

THE INFLUENCE OF WEIGHT CONCERNS AND WEIGHT CONTROL
EXPECTANCIES IN THE SMOKING BEHAVIOR OF SPANISH ADOLESCENTS

A Dissertation

by

MAYRA NOEMI BERRIOS-HERNANDEZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2011

Major Subject: Psychology

The Influence of Weight Concerns and Weight Control
Expectancies in the Smoking Behavior of Spanish Adolescents
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ABSTRACT

The Influence of Weight Concerns and Weight Control Expectancies in the Smoking
Behavior of Spanish Adolescents. (May 2011)

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The main goal of this study is to examine the relationship between weight control expectancies, weight concerns, smoking rate and perceived likelihood of smoking in the future among Spanish adolescents. Specifically, I intend to explore the potential moderator role of weight concerns on the relationship between weight control expectancies and smoking rate, as well as between weight concern and perceived likelihood of smoking in the future. Additionally, I want to investigate the possible mediational role of weight control expectancies on the relationship between weight concerns and smoking rate and likelihood of smoking in the future, respectively.

The participants were 311 Spanish adolescents ($M = 15.20$; $SD = 1.63$; 174 female and 137 male) from schools in Alicante, Spain. The students completed questionnaires regarding smoking history and status. They also responded to questions regarding smoking expectancies and weight concerns. Results suggested differences between smokers and nonsmokers in weight control expectancies and fear of fatness

regardless of gender. The moderator model of weight concerns was not supported by findings.

The results prove the meditational role of weight control expectancies on the relationship between fear of fatness and smoking rate, as well as between fear of fatness and perceived likelihood of smoking in the future. Implications, directions for future research and limitations of the study are discussed.

DEDICATION

To Félix Berríos-Torres and Loyda Hernández-Cruz, my parents: Thanks for teaching me the values of hard work, effort, and determination and for your unconditional love.

To Félix Javier Berríos “Bebo”, my nephew: Your beautiful smile and pure love remind me of the precious and good things of the world. I hope this can be an inspiration for your educational pursuits.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Cigarette smoking causes serious health problems and continues to be one of the leading causes of premature death in the world (U.S. Department of Health and Human Services [USDHHS], 1994). For example, according to the Center for Disease Control and Prevention (CDC, 2010b), 46.0 million adult Americans continue to smoke, with prevalence in the adult population of 20.6%, of these 23.1 percent are men and 18.3 percent are women. Although declines in smoking prevalence rates among adolescents have paralleled those found among adults, smoking continues to be all too common among high school students. In fact the CDC (2010a) indicates that even though smoking prevalence rates among high school students declined steadily in the late 1990s, this decline continued but at a slow pace from 2003 to 2009. From 2003 to 2009, the prevalence of current cigarette use (having smoked in the last 30 days) among high school students went from 21.9% to 19.5%. When broken down by grade, smoking rates jump from 13.5% in the 9th grade to 25.2% in the 12th grade, with no substantial differences between boys and girls (CDC, 2010a).

Curtailing youth cigarette smoking is probably the single most effective way of long term reductions in the morbidity and mortality attributed to cigarette smoking. The

This dissertation follows the style of *Journal of Abnormal Psychology*.

2004 Surgeon General Report on the *Health Consequences of Smoking* concluded, “Smoking remains the leading cause of preventable death and has negative impacts on people at all stages of life. It harms unborn babies, infants, children, adolescents, adults, and seniors” (USDHHS, 2004). Most smokers start using tobacco as children and adolescents, with those who do not begin to smoke before or during their adolescence having a very low risk of becoming adult smokers (Novotny & Giovino, 1998). Indeed, according to the National Cancer Institute (NCI, 2010) the younger that a person starts smoking, the greater the risk of developing smoking related cancer. In addition, early onset of smoking behavior is predictive of heavier tobacco use during adolescence and adulthood (USDHHS, 1994). In 2008, the average age at first use among adolescents ages 12-17 was 15.1 (NCI, 2010).

Many variables are associated to onset and rates of smoking among children, including gender and developmental influences. Studies investigating gender differences in smoking rates have presented mixed results. Some studies have found that girls are more likely to become regular smokers within the first year after experimenting with cigarettes (Ershler, Leventhal, Fleming & Glynn, 1989), others studies indicate that boys initiate and maintain tobacco use at higher rates than girls (Coogan et al., 1998; Grunbaum et al., 2002; Pederson, Koval, & O’Connor, 1997); and yet others suggest that smoking rates between boys and girls do not differ (CDC, 2010a). However, all these studies agree that smoking rates among teenagers, boys and girls are alarmingly high.

Adolescence has been characterized as a time of many changes including biological, psychological, and social changes that prepare the child for adulthood.

Teenagers go through multiple transitions to reach physical maturation, identity formation, and emotional dependence. These developmental strivings leave them open to social influences, especially from family, peers, and media messages (Tickle, Hull, Sargent, Dalton & Heatherton, 2006). Indeed, a recent study by Villanti, Boulay and Juon (2010) examined associations between peer smoking, smoking at home and tobacco-related media exposure. Their findings indicated that peer smoking and smoking at home still remain strongly associated with current smoking among early and middle adolescents. Furthermore, Gilman et al. (2009) found that parental smoking was significantly associated with higher risk of smoking initiation in adolescent offspring.

In addition, adolescents seem particularly tuned to adopt behaviors that they associate with being cool, independent, and well liked (Marcia, 1983). It has been established that social influences and developmental processes often interact to increase adolescents' risk for engaging in unhealthy activities, including tobacco use. For example, the expectation that smoking may facilitate bonding with peers and increase the sense of being independent correlates with taking up smoking (USDHHS, 1994). Likewise, the perception that smoking can control weight appears to influence the decision to smoke cigarettes, particularly among girls (Klesges & Robinson, 1995).

Smoking Prevalence in Spain

Spain is a country in which cigarette smoking is highly prevalent. The most current report from the Spanish observatory on drug use indicated that about 38.8% of Spaniards between the ages of 15 to 64 were current smokers in the last 30 days (Delegación del Gobierno para el Plan Nacional sobre Drogas [DGPND], 2009). By

comparison, about 20.6% of Americans 18 and older were smokers in 2009 (CDC, 2010b).

Studies suggest that smoking rates differ considerably by age and sex. In 2007, smoking rates for Spaniards between the ages of 15 to 64 were 42.6% for men and 34.7% for women (DGPND, 2009). By comparison, 23% of men and 18% of women 18 years old and older smoked in the US (CDC, 2010b). The prevalence for adolescents also remains high. The most recent and available school-based survey at the Spanish national level found that 38.1% of adolescents between the ages of 14 and 18 reported smoking during the last year, 32.4% during the last 30 days, and 14.8% reported daily smoking in the last 30 days (DGPND, 2009). When looking at differences between boys and girls, it appears that in Spain smoking prevalence is higher for girls than boys. For example, the rates for having smoked in the last 30 days for adolescents between the ages of 14 and 18 were 33.8% for girls and 30.9% for boys (DGPND, 2009). The average age of smoking initiation in boys and girls in Spain has remained at a 13.3 over the last ten years. Overall, the trends show that smoking rates are high and Spanish health authorities have been particularly and consistently concerned about the health consequences of youth female smoking (DGPND, 1999, 2003, 2004, 2008, 2009). A recent study that examined the risk and protective factors of smoking behavior among Spanish adolescents, revealed no gender differences in term of pattern use of smoking (García-Rodríguez, Suárez-Vazquez, Secades-Villa, & Fernández-Hermida, 2010). The authors reported that the average age of first use of cigarettes among adolescents was 12.5. The results also revealed a direct relation between family, peer smoking and

smoking status. Nonetheless, peer influences had stronger influence than family related variables for smoking behavior in the participants. Additionally, they found that drive for thinness and self-esteem were not related to cigarette use regardless of gender.

Eating Disorders and Body Image

Eating disorders is a serious mental health problem that increased considerably in the 1980's and has remained at consistent prevalence levels since then (Keel & Herzog, 2004). Long term investigations have documented increases in the incidence of anorexia nervosa since the 1950s (Hoek, van Hoeken, & Katzman, 2003). Lucas, Crowson, O'Fallon, and Melton (1999) reported an increase in the incidence rates of anorexia nervosa cases from 1935 to 1989, with an increase of approximately 1.03 per 100,000 individuals per calendar year. In the case of bulimia nervosa, trends have been difficult to ascertain because this disorder was not included in the DSM-III until 1980 (Hoek et al., 2003). Nevertheless, a study conducted by Soundy, Lucas, Suman, and Melton (1995) indicated that the incidence rate of bulimia nervosa increased from 7.4 per 100,000 females in 1980 to 49.7 in 1983, and then remained constant at around 30 new cases per 100,000 females until 1990. Hoek et al. (2003) concluded that the overall incidence rate of anorexia nervosa over recent years has been at least 8 per 100,000. Regarding life time, prevalence rates, approximately 0.5% of females meet criteria for the diagnosis of anorexia nervosa, while a 1% to 2% meets criteria for the diagnosis of bulimia nervosa (APA, 2000).

In a recent review of literature on the incidence, prevalence and mortality associated with eating disorders, Hoek (2006) states prevalence rates for young females

of 0.3% and 1% for anorexia and bulimia nervosa, respectively. Only about 33% of those who meet severe diagnostic criteria for anorexia nervosa and 6% of those with bulimia nervosa are treated in mental healthcare (Hoek, 2006). The mortality rates associated with eating disorders among females, particularly anorexia, are reported to be as high as 6%, which is the highest than for any other mental disorder (Sullivan, 1995). Indeed, a study by Crow and colleagues (2009) found that crude mortality rates were 4.0% for anorexia nervosa, 3.9% for bulimia nervosa, and 5.2% for eating disorder not otherwise specified.

Features of anorexia nervosa include the refusal to maintain a minimal weight, intense fear of gaining weight, and disturbance in the perception of body shape or size (APA, 2000). Bulimia nervosa is characterized by binge eating followed by inappropriate compensatory behaviors aimed at preventing weight gain (APA, 2000). Individuals with eating disorders constantly self-evaluate their body shape and weight. Both types of eating disturbances can have serious health-related consequences if left untreated, including cardiovascular, gastrointestinal, endocrine, and metabolic dysfunction (Cashel, Cunningham, Landeros, Cokley, & Muhammad, 2003; Garner & Garfinkel, 1997). Many adolescent girls and adult women report symptoms of eating disorders, and although these women do *not* meet the criteria for the diagnosis of an eating disorder, their symptoms can cause distress and substantial impairment in their lives (Academy for Eating Disorders, AED, 2006).

As with smoking, the transition from childhood to adolescence is a period of vulnerability for the development of eating disorders, with numerous studies having

documented the emergence and escalation of dieting, bingeing and purging, and non-prescribed use of laxatives in children and young adolescents (Ambrosi-Randic, 2000; Davison, Markey & Birch, 2000; Wood, Becker & Thompson, 1996). Researchers have postulated that media messages that emphasize dieting and slender bodies can have a negative influence on young adolescents (Irving, 2001; Stice, Schupak-Neuberg, Shaw & Stein, 1994; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). These messages as well as those that present overweight people in a derogative manner have also a negative influence on young children (Levitt, 2003). These negative influences can cause young children and adolescents to develop unrealistic expectations of attaining extreme, unhealthy levels of thinness (Tiggemann & Pickering, 1996). Difficulties in attaining high levels of thinness are often accompanied by high levels of body image dissatisfaction, a notable high risk factor for the development of eating disorders (Harrison, 2000). Fear of fat or an intense fear of becoming fat is also one of the markers of eating disorders diagnosis (APA, 1994). As adolescents internalize society's thin ideal of beauty they become vulnerable to engage in behaviors that although unhealthy may help them achieve their internalized but unrealistic standard of beauty (Kilbourne, 1994). Some of these compensatory behaviors may include severe restrictive dieting and other forms of extreme, unhealthy, and compensatory weight control methods such as self-induced purging, use of laxatives, and abuse of diet pills (Vartanian, Herman & Polivy, 2005).

Eating Disorders in Spain

Eating disorders have been historically viewed by some authors as a culturally bound syndrome circumscribed to white, middle to upper class women under the influence of modern, Western values (Katzman & Lee, 1997). The culture bound theory of anorexia nervosa and bulimia nervosa proposes that modern Western values equate thinness with beauty and success, particularly among women. This value is transmitted mainly through mass media messages such as fashion advertisements, movies, TV shows, TV commercials and the internet. That is, our society is saturated with images of thin and extremely thin women portrayed as sexually desirable, highly successful, and happy. Such an environment leads to equating thinness with beauty and success, which in turn leads to the desire of being thin and to behaviors aimed at achieving thinness.

Recent findings suggest that eating disorders are emerging within different ethnic and social-class groups in and out of predominately Anglo countries (Apter et al., 1994; Buddeberg-Fischer et al., 1996; Cooley & Toray, 2001; Gual et al., 2002). Pate, Pumariega, Hester and Garner (1992) suggested that the increase in prevalence of eating disorders around the world may be a result of changes in the Westernization of the cultural values and attitudes of those countries. In layman's terms, the Americanization of the world is associated with an increase in the incidence eating disorders symptoms. A point in case is Spain. Gleaves et al. (2000) suggested that societal standards for thinness and sociocultural pressure to conform to a thin ideal are noticeable in Spain. Toro, Cervera, and Perez (1988) analyzed 10 Spanish women's magazines and found that 22.5% of their advertisements encouraged weight loss targeting primarily the female

population in the 14-28 age range. In parallel with the noted emphasis in thinness, many studies have reported a high incidence of eating disorders symptoms, body dissatisfaction and concern about losing weight among Spanish young women (Gleaves et al., 2000; Raich, Rosen, Deus & Perez, 1992; Raich, Torres- Clarasó, & Mora-Giral, 1997; Raich et al., 2001; Toro et al., 2006).

Studies point to high increase in the incidence of eating disorders in Spain starting in the 1990s. Ruiz-Lázaro et al. (1998) indicated that 16.32 % of females were considered at risk for eating disorders in Spain (at risk was defined as a score above 30 in the Eating Attitudes Test-40 (Garner & Garfinkel, 1979). Ruiz-Lázaro, Alonso, Comet, Lobo, and Velilla, (2005) conducted a survey with a representative national sample of approximately 4,047 adolescents between the ages of 12-18. These authors found a 4.51% overall prevalence of eating disorders; specifically, a 0.14% prevalence of anorexia nervosa, and a 3.83% prevalence of bulimia nervosa. In addition, 16.32% of girls and 3.3% of boys were found to be at risk of developing an eating disorder (see also Gandarillas, et al., 2004; Morandé, Celada & Casas, 1999; Ruiz-Lázaro et al., 1998). Recently, Lopez-de-Andres et al. (2010) conducted a study to analyze the hospitalizations trends in children and adolescents with eating disorders in Spain from 1998 to 2007. There were a total of 10,569 admissions due to disordered eating, and anorexia was the principal discharge diagnosis accounting for 86.8% of those that were admitted.

A history of eating disorders in Spain, suggest that during the first half of the 20th century the illness anorexia nervosa was unknown in Spain, and there is a probability

that patients were misdiagnosed, thinking that anorexia was an endocrinological or metabolic disease. On the other hand, some features of bulimia nervosa such as binge eating were considered as symptoms of obesity and other metabolic diseases. In Spain, anorexia nervosa was first described as a mental health disorder, neuroses characterized by digestive and nutritional dysfunctions, in 1934 (Fernández-Arana, 2003). However, up to the 1970s anorexia nervosa remained a very rare disorder that was treated in pediatric, internal medicine, or endocrinology units (Fernández-Aranda, 2003). It was not until the 1980's that the incidence of anorexia nervosa started to be noticed as a mental disorder and the literature on its treatment started to appear. Two hospitals created special units for the treatment of eating disorders in the early 1980s (Toro, 2003), and the first extensive studies on the clinical state of anorexic patients were published also in the 1980s (Chinchilla, 1981; Toro & Vilardell, 1987).

From the late 1980s until these days, the incidence of eating disorders in Spain has increased progressively to the point of raising a great deal of concern among health professionals, government officials and the population at large. As a result, substantial resources have been set aside for research and medical assistance (outpatient/day hospital and inpatient units) to study and treat eating disorders. The recent interest in eating disorders in Spain has been documented by Ruiz-Lázaro (2003) by noting the surge of publications related to eating disorders, including treatment manuals, handbooks, translation and validation of eating disorder measures, and other research reports ranging from community prevalence studies to basic and applied eating disorders investigations. For example, the adaptation of eating disorder measures to Spanish

include the questionnaire of Eating Disorder Symptoms (Guimerá & Torrubia, 1987), the Eating Attitudes Test (Castro, Toro, Salamero & Guimerá, 1991), the Body Shape Questionnaire (Raich, Deus, Muñoz, Perez, & Requena; 1991; Raich, Torras-Clasaró & Figueroa, 1996) and the Eating Disorders Examination Interview (Raich, Mora, & Marroquín, 2000). Other markers of the current interest in eating disorders in Spain include the creation in the late 1990s of the Asociación Española para el Estudio de los Trastornos de la Conducta Alimentaria [*Spanish Association for the Study of Eating Disorders*], as well as a number of national support-groups and self-help associations such as the Asociación Contra la Anorexia y la Bulimia [*Association against Anorexia and Bulimia*].

The interest in eating disorders also encouraged researchers such as Raich, Rosen, Deus, & Pérez (1992) to conduct the first comparative study of eating disorder symptoms between United States and Spain. For example, these investigators compared US ($n = 1,003$) and Spanish ($n = 1,976$) adolescent girls (14 to 18-year olds) and found that there was a greater interest in losing weight and more eating disorder symptoms in American girls than Spanish girls. Specifically, a 12.1% of American girls reported higher scores on eating disorder symptoms as measured by the EAT, and a 10% females from Spain reported symptoms of eating disorders. The report of bulimic symptoms was 3.5% for American girls but only about 1% of for Spanish girls. Finally, more than 70% of American girls but less than 50% of Spanish girls wanted to loose weight. Ambwani, Warren, Gleaves, Cepeda-Benito and Fernandez (2007) conducted a study with a Spanish and Euro-American sample in which they translated the Goldfarb Fear of Fat

Scale (GFFS). They found that women reported more fear of fatness than males for both samples, yet Spaniards reported less fear of fatness as compared to the Euro-American sample.

Smoking Expectancies

Expectancy theory has been used in psychology to understand different behavioral problems such as drinking problems, drug abuse, and smoking. Expectancy principles can be dated back to the early works of Tolman (1932) who referred to expectancy as the capacity an individual has to store information and guide future behavior. MacCorquodale and Meehl (1954) added to Tolman's theory by describing expectancy as the relationship between an initial stimulus, a response, and the outcome of a response. According to Maddux (1999), others theorists have also used the expectancy framework such as Edwards's (1954) theory of decision making, Rotter's (1954, 1966) social learning theory, protection motivation theory (Rogers, 1975), the theory of reasoned action and planned behavior (Ajzen, 1988; Fishbein & Ajzen, 1975), self-efficacy theory (Bandura, 1977), control theory (e.g., Carver & Scheier, 1982; Hyland, 1988), and response expectancy theory (Kirsch, 1985, 1990).

Kirsch (1985, 1990) described expectancies as beliefs that people have about how they react to an event. In the case of smoking behavior, Kirsch's (1999) expectancy theory states that people express cognitive beliefs, or expectancies, about the consequences of smoking that influence the individual's decision to begin, maintain, and quit smoking, and even relapse after quitting. An expectancy theory formulation that has gained considerable attention from addiction research investigators is that of Goldman

(1999). Goldman described expectancies as active memory templates that are stored within the nervous system. These templates or expectancies prepare an individual to cope with situations that were encountered in the past (Goldman, 1999). Goldman (1999) posited that these outcomes expectancies can be learned through both actual and vicarious experiences, as both types of experiences lead to knowledge about how to behave under specific circumstances (Goldman, 1999). Therefore, it can be argued that smoking expectancies are not necessarily a result of direct experience with smoking cigarettes but can be acquired through observation.

Positive smoking expectancies tend to be more consistently associated with smoking indices than negative outcome expectancies. Scores from smoking expectancies measures have been found to predict smoking in college-student samples (Brandon & Baker, 1991, Downey & Kilbey, 1995) and in nicotine-dependent community samples (Copeland, Brandon & Quinn, 1995). Hine, Tilliczek, Lewko, McKenzie-Ritcher, & Perreault (2005) found that individuals who expect positive consequences from smoking are more likely to begin smoking and continue to smoke than those who expect less positive consequences. Thus, expectancies may predict reported intentions to smoke, smoking initiation, and the progress from smoking initiation to regular smoking (Chassin et al., 1981; Chassin, Presson, & Sherman, 1984). In addition, positive expectancies are linked to greater smoking rates, levels of nicotine dependence, and relapse after quitting (Copeland, Brandon & Quinn 1995). For example, Cepeda-Benito and Reig-Ferrer (2000) found in sample of Spanish smokers, that positive outcome smoking expectancies were significantly and substantially

associated with nicotine dependence scores. They also found higher smoking expectancies in women than in men in (a) weight control, (b) craving reduction and addictiveness, and (c) negative-affect reduction.

Conversely, negative expectancies, such as health-risks expectancies, are strong predictors related to readiness to quit (Copeland, Brandon & Quinn, 1995; Rose, Chassin, Presson, & Sherman, S.J. (1996). Copeland, Brandon & Quinn (1995) also reported that exposing people to information about smoking related illness augmented health-risk outcome expectancies for smoking, which increased readiness to quit and lead to smoking-reduction rates overtime.

Although most studies have addressed direct or simple relationships between smoking expectancies and smoking behavior, a few studies have investigated the relationship between smoking expectancies and smoking behavior hypothesizing the influence of other variables in moderational and mediational models (Cohen, McCarthy, Brown & Myers, 2002). Cohen et al. (2002) examined whether negative affect in combination with smoking outcome expectancies predicted smoking behavior over time. Participants were evaluated during three times over a four year period. The authors found that expectations about positive reinforcement/sensory satisfaction and negative reinforcement through negative affect reduction mediated, but only partially, the relationship between negative affect and smoking. On the other hand, positive expectancies did not moderate the relationship between negative affect and smoking behavior.

Other studies have also explored the role of positive and negative expectancies in smoking behavior among adolescents. Bauman and Chenoweth (1984) conducted a study with a sample of 1,406 adolescents in order to evaluate consequences expected from smoking cigarettes. They found that positive smoking expectancies were more strongly associated to smoking than negative outcome expectancies, i.e., negative physical, social and health outcome expectancies from smoking. Gordon (1986) examined smoking expectancies in a sample of 12 to 14-year old adolescents ($N = 2,339$). Like Bauman and Chenoweth (1984), Gordon (1986) found that positive-outcome rather than negative-outcome expectancies predicted smoking status. Morgan and Grube (1989) examined smoking expectancies in 13 to 17-year olds ($N = 3000$) and found that positive smoking outcome expectancies were significant predictors of smoking; however, younger adolescents reported more positive and less negative outcome expectancies than older adolescents.

Hansen, Collins, Johnson, and Graham (1985) studied smoking expectancies in adolescents (15 and 16-year olds) to examine psychosocial predictors of self-initiated smoking cessation. To examine these predictors they used a questionnaire which asked about their smoking behavior, moral attitudes toward smoking, normative expectations about smoking, level of rebelliousness, and the extent to which their peers and parents smoked. Those who were identified as smokers were reassessed at three and at fifteen months after the initial evaluation. Those who reported no longer smoking at the three-month follow up were classified as ex-smokers. Of these, those who at the 15-month follow up had not begun to smoke were considered long-term abstainers. Using

stepwise discriminant analysis the authors found that moral attitudes, peer smoking, and positive beliefs about smoking discriminated between those who continued to smoke and those who quit at the 3-month follow up. Moreover, the belief that smoking is harmful, low levels of self-perceived rebelliousness, and family attitudes against smoking were predictive of long-term abstinence.

Chassin et al. (1984) examined data from a longitudinal study of smoking behavior in adolescents to identify variables related to smoking cessation 1-year post baseline in middle (grades 6-8) and in high school (grades 9-11) students. Current smokers and ex-smokers status were determined by self report. In the middle school sample there were 20 ex-smokers and 50 continuing smokers. In the high school sample there were 13 ex-smokers and 95 continuing smokers. For the younger group, smoking cessation was associated to parental influences towards smoking. In the high school sample, peer influences (peer smoking and attitudes towards the adolescent smoking behavior) were more influential in the decision to quit smoking. Expectations about the negative health consequences of smoking were unrelated to smoking cessation in both groups.

Chassin, Presson, Sherman, & Edwards (1991) reported 4 to 8 year follow up data from a longitudinal study ($N = 5,799$) that examined beliefs about the consequences of smoking in adolescents first assessed in grades 6 through 12 (mean age 14, between 1980 and 1983). Participants (average age 21.8) were reassessed between 1987 and 1983 for a total of 4,156 participants providing data (a follow-up rate of 72%). Smoking status at both assessment points was ascertained with a single item that divided subjects

into *abstainers* (never smoked a cigarette not even a single puff), *triers* (have smoked one or two “just to try”, but not in the last month), *ex-smokers* (no longer smoke but in the past was a regular smoker), and *regular smokers* (smoke monthly or more; at the follow-up regular smoking was defined as weekly smoking). Chassin et al. (1991) reported that positive general attitudes toward smoking (normative beliefs about smoking, beliefs about the psychological consequences of smoking, and general health beliefs about smoking) predicted smoking during both adolescence and young adulthood. Smokers at the first assessment reported more positive personally relevant beliefs about the social consequences of smoking than nonsmokers and triers. At the second assessment, long-term smokers had more positive personally relevant beliefs about the health consequences of smoking than any other group, including late-onset smokers. Nonetheless, late-onset smokers and stable never smokers were more likely than other groups to believe that smoking has negative social consequences, although late smokers were less negative about smoking than never smokers.

Flay, Hu, and Richardson (1998) examined the psychosocial predictors of different stages of smoking in children who were assessed in grades 7th and 12th. Smoking stage was measured at the 12th grade point. The stages were defined as *trial* (smoked at least part of a cigarette but not more than one cigarette in their life), *experimental* (smoked more than one cigarette but not in the past week), and *regular use* (smoked cigarettes in the past week). Flay et al. found that parental smoking significantly predicted trying, experimenting, and regular smoking, with the strongest effect found for regular smoking. Flay et al. found that the number of friends who have

tried smoking significantly predicted trying, experimenting, and regular smoking. They also found that friends' approval of smoking significantly predicted experimenting and regular smoking. The outcome expectancy scale was found to predict experimental use and regular smoking, while smoking intentions significantly predicted trying, experimenting, and regular smoking. In addition, smoking intentions predicted the transition from trying to experimental use of cigarettes. Recently, Urban and Demetrovics (2010) explored the construct validity of a short version of the Smoking Consequence Questionnaire in a sample of 953 adolescents. Their findings supported the construct validity of the instrument and revealed that smokers were more likely to endorse expectancies of reinforcement consequences from smoking. Additionally, they found gender differences, as boys tended to report higher positive reinforcement expectancies of smoking, while girls reported higher endorsement of appetite and weight control expectancies.

Overall, the studies presented above suggested that positive outcome expectancies (particularly positive social expectancies) and peer smoking are positively associated with the decision to smoke. Among the negative expectancies that do appear to be associated with the decision not to smoke are also those related to social consequences, including parental and peer disapproval (Bauman & Chenoweth, 1984; Chassin et al., 1991).

Weight Control Expectancies and Weight Concerns

The pressure to be thin often leads women to use methods for weight loss that pose serious health risks (Kilbourne, 1994). It has been found that individuals who have

anorexia nervosa or are at risk of developing anorexia and bulimia nervosa are highly likely to engage in risky behaviors to control their weight (Kaltiala-Heino, Kautiainen, Virtanen, Rimpelä, & Rimpelä, 2003). Although there is not a complete picture, some studies have reported that individuals who restrict their caloric intake excessively are also likely to engage in other unhealthy behaviors (French, Perry, Leon & Fulkerson, 1994; Neumark-Sztainer, Story, Dixon & Murray, 1998). In addition to extreme restrictive dieting, excessive exercise, and purging behaviors such as vomiting and using laxatives, individuals with eating disorder symptoms frequently engage in substance abuse, including smoking (Anzengruber et al., 2006; Dansky, Brawerton & Kilpatrick, 2000).

Most of the studies that have examined the relationship between smoking, weight concern, and dieting have been cross-sectional. Although these studies cannot establish a causal relationship between the desire to be thin and smoking behavior, the data suggest that smoking may be used as a weight control mechanism by children with eating disorders. Pomerleau, Berman, Gritz, Marks, and Coeters (1994) noted that cultural messages that put undue emphasis on thinness may contribute to the use of smoking as a tool to control weight gain. Nieri, Kulis, Keith, and Hurde (2005) found that a negative body image among adolescents was associated with smoking. These authors speculated that adolescents used cigarette smoking as a weight control strategy.

Eight prospective studies have examined smoking initiation and body weight concerns (Austin & Gortmaker, 2001; Cawley, Markowitz, & Tauras, 2004; French, Perry, Leon, & Fulkerson, 1994; Harakeh, Engels, Monshouwer, & Hanseen, 2010;

Honjo & Siegel, 2003; Killen et al., 1996; Koval, Pederson, Zhang, Mowery, & McKenna, 2008; Maldonado-Molina, Komro, & Prado, 2007). Harakeh et al. (2010) found that adolescents who believed that smoking helped to control their weight were at higher risk of smoking initiation. However, restrained eating and body mass index were not predictive of smoking onset. Maldonado et al. (2007) examined a sample of 7795 adolescents that were part of a longitudinal study. Participants of this study were interviewed between April 1994 and December 1995 at Time 1 and between April 1995 and August 1996 at Time 2. Their findings indicated that females who initiated dieting during the study period were about two times more likely to initiate regular smoking when compared to non-dieters females. In contrast, males who wanted to lose weight but were not dieting at time 2 were at more risk of initiating regular smoking.

Koval et al. (2008) in a 10 year cohort study also identified that females in grades 8 and 11 who perceived themselves to be overweight were more likely to be young adult smokers. On the other hand, for males, BMI was the more important factor in terms of predicting future smoking. Cawley et al. (2004) found that females who were overweight, or described themselves as being overweight, or were trying to lose weight were more likely to initiate smoking. However, for males objective and subjective measures of weight did not predict smoking initiation.

Honjo and Siegel (2003) found that perceived importance to be thin was a significant predictor of smoking behavior during a 4 year period of follow up. However, in contrast with other studies they found that dieting behavior was not a significant predictor of smoking initiation. Finally Austin and Gortmaker (2001) and French et al.

(1994) found similar results as their studies revealed that girls who dieted and who were more concern about their weight, initiated smoking at a higher rate than those who did not and these findings were not observed on boys.

Earlier studies have also suggested that smokers hold the belief that smoking cessation can result in weight gain (e.g., Klesges, Meyers, Klesges, & La Vasque, 1989). They also reported that smokers weighed less than non-smokers and that smoking initiation was associated with weight loss (see also Gordon, 1986). Similarly, Coates and Li (1983) demonstrated that smokers who quit smoking gained significantly more weight than non-smokers. Other researchers agree that young women report beginning and continuing smoking to control appetite and reduce body weight (Pirie, McBride, Hellerstedt, & Jeffrey, 1992).

Mayhew, Flay, and Mott (2000) reviewed empirical studies of predictors of transitions in stages of smoking progression, and found that concerns over body weight was one of six variables that were strongly associated with increased smoking rate in adolescents. The other variables that they described to be related to increase smoking rates were: number of friends who smoke, affect regulation, holding positive attitudes toward smoking, parental smoking, sibling smoking and intention to smoke in the future. Potter, Pederson, Chan, Aubut, & Koval (2004) conducted a meta-analysis of 55 studies evaluating the relationship between body weight, weight concerns, and smoking among adolescents. These authors indicated that some studies reported a positive relationship between smoking and body weight concerns and that the strongest evidence of this relationship was between dieting behaviors and smoking.

Of the studies that they reviewed, they found that five of them examined the belief or expectancy that smoking helps to control body weight (Camp, Klesges & Relyea, 1993; Charlton & Blair, 1984; Klesges, Elliot, & Robinson, 1997; Robinson, Klesges, Zbikowski, & Glaser, 1997; Wang, Fitzhugh, Eddy, Westerfield, 1998). Charlton and Blair (1984) asked a sample of 9 to 19-years old adolescents whether they agreed with the belief that smoking helps with weight control. Charlton and Blair found that 16.6% of those who had never smoked, 22.6% of those who tried smoking, 27.4% of ex-smokers, 29.8% of light smokers (smoke less than one cigarette per week), 30.6% of regular smokers (smoke more than one cigarette per week), and 42% of the heavy smokers (more than six cigarettes per week) agreed that smoking helps with weight control. In addition, the belief that smoking keeps your weight down was more prevalent in girls than boys. On the other hand, they indicated that when participants reached the age of 17, approximately 25% of the adolescents expressed the belief that smoking controls weight regardless of their smoking status. Under the age of 12 years, the regular smokers were least likely to agree that smoking keeps the weight down, while at the 12 years, the pattern reversed.

Camp et al. (1993) examined data from 659 high school students to estimate whether the belief that smoking can control your weight predicts smoking. In this study, the authors included two questions to evaluate the participant's belief that smoking controls weight and appetite. About 40% of the participants agreed with the belief that smoking could help control appetite and weight. This belief was more prevalent among white girls (45.7%) than white boys (29.9%), black boys (13.5%) and black girls (10%).

In addition, high eating restraint was more common among those who smoked for weight-control reasons. Klesges, Elliot, & Robinson et al. (1997) evaluated the data for 6,961 seventh grade students (mean age = 13) that were part of a longitudinal investigation examining the correlates of smoking onset in black and white adolescents. Smoking expectancies were measured with one item that asked students whether they endorsed the belief that smoking cigarettes helps people to control their weight. In addition, they included another question that asked subjects if they had ever smoked to control or lose weight. Results indicated that 39.4% supported the belief that smoking could help control one's weight, which is consistent with the 40% reported in the Camp et al. (1993) study. White girls and white boys were the most and least likely to endorse this belief, respectively.

Robinson, et al. (1997) studied data from a sample of 6,967 adolescents in 7th grade. Using self-report, students were categorized as nonsmokers, experimental smokers, regular smokers, and those who had smoked cigarettes regularly in the past but did not currently smoke and had quit smoking. Experimental smokers were those who smoked occasionally but less than once a week; and regular smokers were those that used at least one cigarette per week. All children rated on a 3-point scale the extent to which they believed that smoking helps reduce body weight. For those that acknowledged a history of cigarette use, a follow-up question asked them whether they had ever smoked specifically to control their weight. Participants then completed 6 items of a restraint scale to assess food-intake inhibition. Results indicated that children who acknowledged using smoking as a method of losing weight were 3.34 times more

likely to be regular smokers than those who did not smoke for weight control purposes regardless of gender. In addition, the variable of smoking as an active weight-control strategy emerged as the best predictor of experimental versus regular smoking.

A computer assisted telephone interview was conducted by Wang et al. (1998) to evaluate the association of beliefs and attitudes related to smoking and smoking behaviors among school dropouts. A national weighed sample of 492,352 students between the ages of 15 to 18 was interviewed. Smokers were those who indicated that they were currently smoking, had smoked 10 or more days in the past 30 days, and had smoked at least 100 cigarettes in their lifetime. Non-smokers were those who indicated they had never smoked in their lifetime. Analysis revealed that 66.7% of those who believed cigarette smoking help people keep their weight down were smokers, whereas only 54.6% of those who did not believe smoking keeps weight down were smokers. That is, believing that smoking can control body weight and smoking are correlated, but many adolescents who held the belief that smoking controls body weight do not smoke, whereas many adolescents who smoke do not hold the believe that smoking controls body weight.

Recent studies that have examined the belief that smoking helps control body weight have been consistent with previous findings. For instance, Cavallo, Duhig, McKee, Krishnan-Sarin (2006) examined a sample of 103 high school students, ages 14–18, who were daily smokers to evaluate smoking-specific weight concerns and to evaluate the influence of age, gender and BMI. They used two questions to measure smoking-specific weight concerns: How much do cigarettes help you control your

weight and how concerned are you about gaining weight as a result of quitting? They found that among daily smokers, females were more likely than males to believe that smoking controls their weight and had more concerns about gaining weight as a result of quitting smoking. While for males those with higher BMI were more likely to use smoking to control their weight.

Kendzor, Copeland, Stewart, Businelle, and Williamson (2007) examined whether young children who had tried smoking would possess greater concern about body weight than those who had not tried smoking. The 727 participants were between the ages of 7 to 13 years old. They assessed smoking status by asking children the question, *Have you ever tried a cigarette?* Beliefs that smoking controls body weight were assessed with two *True-False* items: (1) *Smokers are thinner than non-smokers*, and (2) *Smokers eat less than non-smokers*. Their findings indicated that weight-control smoking expectancies were higher in children who had tried smoking than in children who had never tried smoking.

Bean et al. (2008) conducted a study with 730 high school students to examine the relationship between adolescent beliefs regarding smoking and weight loss and smoking status. Specifically, they used the following questions: If I stay tobacco free, I will gain weight? and three items that asked if people smoke because it helps them to lose weight, because it helps them to stay thin, and because it makes them less hungry. Results indicated that current smokers were more likely to endorse the belief that if they are “tobacco free” they will gain weight, yet they were less likely to endorse the belief

that people smoke for weight control as compared to non smokers and experimental smokers.

Cavallo et al. (2010) in a recent study explored the association of cigarette smoking and weight concerns in a sample of 4,523 adolescents ages 14 to 18. They asked participants about their past month cigarette use and categorized their responses in three groups: smokers, nonsmokers and light smokers. The percentage of nonsmokers was 79%, 8% were heavy smokers and 13 % were light smokers. Boys were more likely than girls to be heavy smokers while girls were more likely to be light smokers. The belief or expectancy that smoking helps control weight was assessed using the Appetite-Weight Control Scale of the SCQ. Results indicated that adolescents that were smokers have more expectations about the role of smoking in helping control weight and that they also engaged in more dietary-restrictive behaviors than nonsmokers. Differences within the smokers group (heavy smokers and light smokers) suggested that heavy smokers were more likely to engage in non healthy dietary behaviors yet both groups did not differed in the use of unhealthy dietary restrictions. In terms of weight control expectancies, heavy smokers had greater expectancies for weight control when compared to light smokers, regardless of gender.

Although there is convincing evidence to support the association between weight concerns, the belief that smoking helps to control weight and smoking behavior, the examinations of potential moderators or mediators effects among these is scanty. In fact, Harakeh et al. (2010) highlighted that previous studies examining the effects of weight

concerns on smoking initiation have almost not tested moderators and have generally focused on gender effects.

To our knowledge, only three studies have tested a mediator and moderator effect between these variables. For example, Harakeh et al. (2010) studied if sociodemographic (birth order, gender, education level), individual (BMI and restrained eating) and parental characteristic (parental smoking, parent's BMI and restrained eating) moderated the relationship between weight control motives to smoke and smoking initiation. However, their findings did not support a moderation model. Copeland and Carney (2003) proposed to investigate how expectancies would mediate the relationship between dietary-restraint-and-disinhibition and smoking behavior in a sample of college students. They defined dietary restraint as the intention to control body weight by restrictive eating. Eating disinhibition was defined as the loss of control of eating that resulted in a brief interruption of dietary restraint. The authors found that expectancies for appetite and weight control mediated the relationship between dietary restraint and disinhibition and smoking status. They also reported that women who were higher in dietary restraint and disinhibition had stronger beliefs about appetite and weight control properties of cigarettes and were more likely to smoke than those who were lower in dietary restraint and disinhibition.

Tamez and Cepeda-Benito (2006) evaluated the moderation effect of fear of becoming fat on the relationship between appetite and weight control expectancies and smoking in a mixed sample of adults smokers and nonsmokers from Spain. They found that the fear of becoming fat moderated the relationship between weight control

expectancies and smoking rate for both men and women. That is, the relationship between weight control expectancies and smoking behavior was stronger for those with high levels of fear of becoming fat than for those with low fear of becoming fat. To date, this is the only study to look at the moderating effect of a construct related to eating disorders symptoms on the relationship between weight control expectancies and smoking behavior.

Focus of the Present Study

Cigarette smoking is still considered one of the causes of premature disease and death in U.S. as well as other countries. The rates of smoking in Spanish adolescents are very high for both males and females. At the same time, eating disorders is a mental health problem that is becoming increasingly prevalent among Spanish adolescents. Research shows that female adolescents use smoking as a way to control their weight (Klesges, Elliot & Robinson, 1997). Expectancy theory posits that beliefs about the consequences of a given behavior can be acquired through direct experience as well as vicariously through observation or modeling (Goldman, 1999). For instance, smoking outcome expectancies has been associated with the initiation, maintenance and cessation of smoking (Chassin et al., 1981, Brandon & Baker, 1991). Thus, it is plausible to hypothesize that weight control expectancies are important in determining the decision to smoke.

Several studies have established that both weight concerns and the expectancy that smoking will reduce weight gain are related to smoking initiation. However, little is known about the relative weights and relationship between these two constructs in their

prediction of smoking. Two plausible explanations are the following. One position would be that weight concerns and weight control expectancies interact to predict smoking. For example, it could be hypothesized that weight control expectancies predicts smoking or intentions to smoke to the extent that an individual is concerned or not about his or her weight. A second explanation would be that the relationship between weight concerns and smoking is mediated by weight control expectancies. That is, the reason why weight concerns is associated to smoking is because weight concerns is correlated with weight control expectancies, which in turn influence an individual's decision to smoke. There are no studies that have investigated possible interaction or mediation effects between concerns of gaining weight and weight control expectancies for the prediction of smoking in adolescents.

Research Hypothesis

The first hypothesis of the study was to test whether adolescent smokers and non-smokers, defined as whether or not they reported smoking in the last 30 days, differed along several measures of eating-disorders related concerns. These tests were carried while controlling for both sex and age, as these two variables have been found associated with eating disorder symptoms, and smoking. Based on literature results, the expectation was that there would be an effect for both sex and smoking status, but that the effect of smoking status would be considerably larger in girls than boys. That is, it was predicted an interaction between sex and smoking status. For example, Austin and Gortmaker (2001) and French et al. (1994) found that girls who dieted and who were

more concern about their weight initiated smoking at a higher rate than those who did not and these findings were not observed on boys.

The second hypothesis of the study was to test whether, after controlling for sex and age, smokers and non-smokers differed on their reported weight control expectancies. It was hypothesized that adolescent smokers, and particularly female smokers, would report higher weight control expectancies than non-smokers. That is, it was predicted an interaction between sex and smoking status. For example, Cavallo et al. (2006) found that among daily smokers, females were more likely than males to believe that smoking controls their weight and had more concerns about gaining weight as a result of quitting smoking. While for males those with higher BMI were more likely to use smoking to control their weight.

The third hypothesis of the study was to test a posited moderation effect of smoking expectancies and fears of gaining weight. It was hypothesized that smoking expectancies predicts smoking but only among those who have weight concerns (or that weight concerns predicts smoking to the extent that the individual has the expectancy that smoking helps control weight). This moderation effect was tested for both actual smoking rates and the perceived likelihood that one will smoke in the future. Tamez and Cepeda-Benito (2006) evaluated the moderation effect of fear of becoming fat on the relationship between appetite and weight control expectancies and smoking in a mixed sample of adult smokers and nonsmokers from Spain. They found that the fear of becoming fat moderated the relationship between weight control expectancies and smoking rate for both men and women. That is, the relationship between weight control

expectancies and smoking behavior was stronger for those with high levels of fear becoming fat than for those with low fear of becoming fat.

The fourth and final hypothesis was that the relationship between smoking and weight concerns or fear of becoming fat is mediated by the expectancy that smoking helps keep the weight down. For example, Copeland and Carney (2003) found that smoking expectancies for appetite and weight control mediated the relationship between dietary restraint and disinhibition and smoking status. They also reported that women who were higher in dietary restraint and disinhibition had stronger beliefs about appetite and weight control properties of cigarettes and were more likely to smoke than those who were lower in dietary restraint and disinhibition.

CHAPTER II

METHOD

Participants

A total of 311 Spaniards adolescents between the ages of 13 and 18 years old ($M = 15.20$; $SD = 1.63$) participated in this study. The participants were attending public schools in Alicante, Spain. Of the 311 adolescent who participated, 137 (44.1%) were males and 174 (55.9%) were females. Body Mass Indices (BMIs; pounds/height) were between 11.43 and 34.61 ($M = 20.82$; $SD = 3.05$).

Twenty three percent of the participants were smokers. Among the adolescents that were smokers, 4.2% began to smoke between the ages of 8 and 9 years, 7.0% between ages 10 and 11, 28.2% between the ages of 12 to 13, 39.4% between the ages of 14 and 15 and a 21.1 % after the age of 15 years of age. In terms of smoking rates, 40% indicated that they smoked less than a cigarette per day, 30% reported smoking 1 cigarette per day, 26% smoked between 2 to 5 cigarettes per day, and 4.3 % consumed between 6 to 10 cigarettes per day.

Fifty four percent of all the participants reported that their parents smoked; while 72.9% reported that they had friends who smoked. Eighteen percent of the adolescents reported that they were dieting with the purpose of losing weight, and 71.1 % reported that they engaged in some type of exercise to lose weight.

Measures and Materials

Demographic Questionnaire

Participants began by completing a brief demographic questionnaire that assessed their sex, age, height and weight, dieting, and level of exercise activity. The height and weight estimates were used to calculate Body Mass Index (BMIs; kg/m²) for each participant.

Smoking History

Smoking History was assessed using selected scales of the Global Youth Tobacco Survey (GYTS, 2002). This survey was developed by WHO and Center for Disease Control (CDC) to track tobacco use among youth across countries using a common methodology and core questionnaire. The items used in the present study were those that ask about smoking use, adolescent openness to smoke in the future and adolescent's exposure to smoking in their environment. These items formed the following variables:

1. Smoking Status: Smoking status was measured with the question, "*During the past 30 days (one month), on how many days did you smoke cigarettes?*" Those who reported any smoking in the last month were classified as smokers.
2. Smoking Rate: Smoking rate was the product of the number of days the participant reported smoking in the previous 30 days multiplied by the number of cigarettes the participant smoked on the days he or she smoked.
3. Perceived Likelihood of Smoking: This variable was the sum of three probably "yes-no" (1-0) questions (range 0 to 3):

- a. If one of your best friends offered you a cigarette, would you smoke it?
- b. At any time during the next 12 months do you think you will smoke a cigarette?
- c. Do you think you will be smoking cigarettes 5 years from now?

Smoking Consequences- Questionnaire-Spanish (Cepeda-Benito & Reig-Ferrer, 2000)

The SCQ-Spanish is a 40 item measure scored on a 10-point scale from 0 to 9. This questionnaire contains eight scales which are Negative Affect Reduction, Stimulation/State Enhancement, Health Risks, Taste/Sensorimotor, Social Facilitation, Weight Control, Craving/Addiction and Boredom Reduction. For the present study, the items were paraphrased so that nonsmokers could answer the questions. That is, the wording was modified to assess the respondents' beliefs about the consequences and effects of cigarette smoking in general rather than as it applied to them. In addition, seven items were added to the questionnaire. Only the Weight Control Expectancy (WCE) subscale was used for the purposes of the present study. The Cronbach's alpha coefficient for the WCE subscale was .89.

Weight Control Measures

The Eating Disorder Inventory-2 (EDI-2; Garner, 1991) is a 91-item self-report measure that assesses a variety of symptoms typical of eating disorders and personality characteristics that are associated with eating disorders. The 11 scales of the EDI are Drive for Thinness, Bulimia, Body Dissatisfaction, Interpersonal Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears, Asceticism, Impulse Regulation, and Social Insecurity. For the purpose of this study, the

four scales that best discriminate between clinical and non-clinical population will be used (Garner, 1991): Drive for Thinness, Bulimia, Body Dissatisfaction, and Ineffectiveness. Drive for Thinness assesses preoccupation with weight and an extreme concern with dieting. The Bulimia subscale examines the presence of episodes of binge eating followed by a desire to purge by self-induced vomiting. The Body Dissatisfaction subscale measures dissatisfaction with body shape and believing that certain body parts are too large or too fat. The Ineffectiveness subscale examines feelings of inadequacy and worthlessness. Responses are measured using 6-point likert scale in which participants choose the frequency in which the statements occur. These statements are always, usually, often, sometimes, rarely, or never and are assigned a score of 0 to 3. Items are summed up to obtain a score for each of the subscales. A higher score reflect a more prevalent trait and the lower indicates a less prevalent trait. The EDI-2 has demonstrated a strong reliability, internal consistency, and convergent validity with other measures of eating pathology and is one of the most widely used measure for the assessment of eating disorders (Garner & Garfinkel, 1997; Stormer & Thompson, 1996; Striegel-Moore et al., 2000; Yates, 1989). Internal consistency data reported for the EDI indicate that Cronbach's alpha ranged from .82 to .90 (Eberly & Eberly, 1985). Test-retest reliability correlation coefficients for each of the scales, except Maturity Fears, are reportedly .80 or higher over a 3 week period and range from .47 to .76 across a 1 year period (Crowther, Lilly, Crawford & Shepherd, 1992). Discriminant validity has been demonstrated with anorexia versus control groups (Garner, Olmstead, & Polivy, 1983). The original version of the EDI was translated to Spanish by Guimera Querol &

Torrubia Beltri (1987) and the more recent and expanded second edition (EDI-2; Garner, 1991) has been translated by TEA (Garner, 1998). In the current sample, coefficient alpha ranged from was .70 to .90 for the subscales and the total scale (Drive for Thinness= .88, Body Dissatisfaction= .90, Bulimia= .70, Ineffectiveness= .85, Total Scale= .92).

Goldfarb Fear of Fat Scale (GFFS; Goldfarb, Dykens & Gerrard, 1985) is a 10-item self-report measure reflecting over-concern or fear of fatness. The GFFS is used as a unidimensional measure. Participants rate each statement on a 4-point Likert-type scale from 1 = 'very untrue' to 4 = 'very true'. Items include "My biggest fear is becoming fat" and "I feel like all of my energy goes into controlling my weight." Total responses are summed for the GFFS score (10 = no fear of fat, 40 = extreme fear of fat). Internal consistency coefficient alpha was 0.85 (Goldfarb, Dykens & Gerrard, 1985) with test-retest reliability of 0.88 after 1 week (Corcoran & Fischer, 1987). The GFFS was translated to Spanish validated by Warren, Gleaves, Cepeda-Benito, Fernandez (2002) in a Spanish sample. Warren et al. reported an Cronbach's alpha of .88 in the Spanish sample. In the current sample, the coefficient alpha obtained was of .87.

Procedures

The experimental procedures for data collection followed the recommendations of the Texas A&M University Internal Review Board for the use of human subjects. Texas A&M University recognizes the ethical principles, considerations, and concerns expressed in the report of the National Commission for the Protection of Human

Subjects of Biomedical and Behavioral Research entitled *Ethical Principles and Guidelines for the Protection of Human Subjects of Research (The Belmont Report)*.

Data collection procedures were implemented as requested by Spanish school administrators. Parents were allowed to object to their children's participation by signing and returning a decline-to-participate form sent home by the test administrators. Graduate students and professional staff from the University of Alicante, Spain explained the nature and purpose of the study to school students. Children were informed that their grades would not be affected by their decision to participate or not participate in the study, and that no other benefits or negative consequences would be associated with their decision to participate or not to participate. They were told that teachers will never know who had assented or declined to participate because records will not be kept regarding who had agreed or declined to participate in the study. Those who declined to participate in the study were allowed to use the data-collection time for reading or studying. Children were allowed to participate in the study if their parents signed an informed consent prior to test administration. Informed consents were kept separated from the data and children were reminded not to write their names on any of the questionnaires.

Data Analysis

Analyses were conducted using Statistical Package for the Social Sciences software (Version 16.0, 2007). In addition to descriptive analyses we conducted bivariate correlation analyses between all the variables of interest. To examine

differences between smokers and non-smokers, males and females, and the interaction between smoking status and sex, we conducted a MANOVA and an ANOVA.

To examine moderation effects we conducted two multiple regression analyses to predict, respectively, smoking rate and perceived likelihood of smoking. The predictor variables were fear of fatness, weight control expectancies, and the interaction between these two terms. To minimize multicollinearity introduced by the interaction term, we performed the regression analyses with all predictor variables centered (i.e., put in deviation score form by subtracting from each individual score the variable's mean) and with fear of fatness, weight control expectancies (see Aiken & West, 1991). These analyses were conducted while controlling for sex and age. All variables were simultaneously entered in the model.

To examine mediation effects we conducted multiple regression analyses as follows. In the first step, we predicted smoking rate from fear of fatness while controlling for age and sex. In the second step, we predicted the mediator, or weight control expectancies while controlling for age and sex. Finally, we tested whether the mediator predicted smoking rate while controlling for age, sex and fear of fatness. This analysis also served to assess whether the effect of fear of fatness went away after controlling for the indirect effect of weight control expectancies. Finally, to test whether the mediation or indirect effect was statistically significant, we used the Sobel test (Sobel, 1982) as recommended by MacKinnon, Lockwood, Hoffman, West, & Sheets (2002). These analyses were repeated for the prediction of smoking rate and perceived likelihood of smoking in the future.

CHAPTER III

RESULTS

Bivariate Correlations

Descriptive information for the sample is presented in Table 1. Bivariate correlations are presented in Table 2. The analysis indicated that smoking rate and perceived likelihood of smoking in the future were statistically significantly related to age, social influences, weight control expectancies and fear of fatness. Moreover, weight control expectancies correlated positively with fear of fatness, and age. Fear of fatness was significantly related to sex, BMI, and the EDI-2 total scores and its subscales (Drive for Thinness, Bulimia, Body Dissatisfaction, and Ineffectiveness). BMI was related to age.

Hypothesis 1

The first hypothesis was to test whether adolescent smokers and non-smokers, (defined as whether or not they reported smoking in the last 30 days) differed along several measures of eating-disorders-related concerns. Given that eating disorder symptoms were correlated with age and sex, and the nonsmokers were overrepresented in the sample, we matched each smoker to a nonsmoker on sex, age, and school grade by selecting at random from all the possible matches available in the sample. With this matched sample, we performed a multivariate analysis of variance with smoking status and sex as between subject factors, and the fear of fatness and the four subscales of the EDI-2 (Drive for Thinness, Bulimia, Body Dissatisfaction, and Ineffectiveness) as

independent variables (see Table 3). Evaluation of the homogeneity of variance-covariance matrices and normality assumptions underlying MANOVA did not reveal any substantial anomalies, and the *a priori* level of significance was set at .05. The overall multivariate effect was not statistically significant for smoking status (Wilk's $\Lambda = .940$; $F(5, 150) = 1.93$, $p < .09$; $\eta^2 = .065$), was statistically significant for sex (Wilk's $\Lambda = .916$; $F(5, 150) = 2.74$, $p < .02$; $\eta^2 = .084$), and was not significant for the interaction term (Wilk's $\Lambda = .991$; $F < 1$). *A priori* planned comparisons at the univariate level revealed that smokers and nonsmokers differed only on fear of fatness, ($F[1, 154] = 5.70$, $p < .018$, $\eta^2 = .036$). For sex, females reported greater endorsement of Fear of Fatness ($F[1, 154] = 7.60$, $p < .007$, $\eta^2 = .047$), Drive for Thinness ($F[1, 154] = 8.33$, $p < .004$, $\eta^2 = .051$), and Body Dissatisfaction ($F[1, 154] = 6.03$, $p < .015$, $\eta^2 = .038$).

Hypothesis 2

The second hypothesis of the study was to test whether smokers and non-smokers differed on their reported weight control expectancies. A two-way ANOVA was conducted on smokers and their matched controls using sex and smoking status as the independent variables and weight control expectancies as the dependent variable (see Table 4). There was a statistically significant main effect for smoking status ($F[1, 154] = 13.43$, $p < .001$, $\eta^2 = .08$), no significant effect for sex, $F < 1$, and a marginal interaction effect ($F[1, 154] = 3.05$, $p < .09$, $\eta^2 = .02$).

Hypothesis 3

The third hypothesis of the study was to test the posited moderation effect between smoking expectancies and fears of fatness to predict smoking rate and

perceived likelihood of smoking in the future, respectively. The analyses were conducted using multiple regression analyses with all the variables centered around their mean. The variables were entered in three separate steps to more easily assess the change in variance explained at each step. Age and sex were entered first in the analysis, weight control expectancies and fear of fatness were entered in the second step, and the product of these two terms was the interaction term and entered in the last step. For the prediction of smoking rate, the results showed that the overall model was statistically significant and accounted for about 10% of the variance, adjusted $R^2 = .102$, $F(5, 305) = 8.07$, $p < .001$. However, entering the interaction term did not add any explanatory power to the model (see Table 5). At the second step, with all the variables but the interaction term in the model, only age, $\beta = .203$, $t(306) = 3.57$, $p < .001$, and weight control expectancies, $\beta = .188$, $t(306) = 3.26$, $p < .001$, were significant predictors of smoking rate.

For the prediction of perceived likelihood of smoking in the future, the results showed that the overall model was statistically significant and accounted for about 12% of the variance, adjusted $R^2 = .116$, $F(5, 305) = 9.16$, $p < .001$. However, entering the interaction term did not add any explanatory power to the model (see Table 6). At the second step, with all the variables but the interaction term in the model, age, $\beta = .208$, $t(306) = 3.71$, $p < .001$, fear of fatness, $\beta = .144$, $t(306) = 2.53$, $p < .01$, and weight control expectancies, $\beta = .181$, $t(306) = 3.16$, $p < .002$, were significant predictors of perceived likelihood of smoking in the future.

Hypothesis 4

The fourth hypothesis tested whether weight control expectancies mediated the relationship between fear of fatness and smoking rate, as well as between fear of fatness and perceived likelihood of smoking in the future. To test the mediation model, we first established that there was a relationship between the hypothesized mediated variable (fear of fatness) and the predicted variable (smoking rate or perceived likelihood of smoking in the future, respectively). All relationships were assessed while controlling for age and sex. We conducted multiple regression analysis entering the independent variables in two steps. At the first step we entered age and sex; at the second step we entered fear of fatness. For the prediction of smoking rate, the results showed that the overall model was statistically significant and accounted for about 8% of the variance, adjusted $R^2 = .077$, $F(3, 307) = 9.65$, $p < .001$. Entering fear of fatness in the second step improved the model significantly, $\Delta R^2 = .02$, $\Delta F(1, 307) = 6.62$, $p < .01$.

Once it was established that there was a relationship between the mediated variable and the predicted variable, we proceeded to test whether the mediated variable predicted the proposed mediator (i.e., weight control expectancies). We conducted a hierarchical multiple regression analysis entering the independent variables in two steps. At the first step we entered age and sex; at the second step we entered fear of fatness. For the prediction of weight concerns smoking expectancies the results showed that the overall model was statistically significant and accounted for about 13% of the variance, adjusted $R^2 = .126$, $F(3, 307) = 15.31$, $p < .001$. More importantly, entering fear of

fatness in the second step improved the model significantly, $\Delta R^2 = .04$, $\Delta F(1, 307) = 15.89$, $p < .001$.

Once it was established that there was a relationship between the mediated variable and the predicted variable, as well as between the posited mediated and mediator variables, we proceeded to test whether the mediator predicted smoking rate and whether fear of fatness continued to predict smoking rate with the mediator included in the model. Thus a multiple regression analysis was conducted entering all the variables simultaneously into the equation. For the prediction of smoking rate, the results showed that the overall model was statistically significant and accounted for about 10% of the variance, adjusted $R^2 = .105$, $F(4, 306) = 10.12$, $p < .001$. Analyses of the univariate weights showed that whereas weight control expectancies continued to be a significant predictor of smoking rate, $\beta = .188$, $t(306) = 3.26$, $p < .001$, fear of fatness was no longer a significant predictor, $\beta = .102$, $t(306) = 1.84$, $p = .07$. To test whether the mediation or indirect effect was statistically significant, that is whether the reduction of the effect of the fear of fatness on smoking rate was statistically significant, we used the Sobel test (Sobel, 1982) as recommended by MacKinnon et al. (2002). The results of the Sobel test ($z = 2.49$, $p < .01$) confirmed that overall weight control expectancies was a significant mediator of the effect of weight concerns in predicting smoking rates.

The above analyses were repeated to test a hypothesized mediation effect of weight control expectancies on the effect between fear of fatness and perceived likelihood of smoking in the future. After controlling for age and sex, fear of fatness was a significant predictor of perceived likelihood of smoking in the future. The overall

model was statistically significant and accounted for about 9% of the variance, adjusted $R^2 = .093$, $F(3, 307) = 11.58$, $p < .001$. Entering fear of fatness in the second step improved the model significantly, $\Delta R^2 = .03$, $\Delta F(1, 307) = 10.59$, $p < .01$. Given that we had already established the relationship between the hypothesized mediated and mediator variables in the previous mediation analyses, we proceeded to assess the relationship between weight control expectancies and perceived likelihood of smoking in the future, as well as the hypothesized reduction in the ability of fear of fatness to predict perceived likelihood of smoking in the future. The results showed that the overall model was statistically significant and accounted for about 12% of the variance, adjusted $R^2 = .119$, $F(4, 306) = 11.43$, $p < .001$. Analyses of the univariate weights showed that both weight control expectancies, $\beta = .181$, $t(306) = 3.16$, $p < .001$, as well as fear of fatness, $\beta = .140$, $t(306) = 2.53$, $p = .01$, continued to be significant predictors of perceived likelihood of smoking in the future. Nonetheless, the Sobel test indicated that the reduction of the effect of the fear of fatness on perceived likelihood of smoking in the future was statistically significant ($z = 2.46$, $p < .01$).

CHAPTER IV

CONCLUSION AND SUMMARY

Past research indicated that both weight concerns (e.g., French et al., 1994; Honjo & Siegel, 2003) and the expectation that smoking controls weight gain (e.g., Camp et al., 1993; Klesges et al., 1997) contribute to smoking initiation in adolescents, particularly girls (e.g., Charlton and Blair, 1984, Camp et al., 1993; Cavallo et al., 2006). However, not all studies agree on the extent to which restrictive dieting and other correlates eating disorder symptoms contribute to the decision to smoke (e.g., Harakeh, 2010; Wang, et al., 1998). Moreover, although researches have posited the smoking expectancies may moderate (e.g., Tamez & Cepeda-Benito, 2006) or mediate (e.g., Copeland and Carney (2003) the relationship between weight concerns and smoking, no studies have been conducted with Spanish adolescent smokers. Therefore, the purpose of this study was to expand the understanding of the relationship of weight control expectancies, weight concerns, smoking initiation and perceived likelihood of smoking in the future in a sample of Spanish adolescents. More specifically, the study wanted to test if weight concerns moderated the relationship between weight control expectancies and smoking rate, as well as self perceived likelihood of smoking in the future. In addition, we wanted to examine if weight control expectancies mediated the relationship between weight concerns and smoking rate, as well as self-perceived likelihood of smoking in the future. This section presents the interpretation of major findings discussed in the context of previous research and the *a priori* stated hypotheses.

Smoking Behavior

In this study the prevalence of smoking among Spanish adolescents was lower than that reported by the DGPND (2009). That is, in our sample, 23.1% of children between the ages of 13 to 18 reported having smoked in the previous 30 days. By comparison, the DGPND reported 32.4% for children within the same age range. Yet, the prevalence of smoking in our sample was higher than the prevalence of smoking rate in adolescents in the US (about 19.5% according to the CDC, 2010a). In regards to gender differences, our findings were that the smoking prevalence was similar for girls (22.4%) and for boys (23.4%) in the sample. These findings are consistent with Garcia et al. (2010), who found that Spanish females and males reported similar patterns of smoking use. In contrast, the survey conducted by the DGPND found that the prevalence of smoking use during the last 30 days was higher for females (33.8%) than for males (30.9%). Nonetheless, it should be noticed that in this survey females were just a 2.9 % higher than boys in smoking use in the last 30 days.

Hypothesis 1

The first hypothesis of this study was to test whether adolescent's smokers and non smokers differed as a function of weight concerns and eating disorder measures. It was hypothesized that smokers would have greater weight concerns and eating disorder symptoms than nonsmokers. It was further hypothesized that this effect would be particularly pronounced in female smokers. In order to test these hypotheses participants were first matched according to age, sex, and school grade to reduce bias due to the underrepresentation of smokers and correlations between sex and age with eating

symptoms. Our findings revealed no significant differences for smokers and non smokers in the overall eating disorders concerns regardless of the gender of the participants. These findings contradict previous reports that associate smoking with eating disorder symptoms. For instance, Nieri et al. (2005) found that a negative body image among adolescents was associated with smoking (see also Anzengruber et al., 2006; Dansky et al., 2000). Our results were more similar to those of Harakeh et al. (2010) who found that restrained eating was not predictive of smoking onset.

On the other hand, when examining individual factors making up overall eating disorders concerns, there was a significant effect of smoking status of fear of fatness. The significance of fear of fatness and smoking provides support for other studies that have found associations in weight concern and smoking behavior (Austin & Gortmaker, 2001; French et al., 1994). These effects appear to be a robust finding related to the association between eating disorder symptoms and smoking initiation. For example, Potter et al. (2004) conducted a meta-analysis of 55 studies and found that weight concerns predicted smoking among adolescents. Similarly, Mayhew et al. (2000) reviewed empirical studies of predictors of transitions in stages of smoking progression, and found that concerns over body weight was strongly associated with increased smoking rate in adolescents.

Our findings also revealed gender differences for weight concern as females showed higher levels of fear of fatness, drive for thinness and body dissatisfaction than males. These findings lend support to previous studies that have found that females are more concern about their weight than males do (French et al., 1994). In addition, Ambwani et

al. (2007) found that females reported higher levels of fear of fatness than males in a college sample of Spaniards.

Hypothesis 2

The second hypothesis of this study evaluated whether smokers and nonsmokers showed differences in terms of weight control expectancies. In addition, we wanted to explore if the interaction of gender and smoking status had an effect on this measure. Previous studies have found that adolescents who have weight control expectancies are more likely to be smokers. The results from the present study appear to support these findings (Camp, 1993; Charlton & Blair, 1984; Klesges et al., 1997; Robinson et al., 1997; Wang et al., 1998). In our sample, adolescents who were smokers had higher means in the weight control expectancy scale as compared to those that were non smokers.

We did not find an effect on smoking expectancies for gender nor for the interaction between smoking and gender. This suggests, that unlike what happens in adults (e.g., Reig-Ferrer & Cepeda-Benito, 2000) females seem to hold similar rather than stronger beliefs that smoking helps control their weight. The lack of significant gender differences is consistent with previous studies that found that female adolescents are more likely to agree with the belief or expectancy that smoking helps control weight (Cavallo et al., 2010). These researchers reported that heavy smokers were more likely to endorse weight-control expectancies irrespective of gender. On the other hand, our findings contradict several studies that found gender differences among adolescents (Camp, 1993; Charlton & Blair, 1984; Klesges et al., 1997; Robinson et al., 1997; Wang

et al., 1998). For example Charlton and Blair found that the belief that smoke helps to keep weight down was more prevalent in girls. Cavallo et al. (2006) also found that female adolescents were more likely to believe than smoking helps to control weight.

It should be noted that studies that found gender differences in terms of weight control expectancies or beliefs about smoking relied mainly in one single item to explore this question. In contrast, the present study and Cavallo et al. (2010) utilized the Weight Control Expectancy Scale of the Smoking Consequences Questionnaire. This raises the question about the extent to which methodological issues could explain why Cavallo et al. and us failed to find gender effects on weight control expectancies, but the other studies found the effect. Indeed, Potter et al. (2004) pointed out discrepancies in findings in the studies reviewed in the meta-analysis they conducted. They suggested that most of these discrepancies were related to variables definitions and measurement differences, as well as to populations under study, and inclusion or exclusion of covariates.

Hypothesis 3

The purpose of this hypothesis was to test a possible moderator effect of smoking expectancies and fear of fatness on smoking rate and perceived likelihood of smoking in the future. We wanted to explore if weight control expectancies would predict smoking rate and perceived likelihood of smoking in the future but principally for those who have higher levels of weight concerns as measured by fear of fatness. This effect was found in adults (Tamez & Cepeda-Benito, 2006) but has never been tested in adolescents.

Our findings did not provide support for the moderator role of weight concerns in the relationship between weight control expectancies and either smoking rate or perceived likelihood of smoking in the future. For smoking rate, only the effect of weight control expectancies was significant, indicating that fear of fatness did not account for significant amount of variance in the prediction of smoking above and beyond smoking expectancies. The significant prediction of smoking rate is parallel with previous research that have found that the belief that smoking helps to control weight predicted smoking status (Camp et al., 1993; Cavallo et al., 2006; Charlton & Blair, 1984; Klesges et al., 1997; Robinson et al., 1997). On the other hand, other studies have reported the weight concerns are associated with smoking (e.g., Austin & Gortmaker, 2001; Cawley et al., 2004, French et al., 1994). It is unclear what these studies would have found had they controlled for weight control expectancies.

The interaction term as a potential moderator effect of smoking rate was not significant indicating that the interaction between weight control expectancies and fear of fatness did not add significantly to the explanation of the variance in level of smoking rate. That is, fear of fatness did not alter either the direction or strength of the relationship that existed between weight control expectancies and smoking rate. This indicates that for this sample weight control expectancies do not depend of the levels of fear of fatness to predict smoking rate.

For perceived likelihood of smoking in the future, results from the analysis conducted did not support the hypothesized role of fear of fatness as a moderator. In this analysis, both weight control expectancies and fear of fatness accounted for variance in

perceived likelihood of smoking in the future. The significant effect for weight control expectancies on perceived likelihood of smoking in the future is consistent with previous findings that suggested weight control expectancies predict smoking onset (Harakeh, et al., 2010, Klesges et al., 1997). Similarly, the effects of fear of fatness on perceived likelihood of smoking in the future provides support for studies that have shown a relationship between weight concerns and smoking onset (French et al., 1994, Honjo & Siegel, 2003).

To our knowledge, no previous research have examined the moderator role of fear of fatness on the relationship between weight control expectancies and smoking in adolescents. However, our findings contradict Tamez and Cepeda-Benito (2006) study. The authors found that fear of fatness moderated the relationship between weight control expectancies and smoking rate for females and males in an adult sample. A possible explanation for the lack of findings may be related to individual characteristics of the sample such as age and experience with smoking. Previous research with adults has suggested that the more dependent and heavy smokers, tend to have more positive and more specific expectancies about the consequences of smoking than do less dependent smokers or nonsmokers (Copeland et al., 1995; Reig-Ferrer & Cepeda-Benito, 2000). The participants in Tamez and Cepeda (2006) study were also adult smokers. Thus, having the expectancy that smoking would help to control weight based on own experiences may make a difference on whether or not those who have weight concerns smoke or not. This pattern of results may suggest that during smoking initiation, smoking expectancies mediate rather than moderate the relationship between weight

concerns and smoking. However, once the person is a smoker and confirms through experience that smoking controls the appetite and keeps body weight down, weight control expectancies are relevant only (mostly) if the person fears weight gain in the absence of smoking.

Hypothesis 4

The purpose of this hypothesis was to evaluate if weight control expectancies mediated the relationship between weight concerns and smoking rate and perceived likelihood of smoking in the future in adolescents from Spain. In other words, we hypothesized that the reason why weight concerns predicts smoking initiation in children is because those with weight concerns are more likely to develop the expectancy that smoking controls body weight and smoke to fulfill their expectancies. The analysis for smoking rate as a dependent variable supported a mediational model. In this model, the relation between weight concerns and smoking rate (*path c*) was significant, weight control expectancies had also a significant effect on smoking rate (*path b*). Finally, the results of the mediator model were significant (*paths a and b*). This indicates that adolescents who have weight concerns are more likely to have the expectancy that smoking helps to control their weight and as a result they are more likely to smoke. For this sample, it would suggest that adolescents from Spain who have fear of fatness are more likely to smoke because they have the expectancy that smoking would help them control their weight. Therefore, they would use smoking as a mechanism to avoid gaining weight or to deal with the fears of gaining weight. To the best of our knowledge there are not other studies that have examined the mediator effect of fear of fatness

between weight concerns and smoking rate in adolescents. However, Copeland and Carney (2003) examined weight control expectancies as a mediator in the relationship between dietary restraint and eating disinhibition and smoking behavior. Dietary restraint and eating disinhibition has been associated with eating disorders such as bulimia and binge eating disorder (Fairburn & Cooper, 1993; White & Grilo, 2007). Our study and Copeland and Carney findings, suggest that weight control expectancies may be the link that can explain the relationship between weight concerns and smoking behavior. Therefore, although they measured another domain of eating disorder symptoms, both their results and our results suggest that weight control expectancies have an important effect between weight concerns and smoking behavior.

Regarding perceived likelihood of smoking in the future the mediational model was also significant. In this model, the relation between fear of fatness and perceived likelihood of smoking in the future was significant (*path c*), and weight control expectancies had a significant effect on perceived likelihood of smoking in the future (*path b*). Finally, the results of the mediator model were significant (*paths a and b*), suggesting that adolescents who have weight concerns are likely to have the expectancy that smoking helps to control their weight and as a result they are more likely to say the plan to continue smoking.

Taken together, the significant findings confirming a mediational effect on smoking rate and perceived likelihood of smoking in the future are indicative that weight control expectancies is an important area of study when analyzing the relationship of weight concern and smoking behavior. The mediator model adds important information

to the existing literature of weight concerns and smoking. Specifically, weight control expectancies seem to serve as the chain between weight concerns and smoking.

Implications, Limitations and Future Research

There were several limitations of this study. The first limitation is the cross-sectional nature of this study. Cross-sectional analysis does not allow us to conclude the direction of causal effects between weight concerns and smoking behavior or weight control expectancies and smoking behavior. Therefore, causality cannot be inferred from the observed associations in the present study. The second limitation of this study includes a small sample size, particularly given that the smoking rates we found were lower than what we expected. The fact that this study relied on self-report measures to assess smoking behavior also generates some disadvantages as there might be some bias in individual responses to underreport. As has been suggested in past research, adolescent smokers may underrate the amount of cigarettes they smoke or even deny cigarette use (Murray & Perry, 1987).

The results of the present study have implications for theory, research and practice with regard to the role of weight control and smoking behavior. Expectancy theory has been used to understand different psychological phenomena such as drinking behavior and smoking. One of the theoretical objectives of this study was to understand the impact of weight control expectancies in smoking behavior particularly when weight concerns are present. The findings of this study provide support to the theory of smoking expectancies. The current study also enhances knowledge to limited research available on smoking behavior and its relationship to weight control expectancies and

weight concerns and smoking in Spanish adolescents. In fact, no other studies have been published examining this construct in this population. Additionally this study expands its findings to a different cultural group, providing more information regarding its manifestation in this population. Theoretically, this extension is noteworthy as the findings suggest that weight control expectancies can be applied to other cultural groups.

The findings of this research study also suggest that emphasis should be placed upon further developing or improving the measures used to address weight control expectancies as well as eating disorders symptoms or weight concerns when trying to study its association with smoking. The use of validated instruments in order to assess these constructs is suggested. Additionally, some of the findings of this study were inconsistent with previous research suggesting that the relationship between smoking, weight control expectancies and weight concerns is still unclear and warrants further investigation. For instance, in this study weight concern was not found to be a moderator while a previous study suggested a moderator model for adults. Also, our findings did not reveal gender differences contrary to other research studies. Given the mixed results concerning the impact of weight concerns and weight control expectancies in relation to smoking as well as in regards to gender differences further investigation is recommended. The measure of potential moderators and mediators between weight concerns and weight control expectancies in the relationship with smoking rate and smoking initiation are encouraged. Longitudinal studies examining these constructs in Spanish samples would allow us to examine causal relationships and have a better

understanding of weight control, weight control expectancies and smoking behavior in this population.

In terms of implications for clinical practice, since findings implied that, among Spanish teens, being concerned about your weight is a risk for smoking, prevention programs should also target body image concerns. Also it suggests that weight concerns might impede cessation and prevention efforts. Therefore, psychoeducational programs, counseling services for smokers as well as for those that may have weight concerns regardless of their smoking status should emphasize healthy methods to manage weight.

Summary

Smoking prevalence rates among adolescents continue to be a public concern, not only in the US but also in countries such as Spain. In fact, the prevalence rates of smoking rate in Spanish adolescents are higher than US. Eating disorders among Spanish girls have also increased considerably in Spain in recent years as discussed above. Risk factors of eating disorders include body image, fear of fatness, and drive for thinness. These factors may impel some adolescents to use unhealthy mechanisms to control weight such as smoking. Weight control expectancies or the belief that smoking helps to control weight have been found to be associated with smoking behavior, particularly in females (Cavallo et al., 2006, 2010; Charlton & Blair, 1984; Camp et al., 1993; Kendzor et al., 2007; Klesges et al., 1997; Robinson et al., 1997; Wang et al., 1998). However, most of the studies examining weight concerns and its relationship with smoking have been done with US samples. An investigation about the relationship between smoking expectancies and smoking behaviors in other populations is necessary.

The purpose of this study was to explore the relationship between weight concerns, weight control expectancies, smoking rate and perceived likelihood of smoking in the future. Findings from this study supported previous research that has found associations among these variables. A mediational role between the relationship of fear of fatness and smoking rate and likelihood of smoking in the future, suggested that weight control expectancies may be the causal chain between these two variables, supporting previous findings (Copeland & Carney, 2003). To our knowledge there are not studies that have examined weight control expectancies, weight concerns and smoking in adolescents from Spain. Therefore, future research is needed to better understand the degree and direction of the impact of these variables in smoking behavior. The inclusion of weight management components and the discussion of body image in prevention and smoking cessation programs are recommended. Similarly, further research into this area is necessary in order to better understand the relationship between these constructs and provide recommendations for the future.

REFERENCES

- Academy for Eating Disorders (AED). (2006). *Prevalence of eating disorders*. Retrieved from http://aedweb.org/eating_disorders/prevalence.cfm
- Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Ajzen, I. (1988). *Attitudes, personality, and behavior* (Vol. 175). Homewood, IL: Dorsey Press.
- Ambrosi-Randic, N. (2000). Perception of current and ideal body size in preschool age children. *Perceptual and Motor Skills, 90*, 885-889.
- Ambwani, S., Warren, C. S., Gleaves, D. H., Cepeda-Benito, A., & Fernandez, M. C. (2007). Culture, gender, and assessment of fear of fatness. *European Journal of Psychological Assessment, 24*(2), 81-87. doi: 10.1027/1015-5759.24.2.81
- American Psychiatric Association (APA). (1994). *DSM-IV: Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- American Psychiatric Association (APA). (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Anzengruber, D., Klump, K. L., Thornton, L., Brandt, H., Crawford, S., Fichter, M. M., . . . Bulik, C. M. (2006). Smoking in eating disorders. *Eating Behaviors, 7*(4), 291-299. doi: 10.1016/j.eatbeh.2006.06.005.
- Apter, A., Shah, M.A., Lancu, I., Abramovith, H., Weizman, A., & Tyano, S. (1994).

- Cultural effects on eating attitudes in Israeli subpopulations and hospitalized anorectics. *Genetic, Social, and General Psychology Monographs*, 120(1), 83-99.
- Austin, S.B. & Gortmaker, S. L. (2001). Dieting and smoking initiation in early adolescent girls and boys: A prospective study. *American Journal of Public Health*, 91, 446-450.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review*, 84, 191-215.
- Bauman, K.E., & Chenoweth, R.L. (1984). The relationship between the consequences adolescents expect from smoking and their behavior: A factor analysis with panel data. *Journal of Applied Social Psychology*, 14(1), 28-41.
- Bean, M. K., Mitchell, K. S., Speizer, I. S., Wilson, D. B., Smith, B. N., & Fries, E. A. (2008). Rural adolescent attitudes toward smoking and weight loss: relationship to smoking status. *Nicotine and Tobacco Research*, 10, 279-286.
- Brandon, T. H., & Baker, T. B. (1991). The smoking consequences questionnaire: The subjective expected utility of smoking in college students. *Psychological Assessment*, 3(3), 484-491.
- Buddeberg-Fischer, B., Bernet, R. Sieber, M. Schmid J. Buddeberg, C. (1996). Epidemiology of eating behavior and weight distribution in 14-19 year-old Swiss students. *Acta Psychiatrica Scandinavia*, 93, 296-304.
- Camp, D. E., Klesges, R. C., & Relyea, G. (1993). The relationship between body weight concerns and adolescent smoking. *Health Psychology*, 12(1), 24-32.
- Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework

- for personality-social, clinical, and health psychology. *Psychological Bulletin*, 92, 111-135.
- Cashel, M. L., Cunningham, D., Landeros, C., Cokley, K. O., Muhammand, G. (2003). Socio-cultural attitudes and symptoms of bulimia: Evaluating the SATAQ with diverse college groups. *Journal of Consulting Psychology*, 50, 287-296.
- Castro, J., Toro, J., Salamero, M., & Quimera, E. (1991). The Eating attitudes test: Validation of the Spanish version. *Psychological Assessment*, 7, 175–190.
- Cavallo, D. A., Duhig, A. M., McKee, S., & Krishnan-Sarin, S. (2006). Gender and weight concerns in adolescent smokers. *Addictive Behavior*, 31, 2140-2146.
- Cavallo, D. A., Smith, A. E., Schepis, T. S., Desai, R., Potenza, M. N., & Krishnan-Sarin, S. (2010). Smoking expectancies, weight concerns, and dietary behaviors in adolescence. *Pediatrics*, 126(1), 66-72.
- Cawley, J., Markowitz, S., & Tauras, J. (2004). Lighting up and slimming down: The effects of body weight and cigarette prices on adolescent smoking initiation. *Journal of Health Economics*, 23(2), 293-311.
- Center for Disease Control and Prevention (CDC). (2010a). Cigarette use among high school students — United States, 1991–2009. *Morbidity and Mortality Weekly Report*, 59 (26):797-798. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5926a1.htm>
- Center for Disease Control and Prevention (CDC). (2010b). Vital signs: current cigarette smoking among adults aged ≥ 18 years-United States, 2009. *Morbidity and Mortality Weekly Report*, 59(35):1135–1140. Retrieved from

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5935a3.htm>

Cepeda-Benito, A., & Reig Ferrer, A. (2000). Smoking consequence questionnaire-

Spanish. *Psychology of Addictive Behaviors*, 14(3), 219-230.

Charlton, A., & Blair, V. (1984). Smoking and weight control in teenagers. *Public*

Health, 98, 277-281.

Chassin, L., Presson, C. C., Bensenberg, M., Corty, E., Olshavsky, R.W., & Sherman,

S.J. (1981). Predicting adolescents' intentions to smoke cigarettes. *Journal of Health and Social Behavior*, 22, 445-455.

Chassin, L., Presson, C.C., & Sherman, S.J. (1984). Cognitive and social influence factors in adolescent smoking cessation. *Addictive Behaviors*, 9, 383-390.

Chassin, L., Presson, C.C., Sherman, S.J., & Edwards, D.A. (1991). Four pathways to young-adult smoking status: Adolescents social-psychological antecedents in a midwestern community sample. *Health Psychology*, 10, 409-418.

Chinchilla, A. (1981). *La Anorexia Nerviosa*. Barcelona: Ferrer Internacional.

Coates, T.J., & Li, V. (1983). Does smoking cessation lead to weight gain? The experience of asbestos-exposed shipyard workers. *American Journal of Public Health*, 72, 1303-1304.

Cohen, L. M., McCarthy, D.M., Brown, S.A., & Myers, M.G. (2002). Negative affect combines with smoking outcome expectancies to predict smoking behavior over time. *Psychology of Addictive Behaviors*, 16, 91-97.

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), 484-494.
- Copeland, A. L., & Carney, C. E. (2003). Smoking expectancies as mediators between dietary restraint and disinhibition and smoking in college women. *Experimental and Clinical Psychopharmacology*, 11(3), 247-251.
- Corcoran, K., & Fischer, J. (1987). *Measures for clinical practice: A sourcebook*. New York: The Free Press.
- Coogan, P.F., Adams, M., Geller, A, A.C., Brooks, D., Miller, D.R., Lew, R.A., & Kohn, H.K. (1998). Factors associated with smoking among children and adolescents in Connecticut. *American Journal of Preventive Medicine*, 15(1), 17-24.
- Cooley, E., & Toray, T. (2001). Disordered eating in college freshman women: A prospective study. *Journal of American College Health*, 49, 229-235.
- Crow, S. J., Peterson, C. B., Swanson, S. A., Raymond, N. C., Specter, S., Eckert, E.D., & Mitchell, J. E. (2009). Increased mortality in bulimia nervosa and other eating disorders. *American Journal of Psychiatry*, 166, 1342-1346.
- Crowther, J. H., Lilly, R. S., Crawford, P. A., & Shepherd, K. L. (1992). The stability of the eating disorders inventory. *International Journal of Eating Disorders*, 12, 97-101.
- Dansky, B. S., Brewerton, T. D., & Kilpatrick, D. G. (2000). Comorbidity of bulimia nervosa and alcohol use disorders. Results from the national women's study. *International Journal of Eating Disorder*, 27, 180-190.

Davison, K. K., Markey, C. N., & Birch, L. L. (2000). Etiology of body satisfaction and weight concerns among 5-year-old girls. *Appetite*, 35, 143-151.

Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPND). (1999).

Encuesta domiciliaria sobre consumo de drogas. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad y Consumo. Available online: <http://www.pnsd.msc.es/Categoria2/observa/pdf/encu.pdf>

Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPND). (2003).

Encuesta domiciliaria sobre abuso de drogas. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad y Consumo. Available online: <http://www.pnsd.msc.es/Categoria2/observa/pdf/domiciliaria2003.pdf>

Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPND). (2004).

Encuesta estatal sobre uso de drogas en enseñanzas secundarias. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad y Consumo. Available online: <http://www.pnsd.msc.es/Categoria2/observa/pdf/escolar2004.pdf>

Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPND). (2008).

Encuesta estatal sobre uso de drogas en enseñanzas secundarias. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad y Consumo. Available online: <http://www.pnsd.msc.es/Categoria2/observa/pdf/escolar2008.pdf>

Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPND). (2009). Informe

- 2009 Del Observatorio Español sobre Drogas, Situación y tendencias de los problemas de drogas en España: Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad y Consumo. Available online: www.dianova.es/docs/publico/oed-2009.pdf
- Downey, K. K., & Kilbey, M. M. (1995). Relationship between nicotine and alcohol expectancies and substance dependence. *Experimental & Clinical Psychopharmacology*, 3, 174-182.
- Eberly, C. C., & Eberly, B. W. (1985). A review of the eating disorder inventory. *Journal of Counseling and Development*, 64, 285.
- Edwards, W. (1954). The theory of decision making. *Psychological Bulletin*, 51, 380-417.
- Ershler, J., Leventhal, H., Flemming, R., & Glynn, K. (1989). The quitting experience for smokers in sixth through twelfth grades. *Addictive Behaviors*, 14, 365-378.
- Fairburn, C. G., & Cooper, Z. (1993). The eating disorder examination. In C.G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (12th ed., pp. 317-360). New York: Guilford.
- Fernández-Aranda, F. (2003). Treatment of eating disorders in Spain: A historical perspective. In G. M. Ruggiero (Ed.), *Eating disorders in the mediterranean area: An exploration in transcultural psychology*. (pp. 99-110). Hauppauge, NY: Nova Science Publishers.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

- Flay, B. R., Hu, F. B., & Richardson, J. (1998). Psychosocial predictors of different stages of cigarette smoking among high school students. *Preventive Medicine*, 27, A9-A18.
- French, S. A., Perry, C. L., Leon, G. R., & Fulkerson, J. A. (1994). Weight concerns, dieting behavior, and smoking initiation among adolescents: A prospective study. *American Journal of Public Health*, 84(11), 1818-1820.
- Gandarillas, A., Febrel, C., Galán, C., León, C., Zorilla, B., & Bueno, R. (2004). Population at risk for eating disorders in a Spanish region. *Eating Weight Disorders*, 9, 179-185.
- García-Rodríguez, O., Suárez-Vázquez, R., Secades-Villa, R., & Fernández-Hermida, J., R. (2010). Smoking risk factors and gender differences among Spanish high school students. *Journal of Drug Education*, 40(2), 143-156.
- Garner, D.M. (1991). *Manual for the Eating Disorders Inventory-2 (EDI)*. Odessa, FL: Psychological Assessment Resources.
- Garner, D. M. (1998). *Manual del EDI 2: Inventario de Trastornos de la Conducta Alimentaria*. Madrid: TEA Ediciones, S. A.
- Garner, D.M., & Garfinkel, P.E. (1979). The eating attitudes test: An index of the symptoms of anorexia nervosa. *Psychological Medicine*, 9, 273-279.
- Garner, D. M., & Garfinkle, P.E. (1997). (Eds.). *Handbook of treatment for eating disorders*. New York: Guildford Press.
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a

- multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2(2), 15-34.
- Gilman, S., Rende, R., Boergers, J., D.B., A., Buka, S. L., Clark, M. A., . . . Niaura, R. S. (2009). Parental smoking and adolescent smoking initiation: An intergenerational perspective on tobacco control. *Pediatrics*, 123(2), 274-281.
- Gleaves, D., Cepeda-Benito, A., Williams, T., Cororve, M., B., Fernandez, M. C. & Vila, J. (2000). Body image preferences of self and others: A comparison of Spanish and American male and female college students. *Eating Disorders*, 8, 269-282.
- Goldfarb, L. A., Dykens, E. M., & Gerrard, M. (1985). The goldfarb fear of fat scale. *Journal of Personality Assessment*, 49(3), 329-332.
- Goldman, M. S. (1999). Expectancy operation: Cognitive neural models and architectures. In I. Kirsch (Ed.), *How expectancies shape experience* (pp. 41-63). Washington DC: American Psychological Association.
- Gordon, N.P. (1986). Never smokers, tries and current smokers: Three distinct target groups for school-based antismoking programs. *Health Education Quarterly*, 13(2), 163-180.
- Grunbaum, J., Kann, L., Kinchen, S.A., William, B., Ross, J.G., Lowry, R., & Kolbe, L. (2002). Youth risk behavior surveillance (YRBS). United States, 2001. *Morbidity and Mortality Weekly Report*, 51 (25), 1-183.
- Gual P., Pérez-Gaspar., M., Martínez, M. A., Lahortiga, F., De Irala J, Cervera., S. (2003). Self-esteem, personality and eating disorders: Baseline assessment of a

- prospective population-based cohort. *International Journal of Eating Disorder*, 31(3), 261-273.
- Guimera, E., & Torrubia, R. (1987). Adaptación española del eating disorder inventory (EDI) en una muestra de pacientes anoréxicas. *Anales Psiquiatría*, 3, 185-1990.
- Hansen, W. B., Collins, L. M., Johnson, C. A., & Graham, J. W. (1985). Self-initiated smoking cessation among high school students. *Addictive Behavior*, 10, 265-271.
- Harakeh, Z., Engels, R. C. M. E., Monshouwer, K., & Hanssen, P. F. (2010). Adolescent's weight concerns and the onset of smoking. *Substance Use & Misuse*, 45(12), 1847-1860.
- Harrison, D. (2000). Television viewing, fat stereotyping, body shape standards, and eating disorder symptomatology in grade school children. *Communication Research*, 27, 617-640.
- Hine, D. W., Tilleczek, K., Lewko, J., McKenzie-Richer, A., & Perreault, L. (2005). Measuring adolescent smoking expectancies by incorporating judgments about the expected time of occurrence of smoking outcomes. *Psychology of Addictive Behaviors*, 19(3), 284-290.
- Hoek, H., van Hoeken, D., Katzman, M. (2003). Epidemiology and cultural aspects of eating disorders: A review. In M. Maj, K. Halmi, J. J. López-Ibor (Eds.). *Eating disorders*, (pp. 75-138). Chichester, UK: John Wiley & Sons.
- Hoek, H. W. (2006). Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry*, 19(4), 389-394.
- Honjo, K., & Siegel, M. (2003). Perceived importance of being thin and smoking

- initiation among young girls. *Tobacco Control*, 12, 289-295.
- Hyland, M.E. (1988). Motivational control theory: An integrative framework. *Journal of Personality and Social Psychology*, 55, 642-651.
- Irving, L. M. (2001). Media exposure and disordered eating: Introduction to the special section. *Journal of Social and Clinical Psychology*, 20, 259-269.
- Kaltiala-Heino, R., Kautiainen, S. K., Virtanen, S., Rimpelä, A., Rimpelä, M. (2003). Has the adolescents' weight concern increased over 20 years? *European Journal of Public Health*, 13; 4-10.
- Katzman, M.A., & Lee, S.. (1997). Beyond body image: The integration of feminist and transcultural theories in the understanding of self-starvation. *International Journal of Eating Disorders*, 22, 385-394.
- Keel, P. K. & Herzog, D. B. (2004). Long-term outcome, course of illness, and mortality in anorexia nervosa, bulimia nervosa, and binge-eating-disorder. In T.D. Brewerton, *Clinical Handbook of Eating Disorders. An Integrated Approach* (pp. 97-116). New York: Marcel Dekker.
- Kendzor, D. E., Copeland, A. L., Stewart, T. M., Businelle, M. S., & Williamson, D. A. (2007). Weight-related concerns associated with smoking in young children. *Addictive Behaviors*, 32(3), 598-607
- Killen, J. D., Taylor, C. B., Hayward, C., Haydel, K. F., Wilson, D. M., Hammer, L., . . . Strachowski, D. (1996). Weight Concerns Influence the Development of Eating Disorders: A 4-Year Prospective Study. *Journal of Consulting and Clinical Psychology*, 64(5), 936-940.

- Kilbourne, J. (1994). Still killing us softly: Advertising and the obsession with thinness. In P. Fallon, M. A. Katzman, & S.C. Wooley (Eds.), *Feminist perspectives on eating disorders* (pp. 395-418). New York: The Guilford Press.
- Klesges, R. C., Elliot, V. W., & Robinson, L. A. (1997). Chronic dieting and the belief that smoking controls body weight in a biracial, population-based adolescent sample. *Tobacco Control*, 6, 89-94.
- Klesges, R. C., Meyers, A. W., Klesges, L. M., & LaVasque, M. E. (1989). Smoking, body weight, and their effects on smoking behavior: A comprehensive review of the literature. *Psychological Bulletin*, 106(2), 204-230.
- Klesges, R. C., & Robinson, L. A. (1995). Predictors of smoking onset in adolescent African American boys and girls. *Journal of Health Education*, 26 (2), 1-7.
- Kirsch, I. (1985). Response expectancy as a determinant of experience and behavior. *American Psychologist*, 40, 1189-1202.
- Kirsch, I. (1990). *Changing expectancies: A key to effective psychotherapy*. Pacific Grove: Brooks/Cole.
- Kirsch, I. (1999). Response expectancy: An introduction. In I. Kirsch (Ed.), *How expectancies shape experience* (pp.3-14). Washington, DC: American Psychological Association.
- Koval, J. J, Pederson L. L., Zhang, X., Mowery, P., & McKenna, M. (2008) Can young adult smoking status be predicted from concern about body weight and self-reported BMI among adolescents? Results from a ten-year cohort study. *Nicotine and Tobacco Research*, 10 (9): 1449-1455.

- Levitt, H. D., (2003). Drive for thinness and fear of fat: Separate yet related constructs? *Eating Disorders*, 11, 221-223.
- Lopez-de-Andres, A., Carrasco-Garrido, P., Hernández-Barrera, V., Gil-de-Miguel, A., Jiménez-Trujillo, I., & Jiménez-García, R. (2010). Hospitalization trends in Spanish children and adolescents with eating disorders (1998–2007). *Appetite*, 55, 147–151.
- Lucas, A. R., Crowson, C.S., O’Fallon, W. M., & Melton, L.J. (1999). The ups and downs of anorexia nervosa. *International Journal of Eating Disorders*, 26, 397-405.
- MacCorquodale, K. M., & Meehl, P. E. (1954). Preliminary suggestions as to a formalization of expectancy theory. *Psychological Review*, 60, 125-129.
- Maddux, J. E. (1999). Expectancies and the social-cognitive perspective: Basic principles, processes, and variables. In I. Kirsch (Ed.), *How expectancies shape experience* (pp. 17-40). Washington, DC: American Psychological Association.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83-104.
- Maldonado-Molina, M. M., Komro, K. A., & Prado, G. (2007). Prospective association between dieting and smoking initiation among adolescents. *American Journal Of Health Promotion*, 22(1), 25-32.
- Marcia, J. E. (1983). Some directions for the investigation of ego development in early adolescent. *Journal of Early Adolescence*, 3, 215-223.

- Mayhew, K. P., Flay, B. R., & Mott, J. A. (2000). Stages in the development of adolescent smoking. *Drug and Alcohol Dependence*, 59, (Supple. 1), S61-S81.
- Murray, D. M., & Perry, C. L. (1987). The measurement of substance use among adolescents: When is the "bogus pipeline" method needed? *Addictive Behaviors*, 12(3), 225-233.
- Morandé, G., Celada, J. & Casas, J. (1999). Prevalence of eating disorders in Spanish school-age population. *Journal of Adolescent Health*, 24, 212-219.
- Morgan, M., & Grube, J. W. (1989). Adolescent cigarette smoking: A developmental analysis of influences. *British Journal of Developmental Psychology*, 7, 179-189.
- National Cancer Institute (NCI). (2010). *Cancer Trends Progress Report 2009/2010 Update*, Bethesda, MD: National Institutes of Health. Retrieved from: <http://progressreport.cancer.gov>.
- Neumark-Sztainer, D., Story, M., Dixon, L. B., & Murray, D. M. (1998). Adolescents engaging in unhealthy weight control behaviors: Are they at risk for other health-compromising behaviors? *American Journal of Public Health*, 88(6), 952-955.
- Nieri, T., Kulis, S., Keith, V. M., & Hurdle, D. (2005). Body image, acculturation, and substance abuse among boys and girls in the southwest. *The American Journal of Drug and Alcohol Abuse*, 31, 617-639.
- Novotny, T. E. & Giovino, G. A. (1998). Tobacco Use. In R. Bronwson, P. Remington, & J.Davis (Eds.), *Chronic Disease Epidemiology and Control*, (2nd ed., pp. 117-148). Washington, DC: American Public Health Association.
- Pate, J. E., Pumariega, A. J., Heater, C., & Garner, D. M. (1992). Cross-cultural patterns

- in eating disorders: A review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 31, 802-809.
- Pederson, L. L., Koval, J. J., & O'Connor, K. (1997). Are psychosocial factors related to smoking in grade 6 students? *Addictive Behaviors*, 22(2), 69-81.
- Pirie, P. L., McBride, C. M., Hellerstedt, W. L., & Jeffrey, R. W. (1992). Smoking cessation in women concerned about weight. *American Journal of Public Health*, 82(9), 1238-1243.
- Pomerleau, C. S., Berman, B.A., Gritz, E.R., Marks, J. L., & Goeters, S. (1994). Drug and alcohol abuse review. In R. R. Watson (Ed.), *Addictive behaviors in women* (Vol. 5, pp. 39-70). Totowa, NJ: Humana Press, Inc.
- Potter, B. K., Pederson, L. L., Chan, S. S. H., Aubut, J. L., & Koval, J. J. (2004). Does a relationship exist between body weight, concerns about weight, and smoking among adolescents? An integration of the literature with an emphasis on gender. *Nicotine & Tobacco Research*, 6(3), 397-425.
- Raich, R. M., Deus, J., Muñoz, M. J., & Pérez, O. (1991). Evaluación de la preocupación por la figura en una muestra de adolescentes catalanas. *Revista de Psiquiatría de la Facultad de Medicina de Barcelona*, 18(5), 210-220.
- Raich, R. M., Mora-Giral, M., & Marroquín, H. (2000). Tratamiento cognitive-conductual en alteraciones alimentarias: Una experiencia grupal. *Psicología Contemporánea*, 7(1), 48-55.
- Raich, R. M., Mora-Giral, M., Sánchez-Carracedo, D., Torras, J., Viladrich, M. C., Zapater, L., Mancilla, J. M., Vázquez, R., & Álvarez-Rayón, G. (2001). A

- cross-cultural study on eating attitudes and behaviors in two Spanish-speaking countries: Spain and Mexico. *European Eating Disorders Review*, 9, 53-63.
- Raich, R. M., Rosen, J. C., Deus, J., & Pèrez, O. (1992). Eating disorder symptoms among adolescents in the United States and Spain: A comparative study. *International Journal of Eating Disorders*, 11(1), 63-72.
- Raich, R. M., Torras-Clasaró, J., & Figueroa, M. (1996). Estudio de la imagen corporal y su relación con el deporte en una muestra de estudiantes universitarios. *Análisis y Modificación de Conducta*, 23, 405-424.
- Raich, R. M., Torras-Clasaró, J., & Mora-Giral., M. (1997). Análisis estructural de las variables influyentes en la aparición de alteraciones de la conducta alimentaria. *Psicología Conductual*, 5, 55-70.
- Robinson, L. A., Klesges, R. C., Zbikowski, S. M., & Glaser, R. (1997). Predictors of risk for different stages of adolescents smoking in a biracial sample. *Journal of Consulting and Clinical Psychology*, 65, 653-662.
- Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology*, 91, 93-114.
- Rose, J., Chassin, L., Presson, C. C., & Sherman, S. J. (1996). Prospective predictors of quit attempts and smoking cessation in young adults. *Health Psychology*, 15, 1-8.
- Rotter, J. B. (1954). *Social learning and clinical psychology*. New York: Prentice-Hall.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied*, 80(1), 1-28.

- Ruiz-Lázaro, P. M. (2003). Epidemiology of eating behavior disorders in Spain/Epidemiología de los trastornos de la conducta alimentaria en España. *Actas Españolas de Psiquiatría*, 31(2), 85-94.
- Ruiz-Lázaro, P. M., Alonso, J. P., Comer, P., Lobo, A., & Velilla, M. (2005). Prevalence of eating disorders in Spain: A survey on a representative sample of adolescents. *Trends in Eating Disorders Research*, 85-108.
- Ruiz-Lázaro, P. M., Alonso, J. P., Velilla, J. M., Lobo, A., Martín, A., Paumard, C., & Calvo, A. (1998). Study of the prevalence of eating disorders in adolescents of Zaragoza/Estudio de prevalencia de trastornos de la conducta alimentaria en adolescentes de Zaragoza. *Revista de Psiquiatría Infanto-Juvenil*, 3, 148-162.
- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological Methodology 1982* (pp.290-312). San Francisco: Jossey-Bass.
- Soundy, T. J., Lucas, A. R., Suman, V. J., Melton L. J. (1995). Bulimia nervosa in Rochester, Minnesota from 1980 to 1990. *Psychological Medicine*, 25: 1065-1071.
- Steptoe, A., & Wardle, J. (1996). The European health and behaviour survey: The development of an international study in health psychology. *Psychology and Health*, 11, 49-73.
- Stice, E., Schupak-Neuberg, E., Shaw, H. E., & Stein, R. I. (1994). Relation of media exposure to eating disorder symptomatology: An examination of mediating mechanisms. *Journal of Abnormal Psychology*, 103, 836-840.

- Striegel-Moore, R. H., Schreiber, G. B., Lo, A., Crawford, P., Obarzanek, E., & Rodin, J. (2000). Eating disorder symptoms in a cohort of 11 to 16-year-old black and white girls: The NHLBI growth and health study. *International Journal of Eating Disorders*, 27, 49-66.
- Stormer, S. M., & Thompson, J. K. (1996). Explanations of body image disturbance: A test of maturational status, negative verbal commentary, social comparison, and socio-cultural hypothesis. *International Journal of Eating Disorders*, 19, 193-202.
- Sullivan, P. F. (1995). Mortality of anorexia nervosa. *American Journal of Psychiatry*, 152, 1073-1074.
- Tamez, J., & Cepeda-Benito, A. (2006, September). *The moderating effects of fear of being fat and level of distress on smoking outcome expectancies and smoking rate on Smoking Outcome Expectancies and Smoking Rate*. Oral presentation at the *National Hispanic Science Network on Drug Abuse's Sixth Annual Conference*, Scottsdale, AZ.
- Tickle, J. J., Hull, J. G., Sargent, J. D., Dalton, M. A., & Heatherton, T. F. (2006). A structural equation model of social influences and exposure to media smoking on adolescent smoking. *Basic and Applied Social Psychology*, 28(2), 117-129.
- Tiggemann, M., & Pickering, A. (1996). Role of television in adolescent women's body dissatisfaction and drive for thinness. *International Journal of Eating Disorders*, 20(2) 199-203.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting*

beauty: Theory, assessment, and treatment of body image disturbance.

Washington, DC: American Psychological Association,

Tolman, E. C. (1932). *Purposive behavior in animals and man*. New York: Appleton-Century-Crofts.

Toro, J. (2003). Epidemiology of eating disorders and related questions in Spain. In G. M. Ruggiero (Ed.), *Eating disorders in the Mediterranean area: An exploration in transcultural psychology*. (pp. 93-98). Hauppauge, NY: Nova Science Publishers.

Toro, J., Cervera, M. & Perez, P. (1988). Body shape, publicity and anorexia nervosa. *Social Psychiatry and Psychiatric Epidemiology*, 23, 132-136.

Toro, J., Gomez-Peresmitre, G., Sentis, J., Valles, A., Casulà, V., Castro, J., . . . Rodriguez, R. (2006). Eating disorders and body image in Spanish and mexican female adolescents. *Social psychiatry and psychiatric epidemiology*, 41(7), 556-565.

Toro, J., & Vilardell, E. (1987). *Anorexia Nerviosa*. Barcelona: Martínez Roca.

Urbán, R., & Demetrovics, Z. (2010). Smoking outcome expectancies: A multiple indicator and multiple cause (MIMIC) model. *Addictive Behaviors*, 35(6), 632-635.

US Department of Health and Human Services (USDHHS). (1994). *Preventing tobacco use among young people: A report of the Surgeon General*. Atlanta, Georgia: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic

Disease Prevention and Health Promotion, Office on Smoking and Health.

U.S. Department of Health and Human Services (USDHHS). (2004). *Health Consequences of Smoking*. Atlanta, GA: USDHHS, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Vartanian, L., Herman, C. P., Polivy, J. (2005). Implicit and explicit attitudes towards fatness and thinness: The role of the internalization of societal standards. *Body Image*, 2, 373-381.

Villanti, A., Boulay, M., & Juon, H. (2010). Peer, parent and media influences on adolescent smoking by developmental stage. *Addictive Behaviors*, 36(1-2), 133-136.

Wang, M. Q., Fitzhugh, E. C., Eddy, J. M., & Westerfield, R. C. (1998). School dropouts' attitudes and beliefs about smoking. *Psychological Reports*, 82, 984-986.

Warren, C. W., Gleaves, D. H., Cepeda-Benito, A., & Fernández, M. C. (2002, November). *Psychometric properties of Spanish versions of the Sociocultural Attitudes Towards Appearance Questionnaire, Goldfarb Fear of Fat Scale, & the Body Shape Questionnaire*. Poster session presented at the annual meeting of the Eating Disorder Research Society, Charleston, SC.

White, M. A. & Grilo, C. M. (2007). Symptom severity in obese women with binge eating disorder as a function of smoking history. *International Journal of Eating Disorders*, 40, 77-81.

Wood, K. C., Becker, J. A., & Thompson, J. K. (1996). Body image dissatisfaction in preadolescent children. *Journal of Applied Developmental Psychology, 17*, 85-100.

Yates, A. (1989). Current perspectives on the eating disorders: I. History, psychological and biological aspect. *Journal of the American Academy of Child and Adolescent Psychiatry, 28*, 813-828.

APPENDIX A

Table 1
Frequency Distribution of Adolescent Demographic Characteristics

	Frequency	%
Males	137	44.1
Females	174	55.9
Total smokers	71	23.1
Female smokers	39	22.4
Male smokers	32	23.4
Dieting to prevent weight gain	55	17.7
Females dieting to prevent weight gain	41	24.1
Males dieting to prevent weight gain	14	10.5
Females exercising to lose weight	108	63.2
Males exercising to lose weight	111	81.0
Parents smokers	164	53.8
Friends smokers	77	27.1

Table 2
Pearson Moment Correlations between Dependent Variables and Independent Variables

Variable	1	2	3	4	6	7	8	10	11	12	13
1. Smoking Rate	--										
2. Likelihood	.77	--									
3. Age	.32	.27	--								
4. BMI	.11	.07	.17	--							
6. Gender	.01	.05	.06	-.16	--						
7. WCE	.29	.29	.32	.17	.04	--					
8. GFFS	.15	.22	.04	.18	.15	.21	--				
10. Drive-for-Thinness	.03	.11	.04	.20	.20	.19	.70	--			
11. Bulimia	.01	.06	-.03	-.01	-.05	.10	.26	.25	--		
12. Body Dissatisfaction	.04	.09	.05	.26	.16	.16	.56	.69	.36	--	
13. Ineffectiveness	.02	.08	-.06	.08	.01	.15	.37	.35	.41	.55	--

Note: BMI: Body Mass Index; WCE: Weight Control Expectancies; GFFS: Goldfarb Fear of Fat Scale.
 Correlation greater than .16 and .13 are significant at the $p < .01$ and $p < 0.5$ level, respectively (all 2-tailed tests).

Table 3
Analysis of Variance of Weight concerns by Gender and Smoking Status

Variable	Gender	Smoker		95% Confidence Interval			
		No	Yes	No		Yes	
		Mean (SD)	Mean (SD)	LB	UP	LB	UP
GFFS	Female	17.9 (5.89)	19.6 (6.94)	16.1	19.7	17.8	21.3
	Male	14.6 (4.00)	17.5 (6.66)	12.5	16.6	15.5	19.6
Drive for Thinness	Female	4.5 (5.88)	4.3 (5.56)	3.1	5.9	2.8	5.7
	Male	1.8 (2.70)	2.4 (4.34)	0.9	3.4	0.8	4.1
Bulimia	Female	0.7 (1.46)	1.29 (2.81)	0.4	1.3	0.7	1.9
	Male	0.9 (2.15)	1.26 (1.76)	0.2	1.6	0.5	1.9
Body Dissatisfaction	Female	5.3 (5.98)	5.6 (6.95)	3.6	6.9	3.9	7.3
	Male	2.5 (3.50)	3.9 (5.27)	0.6	4.5	1.9	5.8
Ineffectiveness	Female	1.7 (2.28)	2.2 (3.69)	0.7	2.6	1.2	3.1
	Male	1.6 (2.38)	1.9 (4.04)	0.5	2.7	0.8	3.0

Note: GFFS= Goldfarb Fear of Fat Scale

Table 4
Two-way Analysis of Variance of Weight Control Expectancies by Sex and Smoking Status

Variable	Gender	Smoker		95% Confidence Interval			
		No	Yes	No	Yes	No	Yes
		M (SD)	M (SD)	LB	UP	LB	UP
WCE	Female	10.9(9.91)	13.9 9.02	7.9	13.8	11.0	16.9
	Male	8.5 (9.11)	17.1 11.8	5.1	11.8	13.7	20.5

Note: WCE= Weight Control Expectancies

Table 5
Model Summary of the Multiple Regression Analysis for the Prediction of Smoking Rate

Steps	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.258 ^a	.066	.060	2.33298	.066	10.966	2	308	.000
2	.342 ^b	.117	.105	2.27663	.050	8.719	2	306	.000
3	.342 ^c	.117	.102	2.28036	.000	.000	1	305	.987

Note: a) Sex and age; b) adding fear of fatness and weight control expectancies; and c) adding the interaction between fear of fatness and weight control expectancies

Table 6
Model Summary of the Multiple Regression Analysis for the Prediction of Perceived Likelihood of Smoking in the Future

Steps	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.266 ^a	.071	.065	2.05910	.071	11.720	2	308	.000
2	.361 ^b	.130	.119	1.99880	.059	10.433	2	306	.000
3	.361 ^c	.131	.116	2.00145	.001	.190	1	305	.663

Note: a) Sex and age; b) adding fear of fatness and weight control expectancies; and c) adding the interaction between fear of fatness and weight control expectancies.

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