts associated with smoking.

Beliefs about Smoking Consequences

One explanation of the high rates of smoking among college-aged women explored in the literature is the belief that smoking is an effective weight control strategy, (Chiolero, Faeh, Paccaud, & Cornuz, 2008; Welch & Fairburn, 1998). Specifically, there is a belief that nicotine suppresses appetite, and acts to increase the resting metabolic rate (Jo, Talmage, & Role, 2002). This is especially true among college-aged female smokers (Bush, Levine, Deprey, Cerutti, Zbikowski, McAfee, et al., 2009; Clark, Hurt, Croghan, Patten, Novotny, Sloan et al., 2006; Nademin, Napolitano, Xanthopoulos, Fava, Richardson, & Marcus, 2010). For individuals with high levels of body dissatisfaction, the perceived benefits of appetite suppression and weight loss may be viewed as more beneficial than the long term, harmful effects of smoking (Chiolero et al, 2008). In order to fully understand the impact this belief has on an individual's decision to smoke, it is helpful to look at how an individual's behavior is shaped.

There are two major aspects that influence an individual's behavior: first, the probability of certain outcomes and, second, how desirable those outcomes are (Brandon,

Juliano, & Copeland, 1999). The more desirable or important an outcome is to an individual, the more influence it has on their behavior (Brandon et al, 1999). Weight control is considered to be very desirable by most college-aged women and is viewed as a positive consequence of smoking (Brandon & Baker, 1991; Grunberg, 1990). In addition, smoking outcome expectancies (i.e., beliefs about the effects of smoking) have been found to significantly influence smoking behavior (Brandon et al., 1999). Thus, for adult women who wish to control their weight, the belief that smoking is an effective weight control strategy may weigh more heavily on their decision to smoke than the adverse long-term health outcomes associated with smoking (Bush et al., 2009; Clark et al., 2006; Nademin et al., 2010). Beliefs about consequences of smoking related to appetite/weight control have also been associated with a higher smoking frequency (Adams, Baillie, & Copeland, 2011; Copeland, Brandon, & Quinn, 1995; Copeland & Carney, 2003; Rash & Copeland, 2008; Weekley, Klesges, Reylea, 1992).

Limitations of Current Literature

The relationship between body dissatisfaction and smoking has been well established in the literature; however, there is a lack of research regarding moderators of this relationship. Furthermore, there is little research examining the relationship between body dissatisfaction and weight control smoking specifically. The literature examining the relationship between smoking and body dissatisfaction is limited because weight control smoking was primarily assessed using one question regarding weight concerns. This study will add to the literature by examining the role that beliefs about the consequences of smoking related to appetite/weight control plays in moderating the

relationship between body dissatisfaction and frequency of weight control smoking. In addition, this is the first to study to examine the relationship between body dissatisfaction and weight control smoking using a valid measure of weight control smoking.

Aims and Hypotheses

a. Aim 1: To examine the relationship between weight control smoking and body dissatisfaction in young adult women.
    i. Hypothesis 1: Individuals who report higher levels of weight control smoking will also report higher rates of body dissatisfaction.
b. Aim 2: To examine the relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight in young adult women.
    i. Hypothesis 2: Individuals who believe that smoking helps control appetite/weight will report higher levels of body dissatisfaction.
c. Aim 3: To examine whether beliefs about whether smoking helps to control appetite/weight moderates the relationship between body dissatisfaction and frequency of weight control smoking.
    i. Hypothesis 3: There will be a significant interaction between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight, such that there will be a stronger relationship between body dissatisfaction and weight control smoking among individuals who report a stronger belief that smoking helps control appetite/weight. This relationship will be weaker among individuals who report a weaker belief that smoking helps control appetite/weight.

CHAPTER TWO

METHODS

Participants

Participants included undergraduate students who were recruited from subject pools at, Cal State San Marcos and La Sierra University. Additionally, some participants were recruited using a snowball sampling method via flyers posted in the community and online through Facebook and Reddit. The sample consisted of women aged 18-30 (M = 20.11, SD = 2.12). In total, 397 participants completed the survey. The sample was ethnically diverse and majority were Hispanic/Latino (38.6%). In addition, 22.3% of the sample reported having ever smoked in their lifetime and 8.9% reported smoking in the past 30 days. Additional demographic information about the sample is presented in Table 1, including BMI, body dissatisfaction, beliefs about whether smoking helps to control appetite/weight, and weight control smoking.

Table 1. Demographic characteristics of Participants

Race/Ethnicity	*n* (%)
Hispanic (%)	105 (38.600%)
White Non-Hispanic (%)	47 (17.300%)
African American Non-Hispanic (%)	14 (5.100%)
Asian-American	66 (23.5%)
Multi-racial	34 (12.500%)
Other Non-Hispanic (%)	6 (2.200%)
30 Day Smoking Status	
No	113 (91.100%)
Yes	11 (8.900%)
Lifetime Smoking Status	
No	199 (77.700%)
Yes	57 (22.300%)
	M (*SD*)
Age	20.11 (2.119)
Body Mass Index	24.577 (2.119)
Body Dissatisfaction	34.866 (10.634)
Beliefs about Smoking Consequences (AWC)	1.897 (1.876)
Weight Control Smoking	1.075 (.450)

Note. AWC = Appetite and Weight Control

Measures

Demographics

Participants were asked to report demographic information, including age, height, weight, sex, race/ethnicity, and education.

Body Dissatisfaction

The Eating Disorder Inventory 3-Body Dissatisfaction (EDI-3-BD) was used to measure participants' level of dissatisfaction with different aspects of his or her body

(Garner, 2004). The EDI-3-BD consists of ten items rated on a six-point Likert scale ranging from *always* to *never*. Higher scores indicate higher levels of body dissatisfaction. The scale includes statements such as, "I think that my stomach is too big," and "I feel bloated after eating a normal meal." The EDI-BD has shown adequate validity and internal consistency with a Cronbach's alpha of .81 in previous research (Garner, 2004; Herbozo, Menzel, & Thompson, 2013), and .84 in the current study. The average level of body dissatisfaction among non-clinical samples, using the EDI-3 BD scale is 15.34 (Clausen, Rosevinge, Friborg, Rokkedal, 2010).

Smoking Habits

Participants were asked questions regarding their smoking habits. First, they were asked if they have smoked a cigarette within their lifetime or during the past 30 days. Participants who indicated cigarette use both in their lifetime and during the past 30 days were asked a series of additional questions to determine smoking frequency. In order to reduce response burden, participants only answered questions that were relevant to them.

Smoking and Weight Control

The Smoking-Related Weight and Eating Episodes Test (SWEET; Adams et al., 2011) was used to assess participants' level of weight control smoking. The SWEET was used to assess tendencies to smoke as a way to control appetite and overeating, as well as in response to negative body image. The SWEET consists of ten items rated on a five-point Likert scale ranging from *never* to *always*. Higher scores indicated a greater frequency of weight control smoking. It includes statements such as, "When I feel

hungry, I have a cigarette to curb my appetite," and "When I crave unhealthy food, I have a cigarette to avoid eating." The SWEET has shown excellent convergent and predictive validity, and excellent internal consistency, with a Cronbach's alpha of .94 in previous research (Adams et al., 2011), and .99 in the current study. Given that non-smokers do not engage in smoking behavior, they reported hypothetical behaviors related to smoking for weight control purposes.

The Appetite-Weight Control scale of the Smoking Consequences Questionnaire (SCQ; Brandon & Baker, 1991) was used to assess beliefs about the effectiveness of smoking to control appetite and weight. The SCQ is a general measure of the perceived consequences of cigarette smoking. Participants were given a series of consequences related to smoking and were asked to report how likely it is that each consequence will happen to them. They were asked to rate these statements on a five-point Likert scale ranging from *never* to *always*. Higher scores on the Appetite-Weight Control subscale indicate a stronger belief that smoking can help control appetite/weight. The Appetite-Weight control scale includes five items such as, "Smoking keeps your weight down," and "Smoking controls your appetite." The Appetite-Weight Control scale has shown excellent reliability in both college samples and other non-college adult samples ($\alpha = .96$ in both samples and in the current sample; Brandon & Baker, 1991; Copeland, Brandon, & Quinn, 1995).

Procedure

Participants were recruited via the subject pools at the universities listed above and several online communities, including Reddit, Craigslist, and Facebook. Participants

were recruited as part of a larger study examining the possible ethnic differences in sociocultural factors (e.g., pressures felt from parents, peers, and media) that might influence body image, eating disorder psychopathology, and smoking behaviors. At the start of the online survey, participants were presented with an electronic informed consent form. Participants were also given contact information for the primary investigator, allowing them to ask questions or address concerns regarding the study. Once participants provided consent and agreed to participate in the study, participants then proceeded to the online survey. Participants were asked to complete a battery of questionnaires, including the EDI-3-BD, the SWEET, and the SCQ- Appetite-Weight Control. Non-smokers reported on hypothetical behaviors as related to weight control smoking and beliefs about the effectiveness of smoking to control appetite and weight. After completing the online survey participants were compensated with credit for their psychology courses or entered into a raffle for an Amazon gift card.

Statistical Analysis

Analyses were completed using SPSS version 23. A simple linear regression was conducted to examine the relationship between weight control smoking and body dissatisfaction (Aim 1), as well as the relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight (Aim 2). A multiple hierarchical linear regression analysis was used to examine whether beliefs about whether smoking helps control appetite/weight moderates the relationship between body dissatisfaction and the frequency of weight control smoking (Aim 3). The first step in the hierarchical regression analysis included body dissatisfaction and beliefs about whether

smoking is an effective strategy to control weight/appetite. The second step included the interaction between body dissatisfaction and beliefs about whether smoking is an effective strategy to control weight/appetite.

Research indicates that ethnicity (Fairweather-Schmidt, &Wade, 2015), smoking status (Adams Baillie & Copeland, 2011), and body mass index (Howe, Larsen, Taylor, Heron, Munafo, & Taylor, 2017) may contribute to weight control smoking, beliefs about whether smoking helps to control appetite/weight, and body dissatisfaction. Thus, additional analyses were performed for all aims in the current study, controlling for the effects of ethnicity, smoking status, and body mass index. Several interaction effects with smoking status, body dissatisfaction, and beliefs about whether smoking helps to controls appetite/weight were also tested. In order to test for the effects of these variables, a series of multiple regression analyses (described below) were conducted. Separate analyses were utilized to examine the effects of lifetime and 30-day smoking status.

Two multiple hierarchical linear regression analyses were conducted for Aim 1 and Aim 2, one using lifetime smoking status and the other with 30-day smoking status. The first step in the hierarchical regression analyses included Ethnicity, BMI, and smoking status. Ethnicity (Caucasian, African-American, Asian-American, Hispanic/Latino, Multiracial, and Other) was dummy coded, with Caucasian as the reference group. Both lifetime and 30-day smoking status (Yes/No) were dummy coded, with non-smokers as the reference group. The second step of the analysis included body dissatisfaction. Body dissatisfaction was centered prior to the analysis. The final step of the analysis included the interaction between body dissatisfaction and smoking status.

For Aim 3, two multiple hierarchical linear regression analyses were also performed, one using lifetime smoking status and the other using 30-day smoking status. The first step in the hierarchical regression analyses included Ethnicity and BMI. For the analysis using lifetime smoking status, ethnicity was dummy coded, with Caucasian as the reference group, and for 30- day smoking status, ethnicity was contrasted coded, comparing each category to Caucasian. The second step of the analysis included body dissatisfaction, beliefs about whether smoking is an effective strategy to control weight/appetite, and smoking status. Body dissatisfaction and beliefs about whether smoking is an effective strategy to control weight/appetite were centered prior to analysis. The third step of the analysis included the interactions between body dissatisfaction and beliefs about whether smoking helps to control weight/appetite, body dissatisfaction and smoking status, and beliefs about whether smoking is an effective strategy to control weight/appetite and smoking status. The final step of the analysis included the three-way interaction between body dissatisfaction, beliefs about whether smoking is an effective strategy to control weight/appetite, and smoking status.

Data were screened for outliers and any violations of assumptions, including homoscedasticity and linearity, prior to analysis. Tests for outliers revealed four participants for Aim 1, five participants for Aim 2, and 11 participants for Aim 3 with high leverage, high discrepancy, and high global and specific influence, all of which were removed. Tests for violations of assumptions revealed that data were not normally distributed; however, regression is robust to violations of normality in larger samples. In addition, there were no issues with multicollinearity. A post hoc power analysis was conducted using G*Power software to calculate achieved power. Results of the power

analysis indicated that we have more than 99% power to detect a truly significant effect of $R^2 = .30$ at $\alpha = .05$ with 13 predictors, when $N = 104$. It's important to note, sample sizes may vary across the different analyses due to missing data.

CHAPTER THREE

RESULTS

Aim 1: Body Dissatisfaction and Frequency of Weight Control Smoking

A linear regression analysis was used to test the first aim of this study, which was to examine the relationship between body dissatisfaction and weight control smoking in young adult women. Results, presented in Table 2, indicated that body dissatisfaction did not account for a significant amount of the variance in weight control smoking (r^2 = .000, p > .7) and did not predict weight control smoking (p > .05, sr^2 = .0003).

Table 2. Results of regression analyses.

	b	SE	β	*t*	*p*	95% CI	sr^2
Aim 1							
Body Dissatisfaction	.000	.002	-.017	-.321	> .747	[-.003, .002]	.000
Aim 2							
Body Dissatisfaction	.002	..009	.010	.175	> .860	[-.017, .020]	.000
Aim 3							
Body Dissatisfaction	.000	.001	.003	.051	> .958	[-.002, .002]	.000
Beliefs about Smoking Consequences (AWC)	.026	.006	.219	4.032	< .001	[.013, .038]	.048
Body Dissatisfaction X Beliefs about Smoking Consequences (AWC)	.000	.001	-.050	-.922	> .356	[-.002, .001]	.003

Note. AWC = Appetite and Weight Control.

Additional analyses for Aim 1 were conducted to control for the effects of race/ethnicity, smoking status, and body mass index (BMI), as well as to test the

interaction between smoking status and body dissatisfaction. Two hierarchical multiple regression analyses were run: one controlling for whether participants reported ever smoking in their lifetime (Yes/No), and one controlling for whether participants reported having smoked in the last 30 days (Yes/No). Results of the model with lifetime smoking status, presented in Table 3, indicated that the model did not account for a significant amount of the variance in weight control smoking (R^2 = .018, p > .8). Ethnicity, lifetime smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and lifetime smoking status were not significant independent predictors of weight control smoking (ps > .05).

Table 3. Results of multiple regression analysis predicting weight control smoking from, race/ethnicity, lifetime smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and lifetime smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
African American	.006	.069	.006	.092	> .926	[-.130, .143]	.000
Asian American	.023	.040	.049	.587	> .557	[-.055, .102]	.001
Hispanic/Latino	-.001	.036	-.003	-.035	> .971	[-.072, .069]	.000
Other	-.006	.096	-.004	-.059	> .952	[-.194, .183]	.000
Multiracial	-.019	.046	-.032	-.408	> .682	[-.110, .072]	.001
Lifetime Smoking	-.004	.031	-.008	-.114	> .908	[-.065, .058]	.000
Body Mass Index	.004	.003	.112	1.579	> .115	[-.001, .009]	.011
Body Dissatisfaction	.001	.002	.064	.786	> .431	[-.002, .004]	.003
Body Dissatisfaction X Lifetime Smoking	-.003	.003	-.075	-.955	> .339	[-.008, .003]	.004

Note. Caucasian was used as the reference group for ethnicity. Non-smokers were used as the reference group for lifetime smoking status.

In addition, the model with 30-day smoking status, presented in Table 4, did not account for a significant amount of the variance in weight control smoking, R^2 = .133, p >

.06. However, BMI was a significant independent predictor of weight control smoking, such that as BMI increased by one point, weight control smoking increased by .012 points, holding the influence of all other predictors constant, $p < .05$, $sr^2 = .064$. The interaction between body dissatisfaction and 30-day smoking status was also a significant predictor of weight control smoking, $p < .05$, $sr^2 = .042$. Simple regression plots were created in order to examine the interaction and are presented in Figure 1. Overall, it appears that the relationship between weight control smoking and body dissatisfaction was different depending on current smoking status. Specifically, for smokers, weight control smoking decreased as level of body dissatisfaction increased and for non-smokers weight control smoking increased as level of body dissatisfaction increased. Ethnicity, 30-day smoking status, and body dissatisfaction were not significant independent predictors of weight control smoking, *p*s > .05.

Table 4. Results of multiple regression analysis predicting weight control smoking from, race/ethnicity, 30-day smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and 30-day smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
African American	.086	.101	.082	.855	> .394	[-.114, .286]	.006
Asian American	.067	.057	.135	1.190	> .236	[-.045, .179]	.011
Hispanic/Latino	-.030	.051	-.069	-.594	> .553	[-.132, .071]	.003
Other	-.003	.110	-.003	-.028	> .977	[-.222, .216]	.000
Multiracial	-.016	.072	-.024	-.230	> .818	[-.159, .126]	.001
30 Day Smoking	.102	.070	.134	1.464	> .145	[-.036, .240]	.017
Body Mass Index	.012	.004	.272	2.829	< .01	[.004, .020]	.064
Body Dissatisfaction	.003	.002	.148	1.455	> .148	[-.001, .007]	.017
Body Dissatisfaction X 30 Day Smoking	-.013	.006	-.223	-2.307	< .05	[-.025, -.002]	.042

Note. Caucasian was used as the reference group for ethnicity. Non-smokers were used as the reference group for 30-day smoking status.

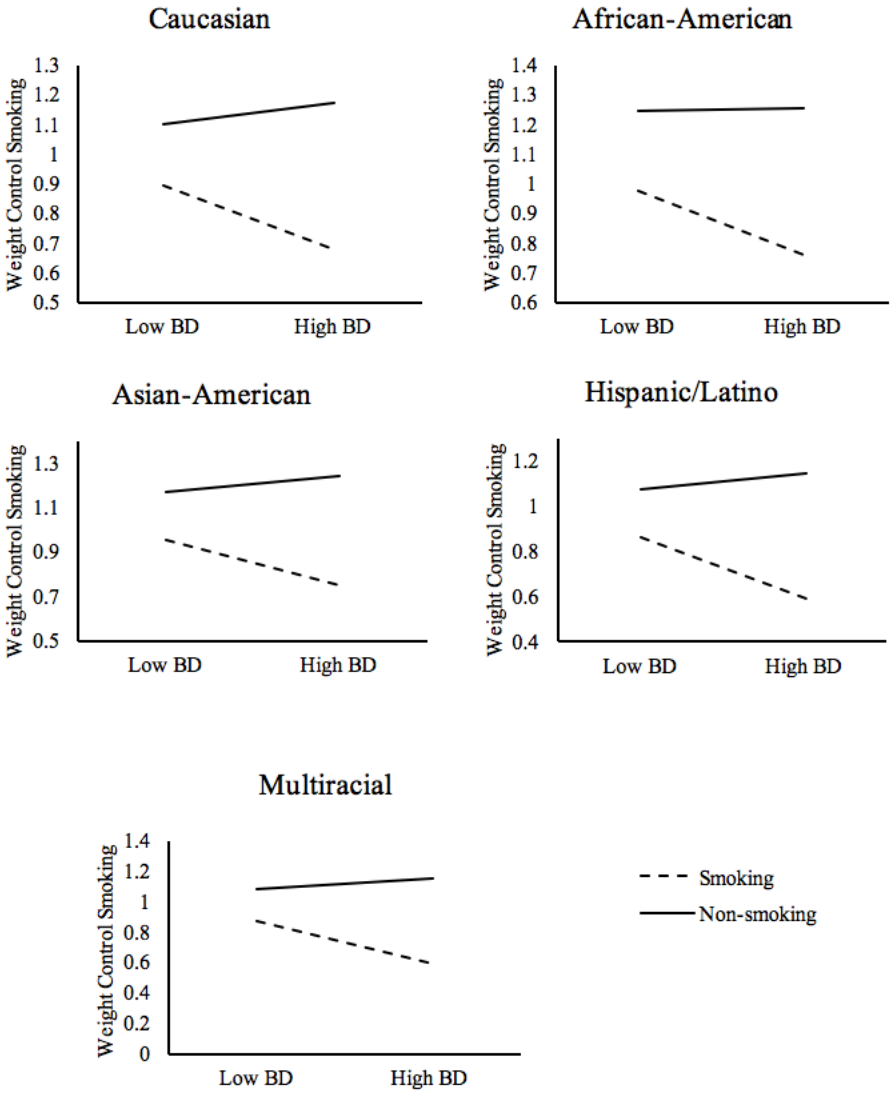

Figure 1. Plots of simple regression equations for the interaction between body dissatisfaction and 30-day smoking status for Aim 1.

Aim 2: Body Dissatisfaction and Beliefs about Smoking for Weight Control

In order to test the second aim of this study, a linear regression analysis was used to examine the relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight in young adult women. Results indicated that body dissatisfaction did not account for a significant amount of the variance in beliefs about whether smoking helps to control appetite/weight (r^2 = .000, p > .8) and did not predict beliefs about whether smoking helps control appetite/weight (p > .05, sr^2 = .0001).

Additional analyses for Aim 2 were conducted to control for the effects of race/ethnicity, smoking status, and body mass index (BMI), as well as to test the interaction between smoking status and body dissatisfaction. Two hierarchical multiple regression analyses were run: one controlling for whether participants reported ever smoking in their lifetime, and one controlling for whether participants reported having smoked in the last 30 days. Results of the analysis with lifetime smoking status, presented in Table 5, indicated that the model accounted for a significant amount of the variance in beliefs about whether smoking helps control appetite/weight (R^2 = .029, p <.05). The interaction between body dissatisfaction and lifetime smoking status was a significant predictor of beliefs about whether smoking helps to control appetite/weight, p < .05, sr^2 = .015). Simple regression plots were created in order to examine the interaction and are presented in Figure 2. Overall, beliefs about whether smoking helps to control appetite/weight increased as body dissatisfaction increased, but the relationship was stronger for smokers than non-smokers. Ethnicity, lifetime smoking status, BMI and body

dissatisfaction were not significant independent predictors of beliefs about whether smoking helps to control appetite/weight, *p*s > .05.

Table 5. Results of multiple regression analysis predicting beliefs about the consequences of smoking related to appetite/weight from, ethnicity, lifetime smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and lifetime smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
African American	-.795	.635	-.075	-1.252	> .210	[-2.045, .454]	.001
Asian American	-.225	.310	-.053	-.726	> .467	[-.836, .385]	.002
Hispanic/Latino	-.300	.293	-.078	-1.023	> .306	[-.876, .277]	.003
Other	-1.350	.965	-.081	-1.399	> .163	[-3.248, .549]	.006
Multiracial	-.134	.370	-.025	-.362	> .716	[-.862, .549]	.001
Lifetime Smoking	-.389	.389	-.093	-1.022	> .307	[-1.164, .368]	.003
Body Mass Index	.012	.020	.034	.563	> .573	[-.029, .052]	.001
Body Dissatisfaction	-.009	.012	-.053	-.783	> .432	[-.033, .014]	.002
Body Dissatisfaction X Lifetime Smoking	.052	.024	.212	2.170	< .05	[.005, .099]	.015

Note. Caucasian was used as the reference group for ethnicity. Non-smokers were used as the reference group for lifetime smoking status.

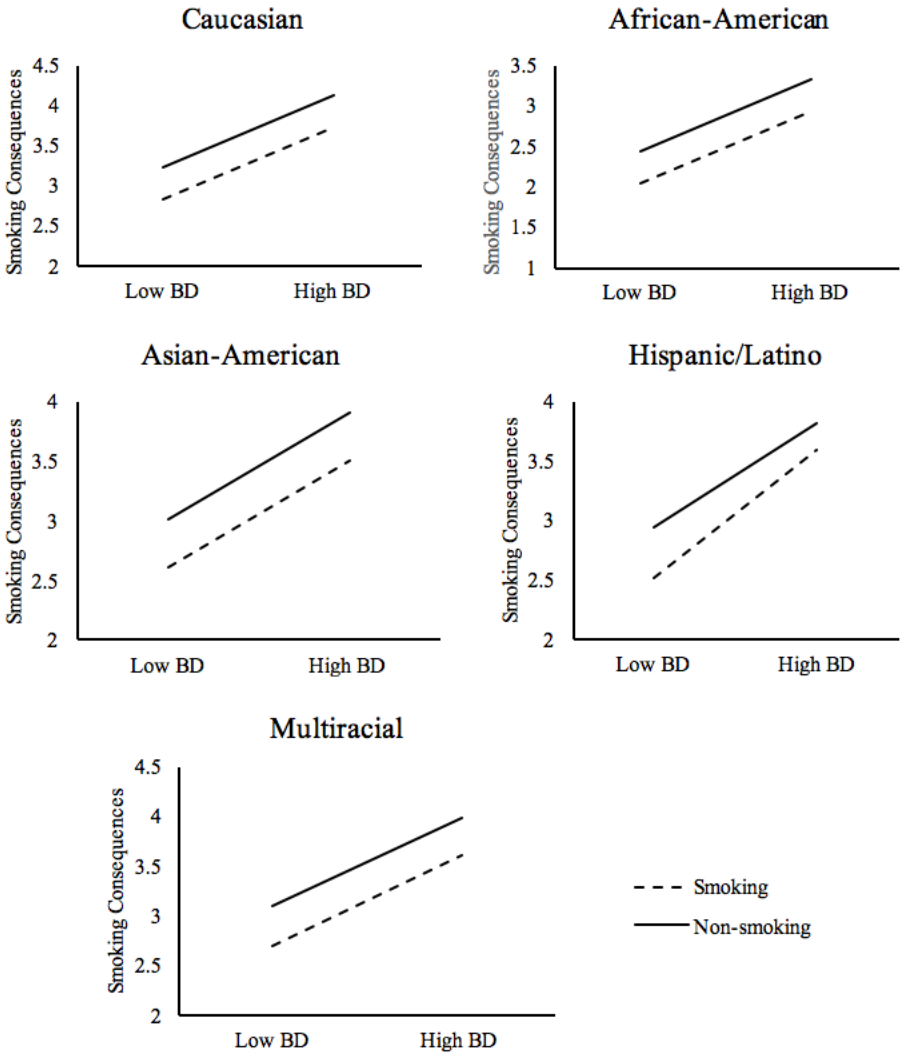

Figure 2. Plots of simple regression equations for the interaction between body dissatisfaction and lifetime smoking status for Aim 2.

The model with 30-day smoking status, presented in Table 6, indicated that the model did not account for a significant amount of the variance in beliefs about whether smoking helps to control appetite/weight, $p > .3$. Ethnicity, 30-day smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and smoking status were not significant independent predictors of beliefs about whether smoking helps to control appetite/weight, *p*s > .05.

Table 6. Results of multiple regression analysis predicting beliefs about the consequences of smoking related to appetite/weight from, race/ethnicity, 30-day smoking status, BMI, body dissatisfaction, and the interaction between body dissatisfaction and 30-day smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
African American	-.490	.977	-.040	-.503	> .616	[-2.418, 1.439]	.001
Asian American	-.348	.442	-.078	-.786	> .432	[-1.221, .526]	.004
Hispanic/Latino	-.091	.437	-.021	-.208	> .835	[-.955, .773]	.000
Other	-.873	1.235	-.056	-.707	> .479	[-3.311, 1.565]	.003
Multiracial	.001	.574	.000	.002	> .998	[-1.133, 1.135]	.000
30 Day Smoking	-.254	.1.415	-.040	-.180	> .857	[-3.049, 2.541]	.000
Body Mass Index	.030	.030	.078	.980	> .328	[-.030, .090]	.006
Body Dissatisfaction	-.019	.016	.097	1.176	> .240	[-.013, .052]	.008
Body Dissatisfaction X 30 Day Smoking	.076	.081	.211	.945	> .346	[-.083, .236]	.005

Note. Caucasian was used as the reference group for ethnicity. Non-smokers were used as the reference group for 30-day smoking status.

Aim 3: Beliefs about Weight Control Smoking as a Moderator of the Relationship between Body Dissatisfaction and Frequency of Weight Control Smoking

A hierarchical linear regression analysis was used to determine if beliefs about whether smoking helps to control appetite/weight moderates the relationship between body dissatisfaction and frequency of weight control smoking. Overall, the regression model accounted for a significant proportion of the variance in weight control smoking. The optimal linear combination of body dissatisfaction, beliefs about whether smoking helps control appetite/weight, and the interaction between them accounted for 5% of the variance in weight control smoking, $F(3, 323) = 5.68$, $p < .01$. Beliefs about smoking consequences related to appetite/weight control was a significant individual predictor of weight control smoking, such that a one-unit increase in beliefs about smoking consequences related to appetite/weight control was associated with a .026-unit increase in weight control smoking, $t = 4.032$, $sr^2 = .048$, 95% CI [.013, .038], $p < .001$. Body dissatisfaction and the interaction between body dissatisfaction and beliefs about whether smoking helps control appetite/weight were not significant predictors of weight control smoking ($p > .95$, $sr^2 = .000$ and $p > .35$, $sr^2 = .003$, respectively). Results of the hierarchical regression, including coefficient estimates, confidence intervals, standard errors, and *p*-values are presented in Table 2.

Additional analyses for Aim 3 were done controlling for the effects of race/ethnicity, smoking status (two regression models, as described above), and BMI. In addition, the interactions between smoking status and body dissatisfaction, beliefs about whether smoking helps to control appetite/weight and smoking status, body dissatisfaction and beliefs about whether smoking helps to control appetite/weight, and

the three-way interaction between these variables were also added to the analysis. Results of the analysis with lifetime smoking status, presented in Table 7, indicated that the model accounted for a significant amount of the variance in weight control smoking (R^2 = .111, p <.01). Body mass index was a significant independent predictor of weight control smoking, such that, as BMI increased by one point, weight control smoking increased by .005 points, holding the influence of all other predictors constant, $p < .05$, $sr^2 = .013$. With regards to race/ethnicity, African-American participants reported greater weight control smoking (b = .192) on average, than Caucasian participants, $p < .01$, $sr^2 = .027$. The interaction between beliefs about whether smoking helps to control appetite/weight and lifetime smoking was also a significant independent predictor of weight control smoking, $p < .05$, $sr^2 = .011$. Simple regression plots were created in order to examine the interaction and are presented in Figure 3. Overall, weight control smoking increased as beliefs about whether smoking helps to control appetite/weight increased, but the relationship appeared to be stronger among participants who smoke compared to participants who do not smoke.

Table 7. Results of multiple regression analysis predicting weight control smoking from, race/ethnicity, BMI, body dissatisfaction, beliefs about consequences of smoking related to appetite/weight, lifetime smoking status, and all two- and three-way interactions between body dissatisfaction, beliefs about the consequences of smoking, and lifetime smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
Entered in Step 1							
African American	.192	.064	.176	2.999	< .01	[.066, .318]	.027
Asian American	-.011	.032	-.024	-.334	> .738	[-.075, .053]	.000
Hispanic/Latino	-.006	.031	-.015	-.203	> .838	[-.067, .055]	.000
Other	-.012	.101	-.007	-.119	> .905	[-.211, .187]	.000
Multiracial	.022	.039	.037	.568	> .570	[-.055, .100]	.001
Body Mass Index	.005	.002	.123	2.101	< .05	[.000, .009]	.013
Entered in Step 2							
Body Dissatisfaction	.000	.001	.022	.329	> .741	[-.002, .003]	.000
Beliefs about Smoking Consequences (AWC)	.015	.008	.128	1.908	> .056	[.000, .031]	.011
Lifetime Smoking	.030	.025	.066	1.197	> .231	[-.019, .080]	.004
Entered in Step 3							
Body Dissatisfaction X Beliefs about Smoking Consequences (AWC)	.000	.001	-.017	-.250	> .802	[-.002, .001]	.000
Body Dissatisfaction X Lifetime Smoking	.001	.002	.030	.469	> .639	[-.004, .006]	.001
Beliefs about Smoking Consequences X Lifetime Smoking	.028	.014	.135	1.978	< .05	[.000, .055]	.011
Entered in Step 4							
Body Dissatisfaction X Beliefs about Smoking Consequences (AWC) X Lifetime Smoking	.000	.001	-.010	-.141	> .887	[-.003, .002]	.000

Note. Caucasian was used as the reference group for ethnicity. Non-smokers were used as the reference group for lifetime smoking status. AWC = Appetite and Weight Control

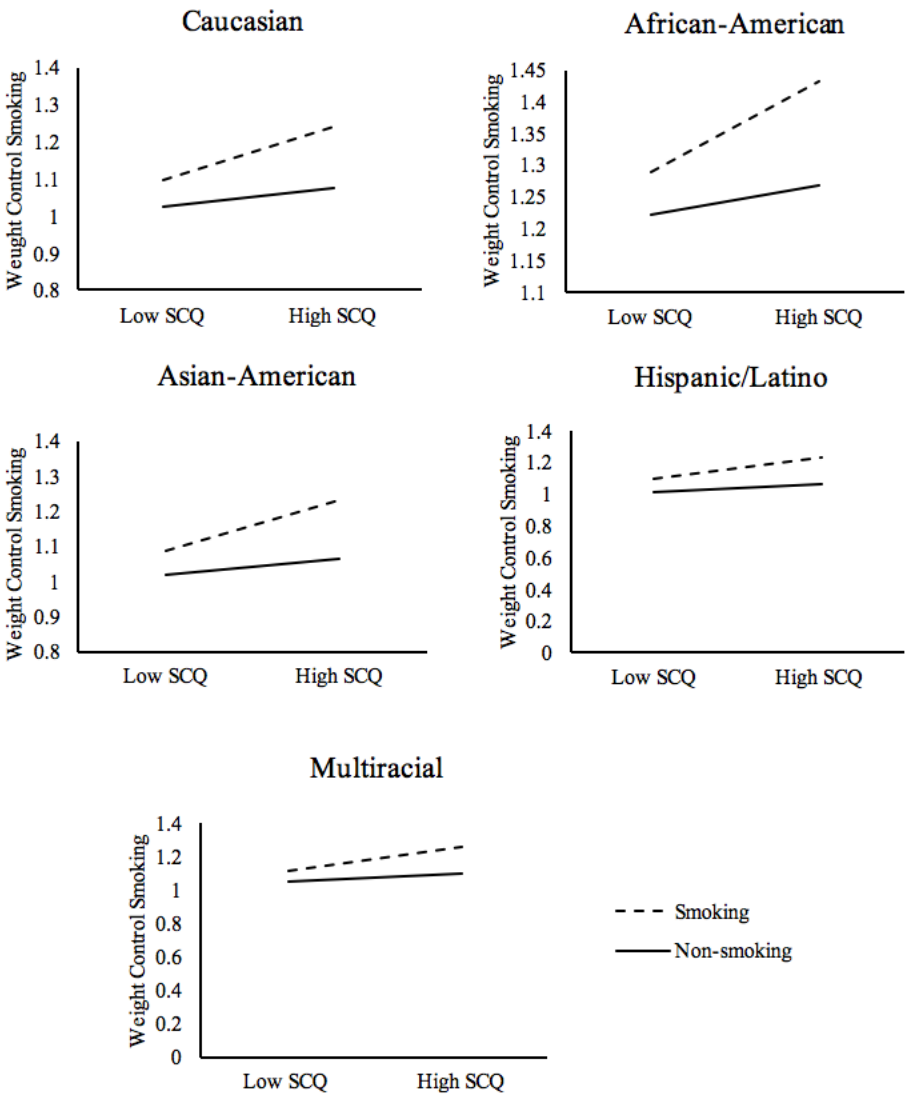

Figure 3. Plots of simple regression equations for the interaction between beliefs about smoking consequences related to appetite/weight control and lifetime smoking status for Aim 3.

For race/ethnicity, Asian- American, Hispanic/Latino, Multiracial, and Other were not significant independent predictors of weight control smoking, *p*s > .05. Additionally, lifetime smoking status, body dissatisfaction, beliefs about whether smoking helps to control appetite/weight, the interactions between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight, and body dissatisfaction and lifetime smoking status were also not significant independent predictors of weight control smoking, *p*s > .05. Lastly, the three-way interaction between body dissatisfaction, beliefs about whether smoking helps to control appetite/weight, and lifetime smoking status was not a significant independent predictor of weight control smoking, $p > .05$.

The same analysis described above was also run using 30-day smoking as the smoking status variable; results of this model are presented in Table 8. Overall, the regression model accounted for a significant proportion of the variance in weight control smoking. The optimal linear combination of race/ethnicity, BMI, 30-day smoking status, body dissatisfaction, beliefs about whether smoking helps control appetite/weight, and the interaction terms accounted for 30% of the variance in weight control smoking, $F(13, 104) = 3.019$, $p < .01$. The mean frequency of weight control smoking for African-American participants was .157 points higher than the mean frequency of weight control smoking for Caucasian participants, $p < .001$, $sr^2 = .169$. The mean frequency of weight control smoking for Hispanic/Latino participants was .036 points lower than the mean frequency of weight control smoking for Caucasian participants, $p > .05$, $sr^2 = .054$. Beliefs about whether smoking helps to control appetite/weight was also a significant independent predictor of weight control smoking, such that as beliefs about smoking consequences related to appetite/weight control increased by one point, weight control

smoking increased by .030 points, for non-smokers at the mean of body dissatisfaction, holding the influence of all other predictors constant, $p < .05$, $sr^2 = .056$.

Table 8. Results of multiple regression analysis predicting weight control smoking from, race/ethnicity, BMI, body dissatisfaction, beliefs about consequences of smoking related to appetite/weight, 30-day smoking status, and all two- and three-way interactions between body dissatisfaction, beliefs about the consequences of smoking, and 30-day smoking status.

	b	SE	β	*t*	*p*	95% CI	sr^2
Entered in Step 1							
African American	.156	.033	.880	4.688	< .001	[.090, .222]	.027
Asian American	-.030	.017	-.236	-1.736	> .085	[-.064, .004]	.169
Hispanic/Latino	-.036	.016	-.321	-2.287	< .05	[-.067, -.005]	.023
Other	-.032	.037	-.175	-.856	> .393	[-.211, .187]	.006
Multiracial	-.019	.023	-.125	-.836	> .404	[-.106, .042]	.005
Body Mass Index	.001	.001	.081	.833	> .407	[-.001, .002]	.005
Entered in Step 2							
Body Dissatisfaction	-.001	.001	-.247	-.656	> .512	[-.004, .002]	.003
Beliefs about Smoking Consequences (AWC)	.030	.013	1.174	2.323	< .05	[.00, .056]	.042
30-Day Smoking	.044	.022	.280	2.056	<.05	[.002, .087]	.032
Entered in Step 3							
Body Dissatisfaction X Beliefs about Smoking Consequences (AWC)	-.004	.002	-1.921	-2.502	<. 05	[-.008, -.001]	.048
Body Dissatisfaction X 30-Day Smoking	-.003	.003	-.418	-1.102	> .272	[-.009, .003]	.009
Beliefs about Smoking Consequences (AWC) X 30-Day Smoking	.061	.026	1.201	2.368	< .05	[.010, .113]	.043
Entered in Step 4							
Body Dissatisfaction X Beliefs about Smoking Consequences (AWC) X 30-Day Smoking	-.008	.004	-1.873	-2.425	< .05	[-.015, -.002]	.045

Note. Ethnicity was contrasted coded, which each racial/ethnic category compared to Caucasian. Non-smokers were used as the reference group for 30-day smoking status. AWC = Appetite and Weight Control

Further, the two-way interaction between beliefs about whether smoking helps to control appetite/weight and 30-day smoking, as well as the three-way interaction between body dissatisfaction, beliefs about whether smoking helps to control appetite/weight, and 30-day smoking status were significant independent predictors of weight control smoking, *p*s < .05. Since it is the highest order interaction, simple regression plots were created in order to examine the three-way interaction and are presented in Figure 4. Overall, for non-smokers weight control smoking increased as beliefs about whether smoking helps to control appetite/weight increased, but the relationship was different depending on level of body dissatisfaction. Non-smokers with high levels of body dissatisfaction reported higher levels of weight control smoking (given that non-smokers do not smoke, these were hypothetical behaviors) overall, than those who reported average and low levels of body dissatisfaction. For smokers, weight control smoking decreased as beliefs about whether smoking helps to control appetite/weight increased, but the relationship was different depending on level of body dissatisfaction. This relationship appeared to be stronger among participants who reported higher levels of body dissatisfaction.

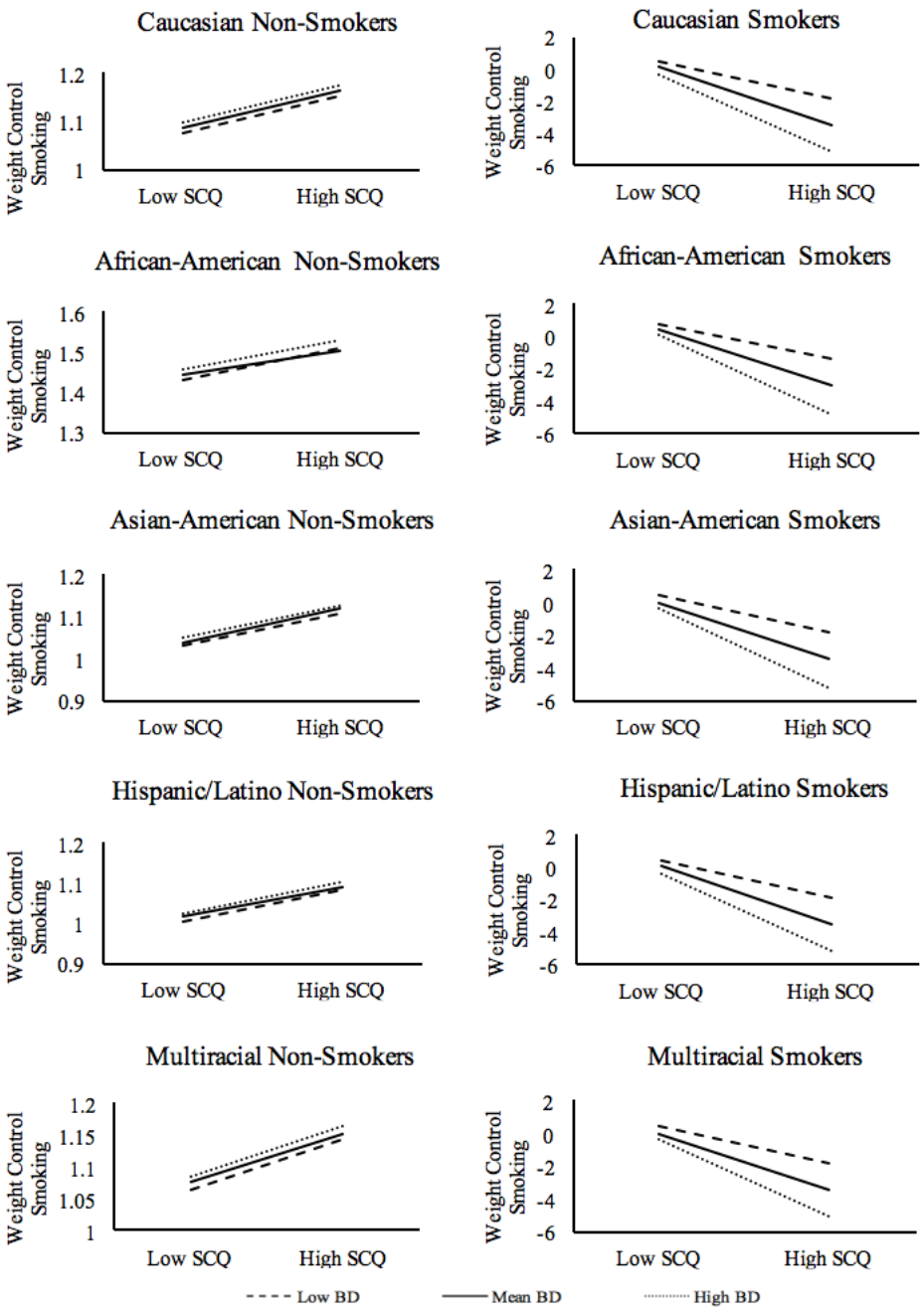

Figure 4. Plots of simple regression equations for the 3-way interaction between beliefs about smoking consequences related to appetite/weight control, body dissatisfaction, and 30-day smoking status for Aim 3.

CHAPTER FOUR

DISCUSSION

The goal of the current analysis was to examine the relationships among weight control smoking, body dissatisfaction, and beliefs about whether smoking helps to control appetite/weight. Specifically, we examined the relationship between weight control smoking and body dissatisfaction, as well as the relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight. In addition, we examined beliefs about whether smoking helps to control appetite/weight as a moderator of the relationship between body dissatisfaction and frequency of weight control smoking. However, because of potential confounding effects, additional analyses were performed controlling for the effects of race/ethnicity, smoking status, and body mass index. Several interaction effects with smoking status, body dissatisfaction, and beliefs about whether smoking helps to controls appetite/weight were also tested.

Aim 1: Body Dissatisfaction and Frequency of Weight Control Smoking

The results of the initial analyses for Aim 1 indicate that there was not a significant relationship between body dissatisfaction and weight control smoking. Controlling for the effects of ethnicity, BMI, and both lifetime and 30-day smoking status did not change the relationship between body dissatisfaction and weight control smoking. However, BMI and the interaction between body dissatisfaction and smoking status were significant independent predictors of weight control smoking in the analysis using 30-day smoking status. There was a positive relationship between BMI and weight control

smoking. The relationship between body dissatisfaction and weight control smoking was different depending on smoking status. Specifically, it appears that increased body dissatisfaction results in decreased frequency of weight control smoking among participants who reported smoking in the past 30-days, but increased weight control smoking among non-smokers (which is a report of hypothetical behavior, given that non-smokers by default do not smoke).

There are several potential explanations for the significant results that were detected after controlling for the effects of potential confounding variables. First, the positive relationship between BMI and weight control smoking is in line with previous research. In a study conducted by Cawley, Markowitz, and Tauras (2004), they found that females with a higher BMI and who reported a desire to lose weight were more likely to initiate smoking compared to females with lower BMIs. In addition, they found that this relationship remained consistent among females, regardless of the cost of cigarettes (Cawley, Markowitz, & Tauras, 2004). It is important to note that this positive relationship between BMI and weight control smoking was only significant for current smokers and not for individuals who have ever smoked during their lifetime. One explanation for this is that, when participants report lifetime smoking, this behavior could have occurred at any point in their lives and for any reason. However, smoking in the past 30 days measures current smoking behavior, which may be more likely to be related to other concurrently measured variables such as BMI. Contrary to previous research, the current study also found that increased body dissatisfaction resulted in decreased weight control smoking among participants who smoked, and increased weight control smoking

among non-smokers. Given that non-smokers are reporting hypothetical smoking behaviors, we will focus on the results from participants who reported smoking.

One potential explanation of the negative relationship between body dissatisfaction and weight control smoking among smokers is the low proportion of participants who reported smoking in the past 30 days (8.9%), and of those who did report smoking, they reported low rates of weight control smoking (M = 1. 0745). Additionally, the sample consisted of a small proportion (7.3%) of participants who endorsed engaging in smoking for the purposes of weight control, all of whom reported relatively low frequencies of weight control smoking. It is possible that the relationship between body dissatisfaction and weight control smoking among current smokers would be strong enough to be detectable among individuals who report greater frequencies of weight control smoking. Thus, it is possible that a larger proportion of smokers with a wider range of reported weight control smoking behaviors, might be associated with a stronger relationship between weight control smoking and body dissatisfaction. Given the high levels of body dissatisfaction reported in the current sample (M = 34.8), compared to average levels in non-clinical samples (15.34; Clausen, Rosevinge, Friborg, Rokkedal, 2010), and that body dissatisfaction has been associated with depression (Wiederman & Pryor, 2000), it is also possible that the negative relationship between body dissatisfaction and weight control smoking is a result of increased depression; however, depression was not measured in the current study

Aim 2: Body Dissatisfaction and Beliefs about Smoking for Weight Control

With regards to Aim 2, results of the initial analyses indicate that there was not a significant relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight. However, the analyses controlling for the effects of ethnicity, BMI, and smoking status accounted for a significant proportion of the variance in beliefs about smoking consequences related to appetite/weight control, but only for participants who reported smoking during their lifetime. The interaction between body dissatisfaction and lifetime smoking status was a significant predictor of beliefs about whether smoking helps to control appetite/weight. Overall, beliefs about the consequences of smoking related to appetite/weight control increased as body dissatisfaction increased, but the relationship was stronger for smokers than non-smokers.

There are several potential explanations for the significant interaction effect between body dissatisfaction and lifetime smoking status. Previous research has found that individuals with high levels of body dissatisfaction often use unhealthy dieting strategies, including smoking (Klesges & Klesges 1988; Thompson et. al., 1999; Vohs, Heatherton & Herrin, 2001). Given that individuals with high levels of body dissatisfaction may have a strong desire to control their weight (Cash, 2004; Fairweather-Schmidt, & Wade, 2015; Neighbors & Sobal, 2007; Stice & Shaw, 2002), and are more likely to engage in unhealthy strategies like smoking to achieve their desired weight, it makes sense that as body dissatisfaction increases, beliefs about whether smoking helps to control appetite/weight also increase. This is further supported by research on outcome expectancies, which suggests that smoking behaviors are associated with the desire to

control weight and the belief that smoking is an effective strategy to control weight (Brandon et. al. 1999).

Although the relationship between body dissatisfaction and beliefs about whether smoking helps to control appetite/weight was stronger for smokers, smokers endorsed overall lower levels of beliefs about smoking consequences related to appetite/weight control. In order to understand this finding, it is helpful to consider the fact that smokers in this model were defined as individuals who have ever smoked in their lifetime. Research suggests that the perceived consequences of a risky behavior, specifically smoking, depend on whether the behavior is considered a one time or a regular behavior (Beyth-Marom, Austin, Fischhoff, Parmgren, Jacobs-Quadrel, 1993); thus, it is possible that the overall lower levels of beliefs about whether smoking helps to control appetite/weight is related to the infrequency of smoking behaviors.

Aim 3: Beliefs about Weight Control Smoking as a Moderator of the Relationship between Body Dissatisfaction and Frequency of Weight Control Smoking

In terms of the final aim of this study, although the initial regression model was significant, beliefs about whether smoking helps to control appetite/weight did not significantly moderate the relationship between body dissatisfaction and weight control smoking. However, beliefs about whether smoking helps to control appetite/weight did significantly predict weight control smoking, which is in line with previous research on smoking outcome expectancies (Brandon & Baker, 1991; Grunberg, 1990). Specifically, the belief in the effectiveness of smoking as a weight control strategy contributes to the

decision to engage in smoking (Bush et al., 2009; Clark et al., 2006; Nademin et al., 2010).

After controlling for the effects of ethnicity, BMI, and smoking status, there were several significant effects. First, in the model using lifetime smoking status, there was a positive relationship between BMI and weight control smoking. Although there is limited research on the association between BMI and weight control smoking, recent research indicates that BMI is related to the onset of regular smoking among females (Howe et. al., 2017). In addition, African-American participants reported engaging in weight control smoking more often than Caucasian participants. Overall, African-Americans report higher rates of smoking compared to Caucasians (CDC, 2014), which may translate into higher rates of weight control smoking. However, there is limited research on racial/ethnic breakdowns on prevalence rates of weight control smoking. Additionally, given that the prevalence of overweight and obesity is higher among African-American women compared to Caucasian women (Hales, Carrol, Fryar, & Ogden, 2017), their tendency to report being overweight at significantly higher BMIs (Fitzgibbon, Blackman, & Avellone, 2000; Rand & Kuldau, 1990), and the fact that they tend to value a larger body shape compared to Caucasian women (Becker, Yanek, Koffman, & Bronner, 1999; Powell & Kahn, 1995), it is possible that increased representation of African-American women in music and media ("Topic: Minorities in media," n.d.) has led to greater internalization of the thin ideal among young African-American women, resulting in increased weight control smoking.

Lastly, there was a significant interaction effect between beliefs about whether smoking helps to control appetite/weight and lifetime smoking. Specifically, there was a

positive relationship between beliefs about whether smoking helps to control appetite/weight and reported weight control smoking behavior that was stronger among smokers. This is most likely related to smoking outcome expectancies. The belief in the effectiveness of smoking as a weight control strategy has been associated with the decision to engage in smoking, because weight control is viewed as a desirable outcome (Bush et al., 2009; Clark et al., 2006; Nademin et al., 2010). In addition, since non-smokers are reporting on hypothetical smoking behaviors, it makes sense that this relationship is stronger among smokers.

There were also several significant independent predictors of weight control smoking in the model using 30-day smoking status. First, similar to the model that included lifetime smoking status, African-American participants engaged in greater frequencies of weight control smoking compared to Caucasian participants. As mentioned prior, it is possible that African-American women are beginning to internalize the thin ideal due to greater representation in music and media, potentially resulting in greater weight control smoking. Conversely, Hispanic/Latino participants reported lower frequencies of weight control smoking compared to Caucasian participants. This is also in line with previous research, suggesting that overall, Hispanic/Latinos generally have lower rates of smoking (CDC, 2014), which may translate into lower rates of weight control smoking, but given the limited research it is difficult to confirm. Further, Hispanic/Latino women may prefer larger body types (Ricciardelli, McCabe, Williams, & Thompson, 2007; Atlabe, 1998), which may contribute to a decreased desire to control weight and thus lower rates of weight control smoking.

Additionally, there was a significant three-way interaction between body dissatisfaction, beliefs about whether smoking helps to control appetite/weight, and 30-day smoking status. For smokers, there was a significant negative relationship between weight control smoking and beliefs about the consequences of smoking related to appetite/weight control, particularly among participants with high levels of body dissatisfaction. This is contrary to previous research on smoking outcome expectancies that has found that stronger beliefs about the effectiveness of smoking to manage weight contributes to the decision to engage in smoking (Bush et al., 2009; Clark et al., 2006; Nademin et al., 2010). However, given that the sample had overall high levels of body dissatisfaction and that body dissatisfaction is associated with depression (Wiederman & Pryor, 2000), it is possible that they experience a sense of learned helplessness. For example, they may believe that smoking can help others control their weight, but not them.

Another potential explanation for this negative relationship is the low levels of beliefs about whether smoking helps to control appetite/weight (M = 1.897), and the high levels of body dissatisfaction (M = 34.8664) found in the sample. Although higher levels of body dissatisfaction are associated with greater use of unhealthy dieting strategies, including smoking (Vohs, Heatherton & Herrin, 2001), the relationship between beliefs about whether smoking helps to control appetite/weight and weight control smoking behavior may be positive at higher levels of beliefs about smoking consequences related to appetite/weight control. In addition, participants reported low rates of weight control smoking (M = 1. 0745). Furthermore, research has found that smoking outcome expectancies differ largely by the frequency in which an individual engages in smoking

behaviors and the duration of smoking (Wetter et. al., 1994). However, in the current study, participants who reported smoking also reported overall low levels of cigarette use, which could potentially obscure the results. Specifically, 0.3% reported smoking at least one cigarette a day, 3.5% reported smoking at least one cigarette a week, and 1.5% reported smoking at least one cigarette a month.

Across all analyses, there were several variables that were not significant predictors. First, several ethnic/racial groups, including Asian-American, Multiracial, and Other, were not significant predictors in the analyses. With regard to Asian-Americans, although previous research indicates prevalence rates for smoking are lowest among this population (CDC, 2014), there is no literature examining weight control smoking; more research is needed. Additionally, the majority of research on smoking prevalence rates has found that individuals who report Other as their ethnicity/race have the highest rates compared to other racial/ethnic categories (CDC, 2014). However, the "Other" category often includes individuals who identify as Multi-racial, or being from multiple ethnic/racial categories. The current study separated multiracial and Other into two separate categories, which may have contributed to the lack of significant relationships, especially since the majority of research on smoking includes Multiracial in the "Other" category. Secondly, smoking status was not a significant independent predictor in all but one analysis. This is likely related to the fact that participants reported, on average, low rates of weight control smoking. It is possible that smoking status contributes to weight control smoking for people who report higher rates than were observed in the current study. Lastly, body dissatisfaction was not a significant predictor in any of the analyses. As mentioned, the sample had relatively high levels of body dissatisfaction, and given

that this contributes to unhealthy dieting strategies including smoking, it is likely that a relationship was not detected due to the low rates of weight control smoking.

Limitations

There are several limitations and strengths of the current study that should be noted. Limitations include generalizability, self-report measures, cross-sectional data, and the low levels of beliefs about the effectiveness of smoking for weight control and reported weight control smoking behaviors. The current study focused on college-aged women in the United States, and thus the results may not be generalizable to men, other age groups, or other countries. However, this sample is important because college-aged women report higher rates of body dissatisfaction and smoking for the purposes of controlling weight compared to the rest of the population (Cash, 2002; Anton, Perri & Ripley, 2000). Another limitation is the use of self-report measures; however, all measures used in the current study had good to excellent reliability, with Cronbach's alphas ranging from .81 to .96. Furthermore, the cross-sectional design of the current study limits the ability to infer causality, but given that the topic of the present study is so novel and literature in this area is so limited, our goal was primarily to test for relationships among our variables of interest to establish a foundation for future research. Lastly, the low proportion of participants who reported smoking for the purposes of weight control; the majority of participants reported never engaging in smoking for the purposes of weight control. It is important to note that the current study sampled from La Sierra University, which is a Seventh-day Adventist institution, where students are less likely to engage in smoking given the healthier lifestyle associated with SDA practices.

Another limitation is the low levels of beliefs about the effectiveness of smoking for weight control poses a substantial limitation, given that beliefs about smoking consequences related to appetite/weight control have been associated with the frequency of smoking behaviors.

Strengths of the current study include the use of both college and community samples and the anonymous method of data collection. Anonymity has been found to improve participants' attitudes and promote honesty, especially as it relates to body dissatisfaction and disordered eating pathology (Lavender & Anderson, 2009). Another strength of this study is the use of a validated measure for weight control smoking; most previous studies assessing weight control smoking have not utilized validated measures (White, 2012). There are several additional strengths of the current study related to the sample. The study had a large sample size and the sample was ethnically diverse, with a large proportion of participants identifying as Hispanic/Latino. An added strength of the current study is that there was strong power to detect a significant effect.

Implications and Conclusions

The current findings have important implications. Overall, it appears that there are stronger relationships between beliefs about the effectiveness of smoking to help control appetite/weight, body dissatisfaction, and weight control smoking behaviors among smokers. Smoking prevalence remains high among college-aged women and among women with eating disorders, despite the known negative health effects (USDHHS, 2001). However, this relationship is still largely unexplored, and although the current study contributes to understanding the dynamics of this relationship, more research is

needed. Specifically, it would be beneficial to extend research on smoking outcomes by examining other beliefs that may contribute to weight control smoking among college women in order to better understand why these relationships are strong among smokers. Moreover, given that college-aged women are continuing to initiate and maintain smoking behaviors (Cepeda-Benito, Reynoso, & Erath, 2004), despite overall decreases in smoking in the rest of the population, future research focusing on additional factors that contribute to this behavior is necessary to improve smoking prevention and cessation programs. In terms of race/ethnicity, it is important to examine cultural factors, such as body preferences, that may contribute to weight control smoking.

In addition, it appears that increased BMI is associated with increased weight control smoking. Research indicates that smoking does not significantly change an individual's BMI (Howe et. al., 2017; White, 2012). However, the belief that smoking is an effective way to manage weight still influences an individual's decision to smoke (Brandon & Baker, 1991; Grunberg, 1990). Incorporating psychoeducation about the consequences of smoking related to appetite/weight control and its ineffectiveness to control appetite and weight into smoking prevention and cessation programs may be beneficial to targeting these beliefs. Furthermore, the current sample is taken from California, in which there is a heavy stigma against smoking behaviors (Alamar & Glantz, 2006). Future research examining the role smoking stigma plays in weight control smoking is needed in order to understand the negative relationship between weight control smoking and beliefs about whether smoking helps to control appetite/weight.

REFERENCES

Adams, C. E., Baillie, L. E., & Copeland, A. L. (2011). The smoking-related weight and eating episodes test (SWEET): Development and preliminary validation. *Nicotine & Tobacco Research*, *13*(11), 1123-1131.

Al-Delaimy, W. K., Manson, J. E., Solomon, C. G., Kawachi, I., Stampfer, M. J., Willett, W. C., & Hu, F. B. (2002). Smoking and risk of coronary heart disease among women with type 2 diabetes mellitus. *Archives of internal medicine*, *162*(3), 273-279.

Alamar, B., & Glantz, S. A. (2006). Effect of increased social unacceptability of cigarette smoking on reduction in cigarette consumption. *American Journal of Public Health*, *96*(8), 1359-1363. doi:10.2105/ajph.2005.069617

Anton, S. D., Perri, M. G., & Riley, J. R. (2000). Discrepancy between actual and ideal body images: Impact on eating and exercise behaviors. *Eating Behaviors*, *1*(2), 153-160.

Anzengruber, D., Klump, K. L., Thornton, L., Brandt, H., Crawford, S., Fichter, M. M., ... & Mitchell, J. (2006). Smoking in eating disorders. *Eating Behaviors*, *7*(4), 291-299.

Altabe, M. (1998). Ethnicity and body image: Quantitative and qualitative analysis. *International Journal of Eating Disorders*, *23*(2), 153-159. doi:10.1002/(sici)1098-108x(199803)23:2<153::aid-eat5>3.3.co;2-v

Bartal, M. (2001). Health effects of tobacco use and exposure. *Monaldi archives for chest disease*, *56*(6), 545-554.

Becker, D. M., Yanek, L. R., Koffman, D. M., & Bronner, Y. C. (1999). Body image preferences among urban African Americans and whites from low income communities. *Europe PMC*, *9*(3), 377-386.

Ben-Tovim, D. I., & Walker, M. K. (1991). The development of the Ben-Tovim Walker Body Attitudes Questionnaire (BAQ), a new measure of women's attitudes towards their own bodies. *Psychological medicine*, *21*(3), 775-784.

Beyth-Marom, R., Austin, L., Fischhoff, B., Palmgren, C., & Et al. (1993). Perceived consequences of risky behaviors: Adults and adolescents. *Developmental Psychology*, *29*(3), 549-563. doi:10.1037//0012-1649.29.3.549

Boles, S. M., & Johnson, P. B. (2001). Gender, weight concerns, and adolescent smoking. *Journal of Addictive Diseases*, *20*(2), 5-14.

Brandon, T. H., & Baker, T. B. (1991). The Smoking Consequences Questionnaire: The subjective expected utility of smoking in college students. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *3*(3), 484.

Brandon, T. H., Juliano, L. M., & Copeland, A. L. (1999). Expectancies for tobacco smoking.

Bruckner, E., Spring, B., & Pingitore, R. (1994). Weight consciousness and food intake during smoking cessation. *Annals of Behavioral Medicine*, *16*, S118.

Bulik, C. M., & Brinded, E. C. (1994). The effect of food deprivation on the reinforcing value of food and smoking in bulimic and control women. *Physiology & behavior*, *55*(4), 665-672.

Bush, T., Levine, M. D., Deprey, M., Cerutti, B., Zbikowski, S. M., McAfee, T., ... & Beebe, L. (2009). Prevalence of weight concerns and obesity among smokers calling a quitline. *Journal of smoking cessation*, *4*(2), 74-78.

Camp, D. E., Klesges, R. C., & Relyea, G. (1993). The relationship between body weight concerns and adolescent smoking. *Health psychology*, *12*(1), 24.

Carroll, S. L., Lee, R. E., Kaur, H., Harris, K. J., Strother, M. L., & Huang, T. T. K. (2006). Smoking, weight loss intention and obesity-promoting behaviors in college students. *Journal of the American College of Nutrition*, *25*(4), 348-353.

Cash, T. F. (2002). Women's body images. In *Handbook of women's sexual and reproductive health* (pp. 175-194). Springer US.

Cash, T. F. (2004). Body image: Past, present, and future. *Body image*, *1*(1), 1-5

Cawley, J., Markowitz, S., & Tauras, J. (2003). Lighting up and slimming down: The effects of body weight and cigarette prices on adolescent smoking initiation. doi:10.3386/w9561

Centers for Disease Control and Prevention. *The Third National Health and Nutrition Examination Survey (NHANES III 1988-94) Reference Manuals and Reports*. Bethesda, Md: National Center for Health Statistics; 1996.

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.

Chang, V. W., & Christakis, N. A. (2003). Self-perception of weight appropriateness in the United States. *American journal of preventive medicine*, *24*(4), 332-339.

Chavez, M., & Insel, T. R. (2007). Eating disorders: National Institute of Mental Health's perspective. *American Psychologist*, *62*(3), 159.

Chiolero, A., Faeh, D., Paccaud, F., & Cornuz, J. (2008). Consequences of smoking for body weight, body fat distribution, and insulin resistance. *The American journal of clinical nutrition*, *87*(4), 801-809.

Clark, M. M., Croghan, I. T., Reading, S., Schroeder, D. R., Stoner, S. M., Patten, C. A., & Vickers, K. S. (2005). The relationship of body image dissatisfaction to cigarette smoking in college students. *Body Image*, *2*(3), 263-270.

Clark, M. M., Hurt, R. D., Croghan, I. T., Patten, C. A., Novotny, P., Sloan, J. A., ... & Bernath, A. (2006). The prevalence of weight concerns in a smoking abstinence clinical trial. *Addictive behaviors*, *31*(7), 1144-1152.

Clausen, L., Rosenvinge, J. H., Friborg, O., & Rokkedal, K. (2010). Validating the Eating Disorder Inventory-3 (EDI-3): A comparison between 561 female eating disorders patients and 878 females from the general population. *Journal of Psychopathology and Behavioral Assessment*, *33*(1), 101-110. doi:10.1007/s10862-010-9207-4.

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.

Copeland, A. L., Brandon, T. H., & Quinn, E. P. (1995). The Smoking Consequences Questionnaire-Adult: Measurement of smoking outcome expectancies of experienced smokers. *Psychological Assessment*, *7*(4), 484.

Ellickson, P. L., Tucker, J. S., & Klein, D. J. (2001). Sex differences in predictors of adolescent smoking cessation. *Health Psychology*, *20*(3), 186.

Fairweather-Schmidt, K., & Wade, T. D. (2015). The relationship between disordered eating and cigarette smoking among adult female twins. *International Journal of Eating Disorders*, *48*(6), 708-714.

Feingold, A., & Mazzella, R. (1998). Gender differences in body image are increasing. *Psychological Science*, *9*(3), 190-195.

Fitzgibbon, M. L., Blackman, L. R., & Avellone, M. E. (2000). The relationship between body image discrepancy and body mass index across ethnic groups. *Obesity Research*, *8*(8), 582-589. doi:10.1038/oby.2000.75

Fornaro, M., Perugi, G., Gabrielli, F., Prestia, D., Mattei, C., Vinciguerra, V., & Fornaro, P. (2010). Lifetime co-morbidity with different subtypes of eating disorders in 148 females with bipolar disorders. *Journal of affective disorders*, *121*(1), 147-151.

Frederick, D. A., Jafary, A. M., Gruys, K., & Daniels, E. A. (2012). Surveys and the epidemiology of body image dissatisfaction. *Encyclopedia of body image and human appearance, 2,* 766-774.

Garner, D. M. (2004). *EDI 3: Eating disorder inventory-3: Professional manual*. Psychological Assessment Resources.

Granner, M. L., Black, D. R., & Abood, D. A. (2002). Levels of cigarette and alcohol use related to eating-disorder attitudes. *American Journal of Health Behavior*, *26*(1), 43-55.

Grogan, S. (2008). *Body image: Understanding body dissatisfaction in men, women, and children.* New York, CA: Routledge.

Grogan, S., Hartley, L., Conner, M., Fry, G., & Gough, B. (2010). Appearance concerns and smoking in young men and women: Going beyond weight control. *Drugs: education, prevention and policy*, *17*(3), 261-269.

Grunberg, N. E. (1990). The inverse relationship between tobacco use and body weight. In *Research advances in alcohol and drug problems* (pp. 273-315). Springer US.

Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017, October 10). Prevalence of obesity among adults and youth: United States, 2015-2016. Retrieved from https://www.cdc.gov/nchs/data/databriefs/db288.pdf

Halimi, J. M., Giraudeau, B., Cacès, E., Nivet, H., & Tichet, J. (2002). The risk of hypertension in men: direct and indirect effects of chronic smoking. *Journal of hypertension*, *20*(2), 187-193.

Herbozo, S., Menzel, J. E., & Thompson, J. K. (2013). Differences in appearance-related commentary, body dissatisfaction, and eating disturbance among college women of varying weight groups. *Eating behaviors, 14*(2), 204-206.

Howe, L. J., Trela-Larsen, L., Taylor, M., Heron, J., Munafò, M. R., & Taylor, A. E. (2017). Body mass index, body dissatisfaction and adolescent smoking initiation. *Drug and Alcohol Dependence*, *178*, 143-149. doi:10.1016/j.drugalcdep.2017.04.008

Hubbard, S. T., Gray, J. J., & Parker, S. (1998). Differences among women who exercise for 'food related' and 'non-food related' reasons. *European Eating Disorders Review*, *6*(4), 255-265.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological psychiatry*, *61*(3), 348-358.

Jamal, A., Homa, D. M., O'Connor, E., Babb, S. D., Caraballo, R. S., Singh, T., ... & King, B. A. (2015). Current cigarette smoking among adults—United States, 2005–2014. *MMWR Morb Mortal Wkly Rep*, *64*(44), 1233-1240.

Jeffery, R. W., Hennrikus, D. J., Lando, H. A., Murray, D. M., & Liu, J. W. (2000). Reconciling conflicting findings regarding post cessation weight concerns and success in smoking cessation. *Health Psychology*, *19*(3), 242.

Jo, Y. H., Talmage, D. A., & Role, L. W. (2002). Nicotinic receptor-mediated effects on appetite and food intake. *Developmental Neurobiology*, *53*(4), 618-632.

King, T. K., Matacin, M., Marcus, B. H., Bock, B. C., & Tripolone, J. (2000). Body image evaluations in women smokers. *Addictive behaviors*, *25*(4), 613-618.

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.

Lantz, P. M. (2003). Smoking on the rise among young adults: implications for research and policy. *Tobacco control*, *12*(suppl 1), i60-i70.

Lavender, J. M., & Anderson, D. A. (2009). Effect of perceived anonymity in assessments of eating disordered behaviors and attitudes. *International Journal of Eating Disorders*, *42*(6), 546-551. doi:10.1002/eat.20645

Lichtenstein, E. (1982). The smoking problem: A behavioral perspective. *Journal of Consulting and Clinical Psychology*, *50*(6), 804.

Ling, P. M., & Glantz, S. A. (2002). Why and how the tobacco industry sells cigarettes to young adults: evidence from industry documents. *American journal of public health*, *92*(6), 908-916.

Lopez, E. N., Drobes, D. J., Thompson, J. K., & Brandon, T. H. (2008). Effects of a body image challenge on smoking motivation among college females. *Health Psychology*, *27*(3S), S243.

Miller, K. J., Gleaves, D. H., Hirsch, T. G., Green, B. A., Snow, A. C., & Corbett, C. C. (2000). Comparisons of body image dimensions by race/ethnicity and gender in a university population. *International Journal of Eating Disorders*, *27*(3), 310-316.

Moran, S., Wechsler, H., & Rigotti, N. A. (2004). Social smoking among US college students. *Pediatrics*, *114*(4), 1028-1034.

Nademin, M. E., Napolitano, M. A., Xanthopoulos, M. S., Fava, J. L., Richardson, E., & Marcus, B. (2010). Smoking cessation in college-aged women: A qualitative analysis of factors important to this population. *Addiction Research & Theory*, *18*(6), 649-666.

Neighbors, L. A., & Sobal, J. (2007). Prevalence and magnitude of body weight and shape dissatisfaction among university students. *Eating behaviors*, *8*(4), 429-439.

Nielsen, S. (2001). Epidemiology and mortality of eating disorders. *Psychiatric Clinics of North America*, *24*(2), 201-214.

Ockene, J. K. (1993). Smoking among women across the life span: prevalence, interventions, and implications for cessation research. *Annals of Behavioral Medicine*.

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.

Perkins, K. A., Marcus, M. D., Levine, M. D., D'amico, D., Miller, A., Broge, M., ... & Shiffman, S. (2001). Cognitive–behavioral therapy to reduce weight concerns improves smoking cessation outcome in weight-concerned women. *Journal of consulting and clinical psychology*, *69*(4), 604.

Pomerleau, O. F. (1979). Why people smoke: Current psychobiological models. *Behavioral medicine: Changing health lifestyles. New York: Brunner/Mazel*.

Powell, A. D., & Kahn, A. S. (1995). Racial differences in women's desires to be thin. *International Journal of Eating Disorders*, *17*(2).

Quick, V., Berg, K. C., Bucchianeri, M. M., & Byrd-Bredbenner, C. (2014). Identification of eating disorder pathology in college students: a comparison of DSM-IV-TR and DSM-5 diagnostic criteria. *Advances in Eating Disorders: Theory, Research and Practice*, *2*(2), 112-124.

Rand, C. S., & Kuldau, J. M. (1990). The epidemiology of obesity and self-defined weight problem in the general population: Gender, race, age, and social class. *International Journal of Eating Disorders*, *9*(3), 329-343. doi:10.1002/1098-108x(199005)9:3<329::aid-eat2260090311>3.0.co;2-b

Rash, C. J., & Copeland, A. L. (2008). The Brief Smoking Consequences Questionnaire–Adult (BSCQ-A): development of a short form of the SCQ-A. *Nicotine & Tobacco Research*, *10*(11), 1633-1643.

Ricciardelli, L. A., McCabe, M. P., Williams, R. J., & Thompson, J. K. (2007). The role of ethnicity and culture in body image and disordered eating among males. *Clinical Psychology Review*, *27*(5), 582-606. doi:10.1016/j.cpr.2007.01.016

Rigotti, N. A., Lee, J. E., & Wechsler, H. (2000). US college students' use of tobacco products: results of a national survey. *Jama*, *284*(6), 699-705.

Saules, K. K., Pomerleau, C. S., Snedecor, S. M., Mehringer, A. M., Shadle, M. B., Kurth, C., & Krahn, D. D. (2004). Relationship of onset of cigarette smoking during college to alcohol use, dieting concerns, and depressed mood: results from the Young Women's Health Survey. *Addictive behaviors*, *29*(5), 893-899.

Solmi, M., Veronese, N., Sergi, G., Luchini, C., Favaro, A., Santonastaso, P., ... & Fornaro, M. (2016). The association between smoking prevalence and eating disorders: a systematic review and meta-analysis. *Addiction*, *111*(11), 1914-1922.

Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: mediating effects of dieting and negative affect. *Journal of abnormal psychology*, *110*(1), 124.

Stice, E. (2002). Risk and maintenance factors for eating pathology: a meta-analytic review. *Psychological bulletin*, *128*(5), 825.

Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of psychosomatic research*, *53*(5), 985-993.

Stice, E., Marti, C. N., & Durant, S. (2011). Risk factors for onset of eating disorders: Evidence of multiple risk pathways from an 8-year prospective study. *Behaviour research and therapy*, *49*(10), 622-627.

Stice, E., Marti, C. N., & Rohde, P. (2013). Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. *Journal of abnormal psychology*, *122*(2), 445.

Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of general psychiatry*, *68*(7), 714-723.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current directions in psychological science*, *10*(5), 181-183.

Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. American Psychological Association.

Thompson, J. K., Schaefer, L., & Menzel, J. (2012). Internalization of thin-ideal and muscular-ideal. *Encyclopedia of Body Image and Human Appearance. London. Elsevier*, 499.

Topic: Minorities in media. (n.d.). Retrieved from https://www.statista.com/topics/3342/minorities-in-media/

US Department of Health and Human Services. (2001). Women and smoking: 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*, 1353-1357.

US Department of Health and Human Services. (2014). The health consequences of smoking—50 years of progress: 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*, *17*.

Van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Coovert, M. (2002). The tripartite influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of psychosomatic research*, *53*(5), 1007-1020.

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, M. M., Elli, D. C., & Jack, L. M. (1993). Differential rates of relapse in subgroups of male and female smokers. *Journal of Clinical Epidemiology*, *46*(9), 1041-1053.

Weekley, C. K., Klesges, R. C., & Reylea, G. (1992). Smoking as a weight-control strategy and its relationship to smoking status. *Addictive behaviors*, *17*(3), 259-271.

Welch, S. L., & Fairburn, C. G. (1998). Smoking and bulimia nervosa. *International Journal of Eating Disorders*, *23*(4), 433-437.

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 and clinical psychology*, *67*(4), 555.

White, M. A. (2012). Smoking for weight control and its associations with eating disorder symptomatology. *Comprehensive psychiatry*, *53*(4), 403-407.

Wiederman, M. W., & Pryor, T. L. (2000). Body dissatisfaction, bulimia, and depression among women: The mediating role of drive for thinness. *International journal of eating disorders*, *27*(1), 90-95.

Wilson, G. T., Grilo, C. M., & Vitousek, K. M. (2007). Psychological treatment of eating disorders. *American Psychologist*, *62*(3), 199.

Appendix A

Eating Disorder Inventory-3-Body Dissatisfaction

For the items below, please indicate to what extent each statement is true of you.

1 = Always 2 = Usually 3 = Often 4 = Sometimes 5 = Rarely 6 = Never

		Always					Never
1.	I think that my stomach is too big.	1	2	3	4	5	6
2.	I think that my thighs are too large.	1	2	3	4	5	6
3.	I think that my stomach is just the right size.	1	2	3	4	5	6
4.	I feel satisfied with the shape of my body.	1	2	3	4	5	6
5.	I like the shape of my buttocks.	1	2	3	4	5	6
6.	I think my hips are too big.	1	2	3	4	5	6
7.	I feel bloated after eating a normal meal.	1	2	3	4	5	6
8.	I think that my thighs are just the right size.	1	2	3	4	5	6
9.	I think my buttocks are too large.	1	2	3	4	5	6
10.	I think that my hips are just the right size.	1	2	3	4	5	6

Appendix B

Smoking Habits

Instructions: Please answer the following questions as accurately as you can.

1. Have you ever smoked a cigarette in your lifetime?
2. Have you smoked a cigarette in the past 30 days?
3. Do you smoke at least one cigarette a day, most days of the week?
4. On average, how many cigarettes do you smoke per day?
5. Do you smoke at least one cigarette per week, most weeks per month?
6. On average, how many cigarettes do you smoke per week?
7. Do you smoke at least one cigarette per month, most months per year?
8. On average, how many cigarettes do you smoke per month?
9. How soon after waking up do you smoke your first cigarette?
   3. Within 5 minutes
   2. 6-30 minutes
   1. 31-60 minutes
   0. After 60 minutes
10. Have you ever smoked an electronic cigarette (e-cigarette, vape) in your lifetime?
11. Have you smoked an electronic cigarette (e-cigarette, vape) in the past 30 days?
12. Do you smoke at least one e-cigarette (e-cigarette, vape) a day, most days of the week?
13. On average, how many e-cigarettes (e-cigarettes, vapes) do you smoke per day?
14. Do you smoke at least one e-cigarette (e-cigarette, vape) per week, most weeks per month?
15. On average, how many e-cigarettes (e-cigarettes, vapes) do you smoke per week?
16. Do you smoke at least one e-cigarette (e-cigarette, vape) per month, most months per year?
17. On average, how many e-cigarettes (e-cigarettes, vapes) do you smoke per month?

Appendix C

Smoking-Related Weight and Eating Episodes Test (SWEET)

Instructions: Please rate how often each statement describes you, from 1 (never) to 5 (always).

1. When I feel hungry, I have a cigarette to curb my appetite.
2. When I crave unhealthy food, I have a cigarette to avoid eating.
3. When I feel like having a snack, I have a cigarette instead.
4. If I don't smoke soon after a meal, I continue to eat more than I need.
5. Smoking after a meal helps me to avoid overeating.
6. When I am full, I smoke so that I won't eat more.
7. When I feel fat, I have a cigarette.
8. I smoke when I am worried about gaining weight.
9. I crave tasty foods when I haven't smoked in a while.
10. I feel hungrier when I haven't smoked in a while.

Appendix D

Smoking Consequences Questionnaire – Adult (ASCQ) – adapted Appetite-Weight Control Scale

Instructions: This questionnaire is designed to assess beliefs people have about the consequences of smoking a cigarette. We are interested in your general expectations about the consequences of your smoking. Below is a list of statements. Each statement contains a possible consequence of smoking. For each of the statements listed below, please rate how LIKELY or UNLIKELY you believe each consequence is for you when you smoke. If the consequence seems LIKELY to you, circle a number from 5-9. That is, if you believe that a consequence would never happen, circle 0; if you believe a consequence would happen every time you smoke, circle 9. If it seems a little unlikely to you, you would circle 4.

1. Smoking controls your appetite.
2. Smoking keeps you from overeating.
3. Smoking helps you control your weight.
4. Cigarettes keep you from eating more than you should.
5. Smoking keeps your weight down.